SOIL SURVEY OF PULASKI COUNTY, ARKANSAS

By E. B. DEETER, of the U. S. Department of Agriculture, in Charge, and A. H. MEYER and T. H. BENTON, of the Arkansas Agricultural Experiment Station

DESCRIPTION OF THE AREA

Pulaski County lies approximately in the center of Arkansas, and about 100 miles west of the Mississippi River. Its shape is that of a triangle with very irregular sides. The Arkansas River divides the county diagonally from northwest to southeast. Little Rock, the State capital, is near the center of the county. The county comprises an area of 779 square miles, or 498,560 acres.

The county includes three principal topographic divisions: (1) the alluvial lowlands along the Arkansas River and the southeastern part of the county; (2) the undulating uplands lying mainly east of the Missouri Pacific Railroad; and (3) the rest of the county consisting of isolated hills and long narrow ridges with rolling upland between.

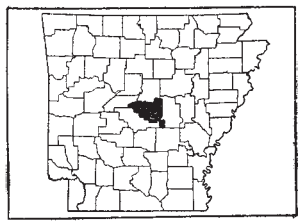

FIG. 21.—Sketch map showing location of the Pulaski County area, Arkansas.

The alluvial lowlands are flat, are partly subject to flooding, and contain a great many oxbow lakes of various sizes, sloughs, and bayous, and numerous ridges of but a very few feet in height.

The undulating uplands range up to about 100 feet above the lowlands in elevation. In the rest of the county the topography varies a great deal in detail. North of the Arkansas River the ridges are narrow and low, some less than 50 feet above the intervening lowlands, others more than 200 feet higher. They are straight or curved. The intervening rolling areas range from less than a mile to 5 or more miles in width. They are not strongly rolling as a rule and in places are nearly level for considerable areas. South of the Arkansas the ridges are less regular in width, length, or height than north of it. The intervening rolling lands are considerably rougher, large areas being best described as rough.

The range in elevation in the entire county is about 830 feet. The lowest point, 225 feet above sea level, is on the Arkansas River where it leaves the county, and the highest, 1,055 feet, lies on the crest of Shinall Mountain.

The mountainous parts of the county are decidedly rough to hilly in topography, especially along the major ridges. There is much smoother, gently sloping and gently rolling land in the valleys and on the tops of some of the broader ridges, as in the vicinity of Camp Pike. There are also flat areas on the floors of some of the valleys through the highlands. South of the Arkansas River the ridges have

an approximate northwest-southeast trend as far west as the western end of Shinall Mountain; westward from this point the trend is more nearly east and west. A series of pinnacles or cone-shaped mountains, known as Maumelle Pinnacles, extend in a nearly east-and-west direction from the Arkansas River near the mouth of Maumelle Creek. These pinnacles are visible from considerable distances.

The drainage of all streams in Pulaski County eventually reaches the Arkansas River. Maumelle, Little Maumelle, and Fourche Creeks receive most of the drainage which flows in a generally eastward direction to the river from the mountains.

The early settlers of Pulaski County came largely from the Southeastern States, especially the Carolinas, Tennessee, and Georgia, but there was also a fair representation from many Northern States. An important Polish settlement now centers about Marche. The most densely populated rural section is in the Arkansas River bottoms, where there are many negroes. This is followed by the region south and southwest of Little Rock, known as the Coastal Plain. The settlement in the mountainous region is largely confined to the valleys.

The 1920 census reports the urban population of the county as 79,190, which represents the cities of Little Rock and North Little Rock. The rural population (including towns having less than 2,500 inhabitants) is given as 30,274. The urban population has increased rapidly, while the rural population has shown a very slow increase.

Little Rock is the county seat and also the capital of the State and the largest and most important city in Pulaski County. It is a large wholesale distributing point and has a number of varied industries. Just across the Arkansas River is North Little Rock, containing large cottonseed-oil mills and the Missouri Pacific Railroad shops. Some of the smaller towns include Jacksonville, Sweet Home, Wrightsville, Woodson, Farrell, Alexander, and Roland.

The Missouri Pacific Railroad, from St. Louis to Hot Springs and Texas points, passes through Little Rock. One branch road goes west from Little Rock to Fort Smith and another extends south to Pine Bluff and Alexander. A short line connects Little Rock and Camp Pike. The Chicago, Rock Island & Pacific Railway extends from Memphis through Little Rock to Oklahoma City. Another line connects Little Rock with El Dorado and Louisiana points. A branch of the St. Louis Southwestern Railway connects Little Rock with the main line at Altheimer, near Pine Bluff.

A system of excellent roads radiate from Little Rock. Some of these are paved, and all are kept in a good state of repair.

Little Rock and North Little Rock are good markets for all kinds of country produce.

CLIMATE

The climatic conditions in Pulaski County in general are favorable to agriculture. There is ample rainfall—the mean annual precipitation is 49.98 inches—and this is fairly well distributed throughout the growing season. The precipitation in the driest year on record was 32.38 inches and in the wettest 75.54 inches. Occasionally corn, grassland, sorgo, truck, and sometimes cotton are injured by drought during July and August, and excessive rainfall delays planting in

some years, but such extreme conditions are not of common occurrence.

The climate is mild; no monthly mean temperature is below 40° F. The mean annual temperature is 61.5° F., and the absolute range over the 43-year period for which records are available is from −12° F. to 106° F.

The average date of the last killing frost in spring is March 18, and of the first in the fall November 13, making an average growing season of 240 days. The latest killing frost on record occurred on April 25, and the earliest on October 22.

The following table, compiled from the records of the Weather Bureau station, shows the normal monthly, seasonal, and annual temperature and precipitation at Little Rock:

Normal monthly, seasonal, and annual temperature and precipitation at Little Rock

[Elevation, 286 feet]

Month	Temperature			Precipitation			
	Mean	Absolute maximum	Absolute minimum	Mean	Total amount for the driest year (1896)	Total amount for the wettest year (1882)	Snow, average depth
	°F.	°F.	°F.	*Inches*	*Inches*	*Inches*	*Inches*
December	43.5	78	5	4.24	2.17	1.33	1.2
January	40.6	78	−8	4.79	8.45	8.17	2.5
February	44.1	87	−12	4.18	2.05	12.74	1.4
Winter	42.7	87	−12	13.21	12.67	22.24	5.1
March	52.7	89	16	4.94	1.59	6.25	.5
April	62.7	94	28	4.51	2.61	5.59	T.
May	70.4	94	39	5.10	1.49	15.91	.0
Spring	61.9	94	16	14.55	5.69	27.75	.5
June	77.2	102	51	4.09	3.00	1.96	.0
July	80.6	106	60	3.99	.44	5.17	.0
August	79.2	105	52	3.74	3.59	3.17	.0
Summer	79.0	106	51	11.82	7.03	10.30	.0
September	73.1	101	41	3.26	1.95	3.03	.0
October	62.9	93	27	2.55	2.92	6.05	.0
November	51.5	84	10	4.59	2.12	6.17	.1
Fall	62.5	101	10	10.40	6.99	15.25	.1
Year	61.5	106	−12	49.98	32.38	75.54	5.7

AGRICULTURE

Agriculture has been the principal industry of Pulaski County since its earliest settlement, and is destined to hold an important place in the future.

In 1880, 172,320 acres, or 36.2 per cent of the area of the county, was classed as land in farms by the census, of which 75,486 acres, or 43.8 per cent, represented improved land in farms (consisting mainly of cultivated land, land lying fallow, improved pasture land, land in mowings, and land in gardens, orchards, and vineyards). In 1910 exactly half of the area of the county was classified as land

in farms, and the proportion of improved land was given as 53.3 per cent. In 1920, 241,831 acres, or 48.5 per cent of the area of the county, represented the land in farms, and 150,419 acres, or 62.2 per cent of the farm land was improved. During this 40-year period there has been an almost uninterrupted increase in the area of improved farm land.

The number of farms increased from 2,154 in 1880 to 4,750 in 1910, and decreased to 4,495 as reported in 1920. The average size of farms was 80 acres in 1880, 50.3 acres in 1910, and 53.8 acres in 1920.

The land not classified as land in farms is principally woodland. In this county the greatest part of the woodland consists of steep slopes of the uplands, often stony, a large part being either topographically unsuited to cultivation or untillable by reason of its thin soil and stony nature. There are other important forested areas in the flatwoods and uncleared stream bottoms and benches, most of which could be cultivated, although the expense of clearing, protecting from overflow, and providing adequate drainage, coupled with the rather low productiveness of the more poorly drained areas, would probably eliminate something like a fourth or a third of this area from use under present economic conditions. Much of the wet land might be used for rice, if irrigation water could be supplied cheaply enough, and all of it could be used for pasture and hay land, probably in a profitable way, if the dairying and livestock industries should be largely increased. A large proportion of this alluvial and wet land is good potential farm land, which is simply awaiting improvement by drainage and clearing.

Another important class of land not classed as farm land represents well-drained gentle slopes that can be brought into farms simply by clearing, and a considerable part of this has a fairly good crop value.

It is estimated that about 60 or 70 per cent of the land not classified as farm land constitutes land which is either absolutely nonarable by reason of its steep slope or stony nature, or else represents land which can be most profitably utilized for timber and grazing. In characterizing land as timber and grazing land, it is not to be understood that such areas are condemned as waste land, because timber can be looked upon as a valuable crop or product of the soil and grazing as a legitimate, economic use of land. Such use of the soil would represent the most efficient means of land utilization, as determined by soil adaptation.

The highest proportion of agricultural land is found on the alluvial soils, principally of the Arkansas River bottom. Practically all the Arkansas River bottom, exclusive of that classified as Riverwash, is good farm land, although some of it must have its drainage improved before it can be profitably farmed. In the Coastal Plain part of the county a very large proportion of the area constitutes farm land. There are some slopes in this part that are so steep that damaging erosion would follow ordinary cultivation, and these, along with small bodies of soggy slope land and some stony areas, should be held out for woodlots and pasture land.

The table following gives the acreage and production of the important farm crops, as given in the Federal census reports of 1880 to 1920, inclusive:

Acreage and production of the leading farm crops in 1879, 1889, 1899, 1909, and 1919

Product	1879		1889		1899		1909		1919	
	Acres	*Bales*	*Acres*	*Bales*	*Acres*	*Bales*	*Acres*	*Bales*	*Acres*	*Bales*
Cotton	29,097	20,439	40,564	21,485	49,038	23,325	60,103	26,137	52,203	16,234
		Bushels		*Bushels*		*Bushels*		*Bushels*		*Bushels*
Corn	20,843	369,911	20,326	454,559	32,201	680,410	28,079	478,178	30,505	424,212
Oats	2,199	32,976	2,942	41,818	5,255	83,710	2,062	31,963	611	10,771
Wheat	1,076	5,623	39	700	1,646	9,630	23	310	602	4,714
Rice									735	24,000
Dry peas		3,362		1,913	593	4,791	330	1,615	330	1,950
Peanuts			9	331	79	992	70	2,009	399	5,580
Sweet potatoes	329	25,935	363	35,838	613	52,416	910	61,809	1,837	176,731
Potatoes		15,512	187	18,513	598	41,834	869	62,253	540	36,967
Other vegetables					1,155		1,945		1,334	
		Tons		*Tons*		*Tons*		*Tons*		*Tons*
Alfalfa					27	67	83	127	1,334	3,929
Hay and forage	1,121	880	1,333	1,862	3,186	4,414	3,225	4,316	13,342	16,400
		Gallons		*Gallons*		*Gallons*		*Gallons*		*Gallons*
Sorgo for sirup		2,478	154	8,773	177	11,883	303	6,448	489	16,709
		Quarts		*Quarts*		*Quarts*		*Quarts*		*Quarts*
Strawberries					133	179,870	105	188,705	128	200,437

Cotton is by far the most important cash crop. In many years it occupies twice the area of corn, the next most important crop. In 1919 the acreage was 52,203 and the production 16,234 bales. The yield per acre of cotton, according to the census, appears to have decreased somewhat. In 1879 the yield returned was 0.7 bale; in 1889, 0.52 bale; in 1899, 0.47 bale; in 1909, 0.43 bale; and in 1919, 0.31 bale. However, the evidence supplied by the census is not sufficient by itself to warrant a definite statement as to loss of productiveness of the soils, because in any given year the yield may be depressed by unfavorable climatic conditions. For example, 1919 was decidedly unfavorable to cotton because of abnormal weather conditions. In the Arkansas Crop Report, 1919, it is stated: "The acreage picked in Arkansas this year was the lowest for a number of years. As with practically all the other crops, the abnormally wet spring and early summer was responsible, in a large part, for the decrease." It is not improbable, however, that there has been some decrease in the yield, as the yields of lint cotton per acre for the State, for the 10-year periods of 1886–1895, 1896–1905, and 1906–1915 were 214 pounds, 206 pounds, and 191 pounds.[1] Some decline has resulted from the activities of the boll weevil, which entered Pulaski County in 1909.

The acreage in corn in 1919 was 30,505 acres, from which there was harvested 424,212 bushels of grain. The yield of corn was 17.7 bushels per acre in 1879, 22.3 bushels in 1889, 21.1 in 1899, 17 bushels in 1909, and 13.9 bushels in 1919. It is believed that unfavorable seasonal conditions had much to do with the low yield of 1919, because Pulaski is a pretty good corn county, as compared with the State, and the State yields, according to the decade periods 1886–1895, 1896–1905, and 1906–1915, were 19.2, 17.8, and 20.4 bushels.[2]

Hay and forage crops are next in importance after corn, at least in point of acreage, 13,342 acres having been devoted to these crops

[1] The Soils and Agriculture of the Southern States, p. 81.
[2] The Soils and Agriculture of the Southern States, p. 82.

in 1919, with a yield of 16,400 tons. Alfalfa is becoming increasingly important. In 1919 it occupied 1,334 acres, with a yield of 3,929 tons, as against 27 acres in 1899, with a yield of 67 tons. The principal hay and forage crops are alfalfa, cowpeas, sorgo (sweet sorghum), wild grasses, and oats not threshed.

Oats were grown on 611 acres in 1919 and produced 10,771 bushels, or 17.6 bushels per acre. The census also reports for that year 1,919 acres of "grains cut green," yielding 1,763 tons of forage. This item represents chiefly oats fed in the sheaf. Wheat is a crop of minor importance and fluctuating acreage.

Sweet potatoes in 1919 occupied 1,837 acres giving a total production of 176,731 bushels, or 96.4 bushels per acre. Potatoes in the same year occupied 540 acres and yielded 68.4 bushels per acre. In 1919 the sorgo (sweet sorghum) from 489 acres was utilized in the manufacture of 16,709 gallons of sirup. Considerable sorgo was grown for forage and reported as part of the hay and forage mentioned above. Peanuts occupied about 400 acres in 1919.

The production of rice is a recent development in Pulaski County. In 1919 rice was grown on 735 acres and yielded about 32½ bushels per acre. Rice is an important crop on the flat second bottoms of Lonoke County, and its production will undoubtedly be extended in Pulaski County.

The growing of vegetables is of some importance on the sandy soils of the Coastal Plain uplands south of Little Rock, and to some extent on the sandy Arkansas River bottom soils near Little Rock. Vegetables, other than potatoes, are reported from 1,334 acres in 1919. A considerable proportion was grown on the market-gardening plan for sale in Little Rock. These vegetables include principally string beans, radishes, garden peas, cabbage, turnips, lima beans, tomatoes, beets, cantaloupes, cucumbers, onions, lettuce, and okra.

Strawberries have come to be a crop of some importance. In 1899, 133 acres produced 179,870 quarts; in 1919, 128 acres produced 200,437 quarts; and it is reported that about 300 acres are in strawberries this year (1922). These berries are grown chiefly in the vicinity of Ironton and other parts of the Coastal Plain section of the county. The area devoted to blackberries and dewberries in 1919 was 46 acres and the yield was 46,244 quarts. These also are grown in the Coastal Plain section.

Pecans are of some importance in the Arkansas River bottoms, where there are a number of small producing groves, some isolated trees, and younger trees in orchards. The fruit industry is not important. In 1919 there were 24,895 apple trees, 20,950 peach trees, and a few pears, plums, and cherries. The output of these trees is not nearly enough to supply the home demand.

The livestock and dairying industries are of increasing importance. Dairy products, exclusive of home use, in 1919 were valued at $387,607, as against $61,287 in 1899. The dairying industry is largely centralized in the section southwest of Little Rock along the Hot Springs highway. Poultry and eggs produced in 1919 were valued at $265,404. The poultry and eggs are sold through country merchants or disposed of by the farmers themselves on the Little Rock market. Animals sold and slaughtered in 1909 were valued

at $213,296, as compared with $126,974 in 1899. This item was not reported by the census of 1920. These animals were mainly raised on the farms in small lots and as range animals in the forested hill lands. One farm in the Arkansas bottoms east of Little Rock is devoted almost exclusively to the production of beef cattle and hogs. A number of the Arkansas-bottom farmers, an increasing number it is believed, are devoting more attention to the raising of cattle and hogs, in conjunction with their larger activities of cotton and corn growing. A cattle ranch in the mountainous country in the western part of the county embraces several thousand acres of forested range land.

Cotton, the principal cash crop, finds ready sale at all times at Little Rock and England, Lonoke County, and to some extent at other points on the railroads. Corn is grown as a farm feed crop, chiefly for the work stock; a considerable part is fed to hogs, some of which are marketed; and a part is made into meal. Many farmers do not produce sufficient corn to meet their needs, and large quantities of corn and corn products are shipped in. Much hay is also shipped in for use on the farm. Some of the alfalfa growers sell part of their crop locally and usually at good prices. A very considerable part of the sweet potato crop is consumed on farms and a part is sold in Little Rock. Potatoes are sold to some extent in Little Rock, but not nearly enough are produced locally to meet the requirements of that market. Strawberries are sold in Little Rock, but some are shipped. While the livestock and dairying industries are important, they do not produce enough to meet the local needs. Pork and beef are shipped in on a large scale, and considerable butter and cheese is imported. The situation is better with reference to poultry and eggs, although there is some importation even of these products. The county is practically dependent upon outside sources for its flour.

The best methods of plowing and cultivation are practiced in the Arkansas River bottoms. In recent years early plowing on the flat-breaking plan has become fairly common on many of the better plantations. Some tractors are being used for plowing, but riding disk and turning plows and heavy walking plows are usually employed. Many farmers still use inefficient light plows and wait until shortly before planting time to prepare their land according to the old method of bedding over last year's middles or on the old beds after the stalks have been plowed out. This method does not give the ground sufficient stirring and airing and does not give time for proper decomposition of the preceding year's stalks and other vegetation left in the field. Some of the best farmers in the bottoms plow to a depth of 6 or 7 inches, but in the uplands, where generally less efficient methods are used, the depth of plowing is ordinarily not more than 3 or 4 inches.

The cultivation of cotton is generally performed efficiently. Many riding cultivators are used, but much of the cultivation is done with one animal and a light walking plow. The light plows and cultivators are just what the crop needs. Cultivation continues until about the latter part of July. It is a common statement among farmers that under boll-weevil conditions the cultivation should be very frequent and that shallow plowing with sweeps or other light

implements should continue late into the growing season—practically until the time the cotton begins to open, some say. It is urged by some of those who have devoted much attention to the production of cotton under boll-weevil conditions that the space between rows should be increased in order that cultivation may be performed later in the season. Close spacing in the row appears to be the better way of growing cotton under boll-weevil conditions.

The most difficult work in connection with the production of cotton is the chopping and hoeing and later the harvesting of the crop. All of this is hand labor. The plants coming up thickly from the drill are thinned to a stand by chopping out the excess plants with a hand hoe and after this the grass is hoed out from around the stalks. This part of the work is sometimes costly, especially when the fields have become overrun with grass and weeds owing to the prevention of plow cultivation by wet weather.

Corn is grown in pretty much the same way as cotton, except that it is not hoed so much nor cultivated so intensively. It is believed that on the mellower soils—that is, the friable sandy and silty types—more nearly flat cultivation would produce a better average crop, in that this would allow better conservation of moisture and cause less injury to the root hairs. On the heavier types and in low situations, where rain water does not disappear from the surface rapidly, it is undoubtedly better to grow corn on a ridge.

Alfalfa is usually seeded on land which has been well prepared, generally in the fall, but sometimes in the spring. It is commonly believed that fall seeding is better. The crop is cut four to five times, producing an average of about 3 tons per acre per year. Some trouble is experienced in the maintenance of the alfalfa stand because of the spread of Johnson grass and Bermuda grass. Some fields have not succeeded because of imperfect underdrainage and others have failed or have given small yields in the latter part of the season on soils having very sandy subsoils.

Sweet potatoes are grown in ridges and are given cultivation with plows and hoes. They are grown from slips produced from potatoes bedded in coldframes and to some extent from cuttings from potato vines.

Most of the other crops are grown in ridges and cultivated after the manner of corn.

Thus far fertilizers have not been very extensively used in Pulaski County or anywhere in this region. In 1909 only $12,485 were expended for fertilizers used on 397 farms. In 1919, $88,267 were expended for fertilizers used on 609 farms. In the last few years more attention has been given to fertilizers. Demonstration tests have been made in the fields of farmers upon several kinds of soil with a number of fertilizer mixtures and separate fertilizer ingredients. Some notable increases in the yields have resulted from these treatments, and the tests are being continued.

As in many localities, more is known about the adaptation of soils to different kinds of crops than the farmers undertake to put into practice. However, soil adaptation receives considerable recognition: For example, well-drained areas of the Portland and Miller clay soils have been selected for alfalfa fields, which shows excellent judgment in the adaptation of soil to crops. On the other hand, in-

stances were noted during the survey where areas of soil having very poor underdrainage had been planted in alfalfa, resulting in complete failure. It may not be generally known that those soils having very sandy subsoils, such as some of the Pulaski and Yahola soils, will give a good stand of alfalfa and one or two good cuttings the first year, followed frequently by a dying out of the crop during a dry spell in late July, August, or September. For this reason it will be best to avoid these soils for alfalfa.

Under boll-weevil conditions less results with cotton may be expected on late soils like the Wrightsville very fine sandy loam, Muskogee silt loam, Conway silt loam, and Atkins silt loam and silty clay loam than on types of lighter texture. The boll weevil may do considerable damage to the cotton crop on the Portland and Perry clays, and for this reason it may be more profitable to use these types for corn and other crops to a much larger extent than in the past unless it is planned to control the weevil by dusting. Where these heavier types are used for cotton some benefit might be derived by spacing the rows widely and making liberal applications of acid phosphate to hasten maturity.

The strawberry has considerable range in the kinds of soil upon which it will succeed. Some varieties can be grown with good results on well-drained gravelly upland soils, sandy loams, and fine sandy loams, and others can be produced on less perfectly drained soils, such as the Conway silt loam, Wrightsville very fine sandy loam, and Muskogee silt loam, where these types have been ditched to insure adequate surface drainage.

Lespedeza will succeed on the imperfectly drained gray lands of the county, and rice also where provision is made for applying and removing cheaply the water needed to meet the requirements of this crop.

The production of vegetables, berries, and melons is spreading on the sandy Coastal Plain soils in the southern part of the county, and this development is in conformity with the adaptation of these soils.

The wide variety of soils in Pulaski County makes possible the development of a diversified type of agriculture, such as may be expected to prove much more profitable to the average farmer than the one-crop system. There is no good reason for buying so much hay and feedstuff; there is even a large possibility of producing much more pork and beef. The growing of alfalfa in conjunction with the raising of hogs offers an opportunity for cheap pork production, as do also the increased growing of Bermuda grass, soybeans, velvet beans, and sweet potatoes, all of which are good forage crops for hogs. There is much lespedeza growing wild among the mountains and hilly areas, which, along with other nutritious grazing plants, is capable of supporting very many more beef cattle than at present, especially where sorgo, soybeans, Bermuda grass, and other forage crops are grown in the associated valley lands for winter feed and pasture. There is considerable mast also in the forested areas, which, combined with cultivated forage crops, would contribute to the raising of more hogs in these rough uplands unsuited to cultivation.

Labor is fairly plentiful under ordinary conditions, and the price paid for it is probably reasonable. It can not be said that all the

farm labor is of the most efficient kind. With increased use of labor-saving farm implements considerable improvement will come, and with progress of agriculture toward more diversified types it is believed there will be an accompanying betterment of labor.

In 1919, 63.2 per cent of the farms of Pulaski County were operated by tenants, 36.4 per cent by owners, and 0.4 per cent by managers. These figures are almost a duplication of the farm tenancy figures for 1910, as given by the census, but they show an increase of 3.7 per cent of farm tenants over the proportion given for 1890, with a similar decrease in number of owners. Under the usual form of lease, where the tenant furnishes the work stock and tools, the landlord receives one-third of the corn and one-fourth of the cotton, but where the tenant furnishes only the labor the landlord receives one-half of the crops produced. Very little land is rented for cash.

The price of land ranges from $2.50 an acre for rough mountain land in large tracts to $150 an acre for good Arkansas River bottom lands with modern improvements and not too close to Little Rock. Between these extremes much farm land can be bought for $25 to $75 an acre, according to the character of the soil, its location, the character of the farm buildings, and drainage conditions.

SOILS

The upland soils of Pulaski County are, where well drained, invariably light in color, contain a moderate to low percentage of organic matter, have been leached of any lime carbonate that may have been present in the rocks from which they were developed, have not accumulated during the period of their development any carbonates or other salts of the alkalies or alkaline earths, and only a moderate percentage, if any, of the sesquioxides. Stated briefly, they possess the characteristics typical of soils developed under a humid climate in the warm Temperate Zone wherever they may be found and regardless of the character of the parent geological formations. In normal types the surface soils are yellowish brown as a rule, but when the coloring due to the presence of organic matter is not present they are grayish to pale yellowish. At relatively shallow depth the thoroughly well-drained upland soils are invariably reddish, becoming red in those that are best developed. It is a region in which the normal soil is yellowish brown and the subsoil reddish to red.

The soils that have attained what has just been stated as normal characteristics for the region are the Hanceville, Greenville, Ruston, Porters, Talladega, Teller, and Waynesboro soils. They are not all developed to exactly the same stage, but are not far apart in that respect. They have been differentiated, one from another, on the basis of their derivation from materials of slightly different kinds or from materials accumulated by different geological processes. In one or two cases they have been separated on the basis of difference in the amount of organic matter. The result of this differentiation is the grouping of soils into series and types, the type being the unit of mapping. In a series are placed soils of similar origin, mode of formation, and color. The type separation is based solely on the texture of the surface layer; that is, the proportion of the various

grades of material, as sand, fine sand, silt, and clay, of which it is composed.

The soils of the Hanceville, Talladega, and Porters series have developed from consolidated rocks; the Hanceville soils from materials derived from sandstones and shales, the Talladega soils from materials derived from slates and metamorphic shales, and the Porters soils from igneous rocks. The Hanceville soils have subsoils rather strongly reddish, the Talladega soils have yellowish-red subsoils, and the Porters soils normally reddish-brown subsoils. In all cases the subsoils are heavier than the soils, the yellowish-red subsoils of the Talladega soils being often somewhat plastic and in most areas containing considerable mica. In all cases the disintegrated parent rock beneath the red subsoil is looser and less red than the true subsoil, which commonly does not extend to depths greater than 3½ feet. In the uncultivated soil the surface layer, containing a considerable amount of organic matter, is thin, ranging around 2 or 3 inches. Beneath this and above the red or reddish heavier subsoil the color is yellow, grayish yellow, or rarely brown. Where erosion has taken place the reddish material lies nearer the surface than elsewhere and may even be seen at the surface. The light-colored layer, or layers, overlying the reddish layer is always thinner in the heavy soils than in those with light or relatively light texture.

The Greenville, Teller, Waynesboro, Susquehanna, Ruston, and Norfolk soils are all well-developed old terrace or upland soils that have been well drained for so long a time that they have lost all trace of any results of imperfect drainage to which they may have been subjected earlier.

The Teller, Waynesboro, and Ruston soils have profiles similar in general features to those of the Hanceville, Porters, and Talladega soils. They are all light in color, except a thin dark-colored surface layer of 1 to 3 inches in the soil of the forest lands, all relatively light in the texture of the surface soil, all have red or reddish, heavier textured subsoils, and below 3 or 4 feet become looser and less red in color. These soils differ one from another in strength of the red color in the subsoil and in source of material. The Teller and Waynesboro soils are derived from old alluvial deposits no longer subject to flooding. The Teller soils have a faintly reddish subsoil, whereas the Waynesboro subsoils are red. The Ruston, Norfolk, Susquehanna, and Greenville soils have developed from unconsolidated sand and clay deposits of Tertiary age. They differ one from another in the details of the profile or soil section. The Ruston soils are very much like the Teller soils, having light-colored surface soils and pale-reddish, somewhat heavier subsoils. The Norfolk soils differ from the Ruston soils in having a yellow rather than a reddish subsoil. The Greenville soils have a dark-colored, rather dark reddish brown surface soil and a deep-red subsoil. In all cases both the soil and subsoil of the Ruston, Norfolk, and Greenville types are friable and as a rule somewhat sandy, but sand without the admixture of a considerable percentage of clay is of very rare occurrence. The Susquehanna soils differ from any of the soils described above. The subsoils of all the types are heavy, tough, and plastic when wet, and the layer of reddish soil, free from gray spots

in the subsoil, is thin. In the sandy types the surface soil to a depth of a foot or more is much like the Ruston soils. Below this is a heavy red clay layer not more than a foot in thickness and usually less and below this is a mottled red and gray heavy plastic clay.

The foregoing include all the normal well-developed, well-drained upland and terrace soils. A few upland soils have developed under conditions of imperfect subsoil drainage. These soils include members of the Caddo, Conway, Crowley, and Muskogee series.

The Caddo and Conway soils to a depth of about 2 feet are very much like the soils of the Norfolk series. Below this depth, however, they are mottled, showing the effect of imperfect subsoil drainage, and in some cases there is a compact or rather hard layer about 3 feet below the surface. The Caddo soils have developed from unconsolidated sands and clays of Tertiary age and the Conway soils have developed from shales of the Carboniferous. The latter are consolidated. They both occur on smooth land, and low mounds, ranging up to 5 feet in height, dot the surface.

The Crowley soils have light-colored surface soils somewhat like the surface soils of the other types of the area, though the lower part of the surface soil, in virgin areas, is often grayer than in other types of the region. The subsoil is a brown, in some places dark-brown, heavy, plastic clay normally mottled with rusty brown and drab. This layer is about a foot in thickness, below which the material is looser and more friable.

The Muskogee soils, like the Crowley soils, have developed from ancient river deposits, but have been subjected to excessive water during a large part of the year throughout the whole period of their existence. Instead of having a surface layer 1 or 2 feet thick that has developed the normal even-colored grayish or yellowish color like the Crowley soils, the surface soil is mottled from the surface or a very few inches below the surface. This mottled material extends downward indefinitely. The subsoils are typically heavier than the surface soils, but ordinarily not so heavy, hard, and plastic as the subsoils of the Crowley soils. They occur on terraces.

In addition to the upland and terrace soils already described there are within the area a total of about 29 alluvial soils belonging to 13 soil series. The series are separated, one from the other, on the basis of perfect or imperfect drainage, on color, and on the presence in the subsoil of clay on the one hand and sandy material on the other. These soils are the product of river and creek deposition, mainly during periods of high water. They are not the product of weathering in place after deposition. Their general features are described below.

The better drained recent-alluvial soils that are entirely or largely composed of material washed from the Hanceville and Talladega soils are of the Pope series, are brown in color with a tendency toward yellow, have some gray mottling in the lower depths, and are friable in structure with little compaction in the 3-foot section. In places they are found along the banks of streams, with gray soils farther back from the banks.

The poorly drained gray soils of the Atkins series are often nearly white in color when dry, but are usually mottled light gray or bluish gray and pale yellow. They contain dark-colored concretions from

the surface down, but commonly there is a greater concentration of concretionary material in the lower subsoil, which is usually compact, approaching a hardpan condition, or else is a stiff impervious clay at about 30 to 40 inches. Poor drainage is responsible for that type of weathering which has resulted in the light and mottled color and the development of concretions.

The reddish-brown soils of the Casa series also occur in these bottoms. They have the same origin, but the drainage conditions have been very good, so that the reddish color may be interpreted as the result of perfect drainage. The material is lighter red at depths of 3 or 4 feet, and below this the substratum is yellow and mottled gray and yellow.

In the first bottoms of streams where the material has been washed entirely or largely from the Ruston, Caddo, Orangeburg, and Greenville soils, the brown soils have been classed as the Ochlockonee and the poorly drained gray and mottled soils as the Bibb. The Ochlockonee soils closely resemble the Pope, and the Bibb closely resemble the Atkins, but they contain a relatively higher percentage of quartzose material. No second-bottom soils corresponding to the Ochlockonee and Bibb have been mapped, but in some places the Caddo soils approach the characteristics of a terrace soil, and possibly a few strips could have been mapped as Kalmia.

The alluvial soils associated with the Arkansas River include several groups of soils that are markedly different from any other alluvial soils in the county, not only in their physical properties and characteristics, but also in the superior agricultural value of the types. In the first place, these Arkansas River soils carry more lime, except perhaps in the case of the most highly leached Pulaski soils, than any of the other alluvial soils or any of the upland soils, for that matter, in the county. As a matter of fact, no evidence of free lime carbonate in the soil, subsoil, or substratum was found in any soils of the county except those of the Arkansas River group. Even here free lime carbonate is not commonly detected by the hydrochloric acid test in the soil and subsoil, but lime nodules are usually present at varying depths in the substratum, and the good growth of lime-loving plants, alfalfa in particular, which is obtained on the better drained types here indicates the presence of lime.

The Arkansas River soils include in their composition enough material which has been transported from the purplish-red soils of the Permian Red Beds region of western Oklahoma by the Arkansas River to impart a distinct purplish-red or reddish-brown color unlike any other red or brown soil color encountered anywhere in the county. Differences in drainage conditions have effected brownish and grayish colors in the Arkansas River bottom soils, or at least in the soil of many areas and in places in the subsoil, but in the substratum the peculiar purplish-red color is commonly encountered.

The more reddish, better drained soils of these bottoms, where the subsoil is heavy, have been classed in the Miller series. These are the least leached soils of the Arkansas bottoms. In places the subsoil effervesces with hydrochloric acid.

The purplish-reddish soils which have lighter textured lower subsoils than upper subsoils have been grouped with the Yahola series. The presence of this sandy material in the lower subsoil is of considerable agricultural importance, in that alfalfa does not last as well as where the lower subsoil is of heavier texture.

The Portland types are chocolate-brownish soils associated with the Miller and Yahola soils. These are not so well drained, but they are not what would be called poorly drained soils. The subsoil is usually light reddish or salmon colored at depths of about 2 to 4 feet, and lime nodules are present in the deep substratum. The Pulaski soils are similar to the Portland, except in the lower subsoil, which is lighter textured than the upper subsoil. The soils of both the Portland and Pulaski series have a purplish-reddish cast over the freshly plowed surface. The Lonoke series has the same origin, so far as material goes, but has a much darker surface color than any other Arkansas River bottom soil. The Lonoke subsoil is commonly of a salmon or light-pinkish color, frequently showing gray mottlings.

The Perry soils occupy the more poorly drained bottoms of the Arkansas River. These types are bluish gray or mottled bluish gray and chocolate brown or rusty brown and generally contain dark-colored concretions. They are wet or covered with water throughout the year.

The Wrightsville series includes the poorest drained types of the Arkansas River terraces. These are mottled pale yellow and grayish in the surface soil, mottled light gray or light bluish gray and pale yellow in the subsurface, and mottled bluish gray and pale yellow in the subsoil. There is compaction in the lower subsoil at depths of about 30 to 40 inches, and concretions are present from the surface down, being sufficiently abundant in places in the lower subsoil to approximate a hardpan or a hardpanlike condition. It may be that the Wrightsville soils have been severely leached. Certainly it seems probable that the original color was much more reddish, judging by the condition of the deep substratum; and, if this was the case, poor drainage may have obliterated the red by deoxidation. Dome-shaped mounds are of common occurrence.

The types of the Crowley series have brown or mottled brown, rusty-brown, and dark bluish gray surface soils, with clay subsoils of a mottled red, bluish-gray, yellow, or yellowish-brown color. These soils are not noticeably compact in the deep subsoil, but the heavy clay of the subsoil is quite impervious in character. These soils are rather closely related to the Muskogee, but are more brownish in the surface soil.

Rough stony land, Riverwash, and Meadow are miscellaneous types which are not included in any soil series.

In subsequent pages of this report the individual soil types are described in detail and their relation to agriculture and forestry is given consideration. Their distribution is shown on the accompanying soil map. The table following gives the actual and relative extent of each soil type:

Areas of different soils

Soil	Acres	Per cent	Soil	Acres	Per cent
Talladega stony silt loam	27,648	14.3	Atkins silt loam	3,776	0.8
Steep phase	43,840		Perry silty clay loam	3,776	.8
Hanceville stony loam	31,296	10.5	Ruston gravelly sandy loam	3,648	.7
Steep phase	20,736		Porters stony silt loam	3,520	.7
Conway silt loam	32,960	6.6	Lonoke very fine sandy loam	3,456	.7
Perry clay	29,568	5.9	Caddo fine sandy loam	3,328	.7
Talladega gravelly silt loam	24,704	5.0	Tyler silt loam	3,072	.6
Pulaski very fine sandy loam	24,064	4.8	Hanceville gravelly fine sandy loam	2,944	.6
Portland clay	21,440	4.3	Lonoke silt loam	2,752	.5
Portland very fine sandy loam	20,224	4.1	Porters silt loam	1,920	.4
Hanceville loam	14,272	3.7	Casa loam	1,856	.4
Valley phase	3,968		Miller clay	1,792	.3
Hanceville fine sandy loam	16,704	3.4	Waynesboro loam	1,792	.3
Ruston fine sandy loam	15,744	3.2	Susquehanna fine sandy loam	1,728	.3
Caddo very fine sandy loam	13,056	2.6	Yahola clay	1,664	.3
Pope silt loam	11,392	2.3	Yahola silty clay loam	1,536	.3
Wrightsville very fine sandy loam	10,112	2.0	Pulaski silt loam	1,536	.3
Ruston sandy loam	9,216	1.8	Teller clay loam	1,408	.3
Portland silty clay loam	8,768	1.7	Ochlockonee silt loam	1,280	.2
Casa silt loam	7,296	1.5	Waynesboro fine sandy loam	1,216	.2
Pulaski clay	7,040	1.4	Bibb fine sandy loam	896	.2
Portland silt loam	6,976	1.4	Meadow (Ochlockonee and Bibb material)	768	.2
Bibb silt loam	6,272	1.3	Yahola silt loam	512	.1
Muskogee silt loam	6,144	1.2	Norfolk sand	512	.1
Rough stony land	5,696	1.1	Susquehanna clay loam	384	.1
Riverwash	5,056	1.0	Crowley silt loam	384	.1
Teller very fine sandy loam	4,928	1.0	Greenville gravelly loam	320	.1
Atkins silty clay loam	4,864	1.0	Greenville silt loam	192	.1
Pulaski silty clay loam	4,352	.9			
Portland loamy very fine sand	4,160	.8			
Casa fine sandy loam	4,096	.8	Total	498,560	

PORTERS STONY SILT LOAM

The Porters stony silt loam is similar to the silt loam type in the general characteristics of color and structure, but differs in that large fragments of syenite are everywhere abundant on the surface and through the soil section. In many places there are outcrops of massive syenite, and bedrock is reached at depths ranging from a few inches to about 20 inches below the surface. The type includes patches of Ashe stony sandy loam in which the subsoil is yellow to reddish yellow.

All this type occurs on Granite Mountain, where it occupies gentle to steep slopes. It has very little agricultural use; practically all of it is forested with hickory, white oak, red oak, post oak, blackjack oak, and dogwood. Some quarries supply granite for building. The selling value in the year of the survey (1922) was about $20 to $25 an acre. Some of the type near Little Rock is held at higher prices for building sites.

PORTERS SILT LOAM

The Porters silt loam consists of about 8 to 10 inches of brown to brownish-red or reddish-brown silt loam, grading into reddish-brown to red silty clay of friable structure. The lower subsoil contains considerable yellowish partly decomposed rock, and there is also some yellow limonitic material. Small particles of the disintegrated parent rock give the lower subsoil a generally gritty, granular character. Where the soil section is exposed the Porters silt loam is always characterized by the pronounced red of the upper subsoil. Bedrock of syenite is often found at about 28 to 30 inches

and in places outcrops of this rock appear. In a few places, for example, 1¼ miles southeast of Biddle, there are included areas of Ashe silt loam in which the subsoil is yellow instead of red.

The Porters silt loam is confined entirely to the syenite or Granite Mountain section immediately south and southeast of Little Rock, where it occupies the lower mountain slopes, the Porters stony silt loam generally occupying the higher areas. The topography ranges from comparatively level in a few places to gently sloping and gently rolling over much of the area. The soil is believed to be derived from syenite by weathering in place, although it may include material washed down from the adjacent syenite hills. Both surface drainage and underdrainage are generally good.

The type covers a total area of 3 square miles. It is highly esteemed, and at least 80 per cent of it is in cultivation. The products are varied and include cotton, corn, oats, red clover, potatoes, sweet potatoes, apples, peaches, strawberries, and blackberries. The soil appears to be adapted to a wide range of crops, of which good yields are generally obtained. Strawberries give excellent results. Lespedeza is found in abundance.

The soil is not only well adapted to a wide range of crops but is also well located with reference to the Little Rock market. These factors enhance its value and at the time of the survey it was held at $100 to $125 an acre.

Suggestions for the improvement of this type would include thorough seed-bed preparation, frequent cultivation, and the prevention of soil washing by terracing and by contour plowing.

HANCEVILLE STONY LOAM

The Hanceville stony loam consists of yellowish-brown loam, ranging from rather silty to somewhat light textured or sandy, and grading at about 5 inches into reddish-yellow heavy loam to clay loam or silty clay loam, which passes at about 8 inches into red or slightly yellowish red friable clay. There is some yellow mottling in the lower subsoil. Fragments of sandstone and some of shale are scattered over the surface and are present through the soil and subsoil.

A part of the area shown as the Hanceville stony loam has fine earth of fine sandy loam texture, and if the greater degree of detail necessary to show this distribution had been warranted by the agricultural worth of the soil such areas would have been mapped as the Hanceville stony fine sandy loam. Rather large areas of this description appear in the ridge section of the county, and there is a large development northeast of Jacksonville and in the western part of the county on the north side of Maumelle Creek.

The principal areas of the Hanceville stony loam are in the northern part of the county, north of the Arkansas River, where there are some large continuous belts. The type includes a few steep slopes, but in general the topography ranges from almost level ridge tops to moderately steep slopes. This land is ramified by innumerable small drainage ways and larger stream courses, and water is quickly removed during periods of rainfall.

Although it has a large acreage, none of this type is in cultivation at present. The timber growth consists of shortleaf pine, blackjack oak, red oak, post oak, and some hickory. The type is valued prin-

cipally as a cattle and hog range and for its timber, although most of it has been cut over. The price of this land is $5 to $10 an acre.

While there are enough rock fragments to interfere somewhat with cultivation, there are not enough to prevent cultivation, at least over the average of the type, and eventually a fairly large proportion of it will be used for the production of certain crops. Grapes could be grown on a commercial scale for the manufacture of grape juice, as is now being done in some other parts of the State.

Hanceville stony loam, steep phase.—The steep phase of the Hanceville stony loam is a grayish-brown to brown stony loam, grading at about 6 to 8 inches into reddish-yellow or yellowish-red stony clay loam, and at about 10 to 12 inches into red friable clay. It carries an abundance of sandstone fragments, scattered on the surface and through the soil and subsoil. There is some variation in the depth of the soil mantle, and the bedrock may outcrop locally. The principal difference between this phase and the typical Hanceville stony loam, however, is one of topography.

There are large areas of the steep phase in the northwestern part of the county, north of Maumelle Creek, and also in large belts north of Camp Pike.

The steep phase of the Hanceville stony loam is one of the chief soils of Pulaski County still used for open range. It is also valued for its timber supply, though most of it has been cut over. It will never furnish any appreciable land area for cultivable crops, as its steepness and rocky character preclude all normal farming operations and use for grazing and forestry must continue to constitute its chief value. Land of this phase can be bought for about $5 an acre, and even less in larger tracts.

HANCEVILLE GRAVELLY FINE SANDY LOAM

The surface soil of the Hanceville gravelly fine sandy loam is a loamy fine sand to fine sandy loam with an average depth of 10 to 12 inches. The subsoil is a yellowish-red to reddish-yellow, friable fine sandy clay, passing at about 20 inches into a reddish-yellow to red fine sandy clay, which in the lower part, usually at about 28 inches, is mixed with some decomposed yellow sandstone material. Bedrock of sandstone is commonly reached within the 3-foot section. The type is characterized by moderate quantities of somewhat angular sandstone gravel and larger fragments. These are scattered over the surface and mingled with the soil material.

The largest areas of this type are in the northwestern part of Pulaski County, along the Perry County line, with one area south of Concord Church. As a rule this soil occupies gently undulating to sloping areas on the broader mountain crests. The drainage conditions are generally good. The type is not extensive, and only about 25 per cent of it is in cultivation; it represents cut-over land, which supports some second-growth pine and some oak.

Cotton, corn, and sorgo and cowpeas for hay are the principal crops. The yields are about the same as on the Hanceville fine sandy loam. Peaches are grown to some extent. There are some vineyards along the county line in the northwestern part of the county. One watermelon patch was observed that produced an excellent crop.

The hills were spaced 12 by 14 feet, with a bushel of manure to each hill, and the vines were thinned to two plants per hill. The melons were large, very numerous, and of fine quality.

Land values range from $15 to $25 an acre. The suggestions for improvement of Hanceville fine sandy loam are also suitable for this type.

HANCEVILLE FINE SANDY LOAM

The virgin soil of the Hanceville fine sandy loam consists of about 3 inches of brown or light-brown fine sandy loam over yellowish-brown fine sandy loam, which passes at about 8 inches into reddish-brown heavy fine sandy loam, and at about 10 to 12 inches into red friable fine sandy clay. This continues to a depth of about 24 to 30 inches, where it rests upon the sandstone bedrock. In a number of places there are small fragments of sandstone scattered over the surface and through the soil section. In places there is some disintegrated yellowish and reddish sandstone material in the lower part of the subsoil just above the bedrock.

In the vicinity of Forest Park and Camp Pike the soil is not quite typical where it occupies flattish areas and depressions in the broader ridges. The average soil here consists of yellowish-brown fine sandy loam about 10 inches deep with a subsurface of pale-yellow fine sandy loam extending to about 15 to 18 inches and a subsoil of yellowish-red fine sandy clay passing into yellow clay mottled with reddish-yellow and a little gray and containing in places reddish disintegrated sandstone material just above the bedrock. In the vicinity of Forest Park the surface soil approaches a very fine sandy loam in texture. In a few small areas of exceptionally poor drainage the surface is a light-brown heavy fine sandy loam, grading at 4 or 5 inches into reddish-yellow or yellowish-red heavy fine sandy loam to fine sandy clay loam, and at about 8 to 10 inches into yellowish-red or dull-red friable fine sandy clay. This passes at depths ranging from about 20 to 26 inches into yellow, moderately friable fine sandy clay to somewhat plastic and mottled bluish-gray, yellow, and reddish-yellow clay, with some red in places. This plastic clay is usually somewhat compact and is more or less impervious. Areas showing this mottled subsoil variation really represent a distinct type, and would be so mapped if larger.

The Hanceville fine sandy loam is most extensive north and northeast of North Little Rock, but there is a considerable development in the vicinity of Forest Park and in the extreme northwestern part of the county. As a rule the type occupies the summits of the broader and flatter topped ridges, but it also is found in a number of sloping areas, so that the topography ranges from flattish and very gently undulating to moderately sloping. Drainage conditions are generally good, except in a few small areas.

About 25 per cent of the type is now in cultivation. Much of it is included in the site of Camp Pike and real estate sections of Forest Park. The forested land supports a growth of shortleaf pine, red oak, blackjack oak, post oak, and hickory. Lespedeza is abundant in many places.

The principal crops are cotton and corn. The yields of cotton vary from one-third to one-half bale per acre, and corn produces an

average of 12 to 15 bushels per acre. Truck growing is important north of Little Rock. Strawberries do well on this type, as do all ordinary vegetables. The truck crops are sold in Little Rock and North Little Rock. Some cowpeas, oats, and sorgo are grown for hay. This type of soil in the vicinity of Camp Pike has had the benefit of large quantities of manure made available at the camp, and in one instance a field of corn to which manure had been applied averaged 50 bushels per acre.

Much of the Hanceville fine sandy loam in the more remote wooded areas can be bought for $20 to $30 an acre. Part of it lying as much as 6 to 8 miles from the city is being sold in small tracts for building sites. As much as $200 an acre has been paid for well-improved tracts of this land 5 miles north of Levy.

The large quantities of manure from Camp Pike that have been used on the Hanceville fine sandy loam have given excellent results, and the good effects will continue for some years. The type should have its supply of organic matter replenished from time to time, and although barnyard manure is not always available it is always possible to grow legumes, particularly cowpeas, as soil-improving crops. Peanuts do especially well on this soil, and could become of commercial importance either for direct sale or as a feed for hogs.

HANCEVILLE LOAM

The Hanceville loam is a brown to light-brown loam grading at about 6 inches into yellowish-brown to yellowish-red clay loam and at 10 to 12 inches into red, friable clay or sandy clay. Very commonly bedrock consisting of sandstone and shale is encountered at depths of 2 to 3 feet, and in places rock fragments are scattered over the surface and through the soil and subsoil.

There are included some areas of Hanceville shale loam in which the surface soil is usually thin and shale fragments are very abundant over the surface and through the soil material. Such areas occur at Friendship Church and 1 mile west of that place.

The Hanceville loam is typically developed on the more gentle slopes of the sandstone and shale region of Pulaski County. Practically all of it is included in a fan-shaped area north of Levy. Although the surface is most commonly gently sloping, there are some fairly steep slopes and also some nearly level areas.

The characteristic position of the type is intermediate between the lower lying areas of Conway silt loam and the higher lying Hanceville stony loam (ridge land). In places small drains and streams which have their source in the higher ridges pass through this type to the lower lying valleys, principally Conway silt loam. Since the soil occupies a transitional area, there are a number of places where it has been almost impossible to separate from it narrow strips of other soils. For instance, at the junction of the Hanceville stony loam and Hanceville loam types, surface wash from the higher stony areas has not infrequently brought down colluvial material and deposited it on the upper part of the slope mapped as Hanceville loam. These narrow strips usually consist of Hanceville fine sandy loam. On the other hand, where the lower slopes of the Hanceville loam merge into the Conway silt loam, there is often a narrow strip of a

soil intermediate between these two types. This is described elsewhere as the Hanceville loam, valley phase, and where large enough such areas have been mapped out.

The surface and internal drainage conditions are usually good, except that there are some small seepy areas in a few places.

In point of utilization and in extent the Hanceville loam is one of the most important upland soils in the county. At least 80 per cent of the type is in cultivation. A forest of pine, oak, and hickory covers the rest. Cotton and corn are the principal crops. The yield of cotton ranges ordinarily from one-third to one-half bale, and of corn from 12 to 18 bushels per acre. Oats, cowpeas, and sorgo are grown as hay crops, while the latter two are also grown for food. With proper care, potatoes and sweet potatoes, strawberries, peanuts, watermelons, and vegetables do well. There are a number of scattering peach and apple trees, but no plantings of any size.

The hill lands, of which this type is representative, do not warm up so early in the spring as the Arkansas River bottom lands. For example, cotton, which is planted during the latter part of March and through April in the bottoms, is not planted in the hills until about May 10 to June 1. Cotton and corn land is usually prepared by throwing up beds or ridges, smoothing them off and planting upon them. Deep plowing is not practiced to a very large extent, and the frequent thorough cultivations practiced in the bottoms are not in such common vogue in the hill lands. Corn and cotton are laid by during the latter part of July or first part of August. Complete commercial fertilizers are frequently applied to cotton at the rate of 150 to 200 pounds per acre. Very commonly cowpeas are broadcasted between the rows of corn at the last cultivation. Not much barnyard manure is available, but some is used. In some instances corn leaves are pulled, cured, and saved for fodder.

Improved farms on this type range in price from about $40 or $50 an acre for the more desirable locations to $20 or $25 an acre in less accessible places.

While there are some instances of good farming on the Hanceville loam, there is plenty of room for improvement of farm practice. As the type occupies slopes and the soil is inclined to wash easily and gully, terraces should be constructed to prevent erosion. The soil is not naturally very productive and responds especially to applications of phosphorus and nitrogen. The latter may be supplied by growing legumes and turning under a crop occasionally. Cowpeas and soybeans would also add organic matter to the soil, would make it more porous and less inclined to bake, allow of better aeration, and increase its power to absorb and hold moisture. In too many cases there is not enough cultivation of cotton and corn, so that weeds, such as cocklebur and crab grass, infest the fields.

Hanceville loam, valley phase.—The surface layer of 2 or 3 inches of the Hanceville loam, valley phase, consists of a mellow brown loam, passing into reddish-brown to brownish-red loam, which grades into a brick-red friable clay. From about 12 to 24 inches the subsoil consists of reddish-yellow clay, below which appears a pale-yellow silty clay with faint to pronounced mottlings of gray. In places at depths of 30 to 36 inches or more there is a distinct hardpan layer consisting of mottled gray, yellow, and yellowish-brown compact clay, with a liberal mixture of black concretionary material.

In the large wooded area north of Clifton Mountain the valley mapped as the valley phase is so variable in soil character that it was not practicable to separate all the inclusions of other types, such as Hanceville loam, Hanceville stony loam, Hanceville fine sandy loam, and Conway silt loam.

This phase occurs in the same general region as the Hanceville loam, but does not occupy quite as high situations. It occupies the lower parts of slopes just above Conway silt loam and low ridges above surrounding areas of Conway silt loam. The drainage is imperfect, but not as deficient as in the case of the Conway silt loam.

About 70 per cent of this phase is in cultivation, with about the same character of crops as the typical soil, and yields almost as good. The methods employed are also about the same, and land values generally conform to those of the adjacent Conway or Hanceville soils.

While this is a fairly desirable soil, it is necessary that some drainage work be done to insure maximum yields. Improved drainage, in conjunction with the growing of legume crops, would prove beneficial.

TALLADEGA STONY SILT LOAM

The Talladega stony silt loam, in the virgin condition, consists of light-brown silt loam passing at about 3 or 4 inches into yellow silt loam to silty clay loam, and at about 6 to 8 inches into reddish-yellow, yellowish-red, or dull-red, moderately friable to slightly stiff silty clay. This grades at about 18 to 20 inches into yellow and red clay, with a little gray in places, having a distinctly greasy or slick feel and containing yellowish, reddish, and purplish disintegrated rock in the lower part. Bedrock, consisting of grayish, yellowish, and reddish slaty rock, having a somewhat schistose appearance, is commonly found at depths of 2 to 3 feet. In places, however, the bedrock lies deeper. Fragments of quartz, quartzite, and slate rock are abundant on the surface and through the soil section.

Other areas, such as that 3½ miles west of Little Rock, consist, in the virgin condition, of 1 inch of brown or yellowish-brown loam to silt loam, grading at about 8 to 10 inches into reddish-yellow silty clay, below this into yellowish-red silty clay, and at about 20 to 24 inches into yellow, brittle clay mottled with red in the lower part. It is underlain by blue slate rock having a pearly luster on the surface of exposed fragments.

On top of a ridge about 1 mile west of Little Rock the surface soil is a brown silt loam, passing at 3 to 5 inches into yellow or brownish-yellow silty clay loam and at about 8 inches into yellow silty clay loam, which grades at about 12 inches into the reddish-yellow silty clay subsoil.

In an area 4½ miles west of Little Rock the soil is a brown or yellowish-brown loam passing at 5 to 6 inches through yellow or pale-yellow silty clay loam into reddish-yellow friable silty clay, which grades into yellowish friable silty clay containing purplish, yellowish, and grayish disintegrated slate material below 15 to 20 inches or just above bedrock. In another boring 3¼ miles west of Little Rock the soil consists of light-brown loam to 3 or 4 inches deep, grading into brownish-yellow heavy loam to silty clay loam, and at about 8 to 10 inches into friable yellowish-red or dull-red clay.

The loam areas are very small and for this reason have not been mapped separately.

The soil derived from the fine-grained slate, frequently referred to as novaculite, is commonly a silt loam, but passing from the typical slate country to the sandstone and shale country there is in places a transitional phase where coarser grained rocks together with the fine-grained slates have been the source of the soil material. In such localities, particularly north of Nowlin Creek, the surface soil is a silty loam to a loam in texture, but the subsoil has the common characteristics of color, texture, and structure of the Talladega stony silt loam, and the land has been included with this type. In some places the sandstones and slates are so intimately associated that the resulting Hanceville and Talladega soils could only be mapped separately with some difficulty, and in places the boundary lines between the two are somewhat arbitrarily placed.

This type is extensively developed in the mountain region extending westward from Little Rock to the county line, with its southern boundary following closely the Little Rock and Hot Springs highway and its northern limit chiefly south of the Arkansas River as far as Roland. A few small areas lie south of Fourche Creek and several areas north of the Arkansas River in the vicinity of Catorce.

The Talladega stony silt loam occupies gently sloping to rather hilly and steeply sloping areas, which commonly are well drained, having drainage ways of such gradient that surface waters are quickly removed.

Although this type is extensive, practically none of it is in cultivation except a very small proportion included in a subdivision in the vicinity of Pulaski. Here the larger rock fragments have been removed from small garden lots.

The forest growth consists largely of shortleaf pine, red oak, post oak, blackjack oak, and hickory. Nearly all this type is used for grazing and timber supply. The abundance of stone and the droughty nature of the soil are the chief reasons for the type not being cultivated, but its topography is such as to allow some form of agriculture.

Cut-over lands of this type in the more distant and less developed sections of the county bring from $5 to $10 an acre. Some areas along the main highways are held at $20 an acre.

This is not considered a very good soil, both because of its stony nature and because, as reported, crops are inclined to suffer under droughty conditions. Where the stone fragments are not too abundant it would be possible to grow such crops as cotton and corn, but the advisability of putting this soil type in cultivation is extremely doubtful. The best uses to which it could be put are grazing and for timber production. Grapes appear to do well and might succeed in a commercial way. Commercial fertilizers or manure will be needed for profitable yields where the type is brought under cultivation. Cotton will give moderate yields with good management. Lespedeza also will succeed, and some corn and potatoes and other vegetables could be grown, the vegetables for home use.

Talladega stony silt loam, steep phase.—The steep phase closely resembles the stony silt loam in general characteristics, but in many places the soil material is not so deep and consists of only a

few inches of pale-yellow silt loam grading either into pale-yellow silty clay loam or into partly disintegrated slate rock. Quartzite and slate fragments are strewn abundantly upon the surface, and the slate fragments are present in quantity to the slate beds below. These fragments vary from a few inches to several feet in diameter, and outcrops of bedrock are not uncommon.

The steep phase is developed in large continuous areas in the western part of the county, being most extensive in the mountain sections separating Maumelle, Nowlin, and Neal Creeks, including Wolf Mountain, Fuller Mountain, Brushy Mountain, and parts of Shinall Mountain. An area several miles in extent lies southwest of Morgan.

As its name implies, the steep phase occupies very steep slopes and sharp-crested ridges, in places so rough and mountainous as to approach Rough stony land in character.

The steep phase is not cultivated; most of it is cut-over land. A second growth of pine is now coming on, and there is considerable red oak, blackjack oak, post oak, and hickory. This land is used for grazing and timber, and this is the only means of profitably using it. One cattle ranch includes thousands of acres under wire fence.

Large tracts of the Talladega stony silt loam, steep phase, could be bought at the time of the survey (1922) for about $2.50 an acre. Small acreages were held at $4 or $5 an acre.

TALLADEGA GRAVELLY SILT LOAM

The virgin soil of the Talladega gravelly silt loam consists of 1 or 2 inches of brown gritty silt loam grading into yellow, heavy silt loam, which passes at 6 to 8 inches into yellowish-red silty clay and at about 18 inches into yellow silty clay having some mottling of red and gray. Beds of slate rock usually occur within 3 feet of the surface. Small fragments of quartzite and slate are abundant over the surface and through the soil and subsoil. In many places white vein quartz and almost transparent quartz crystals are strewn abundantly over the surface.

The Talladega gravelly silt loam occurs in many scattered sections in the slate region west of Little Rock and south of the Arkansas River. One noticeably large area lies on the north side of Fourche Creek between the Saline County line and the Little Rock and Hot Springs road, but there are many other areas, some of them fairly large.

This type differs from the other Talladega soils not only in being gravelly instead of stony, but also in its topography, which is gently sloping to moderately hilly. Drainage conditions are generally good.

About 20 to 30 per cent of the type is in cultivation; the rest has about the same character of forest as the stony types. The chief crops are cotton and corn. The average yield of cotton is about one-third bale and of corn about 10 to 15 bushels per acre. Between Little Rock and Red Gate considerable areas are used for pasturing dairy cattle, although little feed is grown on this soil type. Lespedeza and native grasses supply the pasturage. Some areas are

given over to trucking, the produce being sold in Little Rock. Upon a number of small fields oats are grown to be fed as hay. Hogs, goats, and poultry are important sources of income on a number of the smaller farms. In general the methods and equipment employed are not very modern or efficient. Manure is occasionally used, and some farmers fertilize cotton at the average rate of 150 pounds per acre.

Land of this type has a considerable range in value, prices being affected largely by the proximity of good roads. Prices of $100 an acre are not uncommon in favorable locations, and grade down to $25 and $50 an acre at distances of 3 or 4 miles from good roads. In the more remote sections the prices are somewhat lower.

The Talladega gravelly silt loam is deficient in organic matter, a condition which should be remedied through the growing of legumes, such as cowpeas and soybeans, or the use of barnyard manure. Building up the supply of organic matter, together with deeper plowing and frequent cultivation, would combine to conserve the moisture supply. As the soil is naturally droughty, the control of moisture is one of the most important problems in crop production. Applications of lime would be beneficial. It would seem that poultry raising should be a profitable industry. Another profitable line would seem to be hog raising, with peanuts as one of the main forage crops.

CONWAY SILT LOAM

The surface soil of the Conway silt loam in the virgin condition has a layer of 1 to 3 inches of yellowish-brown silt loam, overlying brownish-yellow or yellow silt loam, 6 to 10 inches deep. The subsurface layer consists of yellow silty clay loam and extends to a depth of 10 or 12 inches, with gray mottlings in places in the lower part. The subsoil to 24 inches is a yellow silty clay, with distinct mottlings of gray or gray and brownish red. Generally below 24 inches a true hardpan occurs, consisting of gray, yellow, and yellowish-brown clay, with an abundance of black concretionary material throughout. In places the brown subsoil is merely a compact layer of mottled grayish and yellowish silty clay.

While the above is a typical description of this soil, there are many local variations. For instance, it is noticed in road cuts that in places the hardpan layer is not present and that in other places the hardpan layer occurs as a wavelike section, causing considerable variation in depth beneath the upper layers. Dark-blue to almost black shale may be found locally at depths of 2 to 3 feet. A common characteristic of this soil is the occurrence of small pebblelike concretions scattered over the surface, and disseminated to some extent through the soil and subsoil. Another common feature is the occurrence of many mounds of perfect dome shape, averaging 3 or 4 feet above the surrounding flat soil. The soil of these mounds is of a deeper brown color, and the mottled yellow and gray material is often not reached above 24 to 30 or even 36 inches.

The Conway silt loam, as it has been mapped, includes areas of loam and fine sandy loam, the total areas of which are very small. Areas of the fine sandy loam soil are found one-half mile northeast of Wilders and one-half mile north of Morgan, one-half mile north-

west of Purdham Hill, and also 1¼ miles northwest of Roland. The loam is found along Jim Creek and 2½ miles north of Newton Valley School.

The most extensive development of the Conway silt loam is in the northeastern part of the county, where it occupies large and continuous areas in the vicinity of Olmstead. Much smaller and more scattered areas lie in the western part of the county. This is the typical residual valley soil within the limits of the sandstone and shale region, and is derived from a rather dark bluish to black argillaceous shale. The largest and most typical areas lie in valleys inclosed by ridges of sandstone and shale (Hanceville soils). However, the type is also mapped in smaller areas within the mountains and ridges occupied by the Talladega soils derived from novaculite. Some of these areas have a tough lower subsoil, either yellow or mottled yellow and gray clay.

In general the surface is flat and the drainage is imperfect, particularly in the subsoil. In places some better drained areas occupy gentle slopes. Frequently there is a marked difference in drainage conditions within short distances. The wettest parts are known as pin-oak flats and have water standing upon them during rainy seasons. Such wet areas are also termed crawfish land or slash land.

The Conway silt loam is an important agricultural soil, and much of it is sufficiently well drained to produce a fairly wide range of crops. Probably 20 to 30 per cent is in cultivation, the rest being forested with pin oak, sweet gum, persimmon, post oak, red oak, and hickory. Haw is a common growth where the shale comes near the surface. Lespedeza grows abundantly. The principal crops are cotton and corn. The ordinary yield of cotton is one-fourth to one-half bale, and of corn 10 to 15 bushels. During some years the army worm and boll weevil have caused severe damage to cotton, 5 to 10 acres being required to produce a bale during serious infestation. Many small fields are devoted to oats, which seem to do fairly well. Most of the oats are fed as hay. Large areas of this soil are used for pasturing hogs and cattle. Many farmers derive some income through the sale of butter, eggs, poultry, and garden produce at Little Rock. Strawberries are grown on better drained areas and do particularly well on the included patches of fine sandy loam. A considerable acreage is given over to hay production, cowpeas, sorgo, and native grasses being the principal hay crops. Sorgo is also grown for sirup, which is made at local mills. Cowpeas are also grown for the seed, being grown alone or drilled in rows between the corn rows. Where drainage conditions are adequate fair to good yields of potatoes and sweet potatoes are obtained. Apples and peaches are limited to higher areas and are generally unsuccessful.

The generally poor drainage of the type makes it cold natured, so that it can not be plowed and planted early. The soil runs together quickly after rains, and if plowed when too wet it forms hard clods. Definite crop rotations are not followed, cotton and corn being grown year after year, but some of the better farmers are using cowpeas to improve the land, and also grow oats, potatoes, and other crops. Cotton is planted as early in the spring as frosts and warming of the soil will allow, which is usually about the middle of May, but may be earlier or later, according to the season. Some

barnyard manure is used on cotton and corn land. Commercial fertilizer is applied to cotton at the rate of 150 to 200 pounds per acre. A few farmers practice deep plowing with excellent results. Cotton and corn are usually "laid by" the latter part of July, but the better farmers give one or two cultivations after this time.

Some of the Conway silt loam which is very wet or lies at a considerable distance from markets is valued at about $15 an acre, but well-located farms that have good improvements and are sufficiently well drained to produce average yields sell for $25 to $40 an acre.

Its freedom from rocks and ease of cultivation make the Conway silt loam a desirable soil, but too often the farmers lose sight of the fact that adequate drainage must be provided before the best results can be obtained. Drainage is probably the greatest need of the soil, and usually there is sufficient fall to drain the type. Following close upon drainage is the need of legumes in the rotation, and for this purpose cowpeas are easily and successfully grown. Barnyard manure has been used with very good results, and more of it should be used to keep up the supply of organic matter. By supplying nitrogen through the legumes and using commercial fertilizers having a high content of phosphoric acid, greater crop yields should be obtained. The sloping and better drained parts have given good yields of potatoes and sweet potatoes where the land has been manured and deeply subsoiled. The application of lime would be very beneficial, especially for legume crops.

RUSTON GRAVELLY SANDY LOAM

The Ruston gravelly sandy loam differs from the Ruston sandy loam chiefly in that there is an abundance of chert and quartzite gravel over the surface and through the soil section. The fine material consists of grayish to brownish-gray loamy sand over pale-yellow or yellow loamy sand to sandy loam, grading at 15 to 20 inches into yellowish-red sandy clay, becoming slightly lighter in color and texture in the lower subsoil.

This type occurs in the city of Little Rock, in the vicinity and northwest of Spring Hill Church, and south of Geyer Springs. The topography varies from gently rolling to hilly, and drainage conditions are good.

This soil is not important in extent or in use, as the greater part of its area is now city property. About 5 per cent of the rural area is in cultivation to cotton, corn, and truck. The soil is not quite as easy to handle as the other Ruston types, but the yields are about the same. Excluding city real estate values, the price is about the same as for the Ruston sandy loam.

RUSTON SANDY LOAM

The Ruston sandy loam consists of 4 to 6 inches of a grayish to brownish-gray loamy sand, passing into pale-yellow or yellow loamy sand to sandy loam, and at about 15 to 20 inches into yellowish-red to dull-red, friable sandy clay, which grades at depths of about 28 to 30 inches into yellowish-red sandy loam. Some chert and quartzite gravel occurs through the soil section.

Some very small patches of Orangeburg sandy loam lying 3 to 4 miles southwest of Ironton have been included with the type. This soil is characterized by a deep-red friable sandy clay subsoil.

The Ruston sandy loam is the principal type of the Coastal Plain region south of Little Rock, being most typically developed from Ironton southwest to the county line. Generally its topography is rolling to somewhat hilly, with here and there some almost level places. Drainage is good to excessive.

About 60 per cent of the type is in cultivation, with pine and oak forest on the rest. Trucking is an extensive industry, and it is becoming increasingly important. One farm of 20 acres may be taken as an example. Ten acres were given over to general farming, with corn and oats, and cowpeas, sorgo, and crab grass for hay. Ten acres were used for trucking, with the largest acreages in sweet potatoes and potatoes, a considerable area of watermelons and cantaloupes, and small patches of beans, cabbage, radishes, onions, turnips, and strawberries. Commercial fertilizers and barnyard manure are used on the truck crops with marked results. Cotton and corn are attempted to some extent, but the yields are only fair to moderately good.

Land of this type is held at $25 to $35 an acre.

Terracing and the incorporation of organic matter are two of the chief needs of this type. Deep plowing will usually prove beneficial. For quick results with vegetables, applications of readily soluble fertilizers like nitrate of soda should be made. Where the situations are favorable this soil would seem to be well adapted to peach growing, and areas where the loamy sand extends to a depth of as much as 20 inches, constituting a deep phase of the type, could be used for this purpose. Peach growing has been a success on the Norfolk sand, in which there is no sandy clay subsoil within the 3-foot section, and the fact that the Ruston sandy loam has a sandy clay subsoil layer makes it even more favorable for peaches in that it would be more retentive of moisture and be less subject to the leaching out of plant food. Crops like cantaloupes, or even cotton, can be grown between the rows of trees until they reach bearing age.

RUSTON FINE SANDY LOAM

The Ruston fine sandy loam is a grayish-brown fine sandy loam, 2 or 3 inches deep, over yellowish-brown to yellow fine sandy loam, which passes at about 8 to 10 inches into reddish-yellow heavy fine sandy loam, and at about 14 inches into reddish-yellow or yellowish-red friable fine sandy clay. A mile north of Ironton the soil is a brown fine sandy loam grading into yellowish-brown fine sandy loam and at about 10 inches into yellowish-red friable fine sandy clay. Across the road the surface soil is decidedly grayish, and many ferruginous sandstone fragments are present. In places the subsoil below about 30 inches is a reddish-yellow or yellowish-red fine sandy loam. Plowed fields when dry often have a distinct light-gray color. Locally the surface soil approximates a loamy fine sand in texture. In some places gravel is very abundant in the subsoil. Along the Arch Street Pike, one-half mile north of the county line, some of the type has a yellow subsoil, with some gray mottlings in the lower part, but this variation is of small extent.

Where this type is mapped in close proximity to the Porters soils (derived from granite) it has locally been influenced by the presence of bauxite. In one such place the soil consists of a brown silty loam passing into reddish-brown clay loam, and this into dull-red or yellowish-red, gritty, friable clay, mottled in the lower part with red, reddish yellow, yellow, gray, and pinkish red, having a compact nature, and containing small fragments of bauxite. Here the lower subsoil apparently is residual from bauxite material. In another place the soil consists of yellowish-gray fine sandy loam over a thin layer of pale-yellow fine sandy loam, passing into a yellowish-red silty clay loam much stiffer than the typical subsoil. The bauxite beds are not continuous and occur at different depths within very short distances.

There are some inclusions of other types which are not indicated on the map because of their small extent. A number of included areas of Ruston very fine sandy loam occur west of Big Lake, south of Ferguson Lake, north of Trammel Lake, 1 mile west of Mabelvale, at Red Gate, 1½ miles southwest of Geyer Springs, around Gravel Hill School, and east of Jacksonville. Two small areas of silt loam occur 3 miles northwest of Jacksonville. There are also a few areas of Orangeburg fine sandy loam within a radius of 1 to 4 miles of Jacksonville.

The largest areas of Ruston fine sandy loam are northwest of Guilford, southwest of Sweet Home, and in the vicinity of Jacksonville. The type usually occupies a gently rolling to rolling country, with here and there some almost level to very gently sloping areas. Drainage conditions are good.

This soil is held in fair esteem for agriculture, and about 80 per cent of it is in cultivation. The forest growth is mainly shortleaf pine, with some oak, hickory, and sweet gum. A considerable acreage is devoted to corn and cotton. The average yield of corn is 12 to 18 bushels per acre, and of cotton from one-third to one-half bale per acre. Oats produce poor to fair yields. Southwest of Little Rock this type is extensively employed in the production of sweet potatoes, cantaloupes, watermelons, strawberries, peas, cabbage, peanuts, okra, beans, and tomatoes. Some apples and peaches are grown. Cowpeas are commonly grown for hay, for improving the soil, and for food.

The methods of tillage on this type are not always the best, but in many cases deep plowing is being done. Commercial fertilizers and manure are used for cotton, corn, and the truck crops.

Some farms on the Ruston fine sandy loam have good houses and improvements and are situated on good roads. In such cases the land sells as high as $100 an acre. Much of the type at the time of this survey was valued at about $40 to $60 an acre, and forested areas could be bought as low as $12.50 to $20 an acre.

One of the most urgent needs on this type is terracing, as the slope areas wash badly during heavy rains. The soil is low in organic matter, and legumes should be grown to increase the supply. Because of its tendency to warm up early in the spring, its ready response to fertilizer and manurial treatments, and its generally favorable location, the type is destined to become one of the chief trucking soils of the county.

CADDO FINE SANDY LOAM

The Caddo fine sandy loam is a grayish-yellow to grayish-brown fine sandy loam, which passes at about 1 to 3 inches (in the virgin soil) into yellow or pale-yellow fine sandy loam, mottled in places with gray, and this at 15 to 18 inches into mottled bluish-gray and pale-yellow fine sandy clay. Locally the lower subsoil contains much ocherous-yellow material of a limonitic nature, and in the lower part of the 3-foot section has the compactness of a hardpan, which causes extremely poor drainage. Black iron concretions are present in places in the subsoil.

On better drained areas the soil is a light-brown to grayish-brown fine sandy loam, passing into yellowish-brown fine sandy loam, and at about 8 inches into yellow fine sandy clay with gray mottling. On some better drained mounds the soil is yellowish-brown fine sandy loam over yellow friable fine sandy clay, with a little gray in the lower subsoil. In proximity to bauxite beds there are some small areas where the soil is typical to a depth of about 20 inches, below which the subsoil is a stiff silty clay loam mottled pale yellow and gray.

The Caddo fine sandy loam occurs in scattered areas in the Coastal Plain section south of Little Rock, notably in strips bordering the flatwoods section. Small areas appear also in the vicinity of Jacksonville. The surface varies from very gently sloping to almost flat, and the drainage is imperfect to poor.

The type does not have a large total extent and only about 15 per cent of it is under cultivation. The native vegetation consists of shortleaf pine, sweet gum, maple, post oak, water oak, black gum, myrtle, and azalea. The small proportion of the type devoted to farming usually represents the better drained parts or areas in which the drainage conditions have been improved. The yields of cotton and corn are moderately good where the drainage is not too poor. Strawberries do well, and sweet potatoes, potatoes, watermelons, and cantaloupes are grown with some success. Cowpeas and sorgo are the common hay crops.

The present average selling price of this type is about $10 to $20 an acre.

Drainage is the chief limiting factor in crop production on the Caddo fine sandy loam. Under present conditions only a small part of slope land can be profitably used for farming. Unless the drainage conditions are improved, nothing like maximum yields can be obtained. However, when this is done, this type constitutes one of the best strawberry soils in the county, and the product would find a ready market.

CADDO VERY FINE SANDY LOAM

The typical Caddo very fine sandy loam consists of a surface soil of mottled gray and yellow to brownish-yellow very fine sandy loam, containing considerable silt, about 12 inches deep, over a subsoil of mottled gray and yellow very fine sandy clay.

The Caddo very fine sandy loam occupies flattish to very gently sloping areas in the Coastal Plain section. The largest and most continuous areas lie northwest of Woodson and in the vicinity and

west of Farrell. Other important developments are near Alexander, north of Guilford, in the vicinity of Mabelvale, and northwest of Ironton, with scattered areas in the vicinity of Jacksonville.

The type is not important agriculturally, although it occupies a fair proportion of the Coastal Plain country. Only about 5 per cent of it is in cultivation, and most of this is immediately south of Little Rock. The forest growth consists of shortleaf pine, pin oak, and red oak. There is much lespedeza in open places. Cotton and corn are grown in small quantities, and some truck crops on areas near the cities. The yields are generally poor, and only moderate on some of the sloping better drained areas. The yield of cotton ranges from one-fourth to one-third bale per acre, and of corn from 8 to 15 bushels per acre.

The soil does not warm up early in the spring, and consequently tillage operations are delayed, thus giving a late start to farm crops. Cowpeas are often grown for soil improvement, for hay, and for food.

The value of land of this type, remote from good roads or towns, is about $10 to $15 an acre; more favorably situated areas are held at considerably higher prices.

To farm this type efficiently it is absolutely necessary that the land be drained. This accomplished, the soil should become well suited to the production of strawberries, and in places it occurs in areas of such extent as to furnish the basis for strawberry-growing centers. In its present imperfectly drained condition the soil could be cleared and made valuable for the production of hay crops or for permanent pasture.

As mapped the type includes a few areas of Caddo silt loam that are not shown separately because of their small extent. In these areas the soil consists of mottled yellow and light-gray silt loam to an average depth of 6 inches, underlain by silty clay loam, which is mottled light gray or bluish gray, yellow, and yellowish brown. In places the lower subsoil approaches a silty clay in texture. Limonite-yellow and black concretions commonly occur through the whole soil section. The largest areas are at Cypress Junction and in the vicinity of Mabelvale. The surface is flat, and both the surface and internal drainage are exceedingly poor. Not over 10 per cent of it is in cultivation, the rest being in forest of shortleaf pine, oak, and sweet gum. About the same character of crops are grown as on the Caddo very fine sandy loam, and if anything the yields are even lower. Because of its generally favorable location the sale value of land of this type is $25 to $40 an acre.

SUSQUEHANNA FINE SANDY LOAM

The Susquehanna fine sandy loam consists of 2 or 3 inches of brownish-gray loamy fine sand overlying pale-yellow loamy fine sand, which passes at about 10 inches into red, stiff, plastic clay, and at about 15 inches into mottled red and bluish-gray, plastic, stiff clay, the gray increasing with depth.

The chief areas of this type are located east of Alexander and east of Mabelvale, with smaller areas in the surrounding Coastal Plain region. There are also some fairly good-sized areas in the Coastal

Plain remnant about Jacksonville, where some of the area mapped has a very fine sandy loam texture, as 2 miles southeast and 3 miles northwest of Jacksonville. The type commonly occupies the higher positions of the Coastal Plain, where the run-off is fairly rapid, and consequently the soil is subject to serious erosion. As a result small patches of the clay subsoil are exposed here and there, but these areas, varying from clay loam to clay in texture, are too small to map.

In the section south of Little Rock not over 5 per cent of the type is in cultivation, but about Jacksonville at least 80 per cent of the soil is cropped. The forest consists of shortleaf pine, red oak, blackjack oak, and some hickory. The crops grown on the type are cotton, corn, cowpeas, and small areas of peanuts and strawberries. The average yield of cotton is about one-third to one-half bale, and of corn 12 to 15 bushels per acre.

The better cultivated parts of the type are held at $25 to $30 an acre.

The Susquehanna fine sandy loam would make a desirable cotton soil over most of its extent in Pulaski County. The type needs careful farming to maintain good yields. Fields should be terraced to prevent loss of soil through erosion, and the supply of organic matter should be maintained through the use of legumes. Commercial fertilizers will be needed in cotton culture.

Peach trees should not be set out on this type of soil, as the stiff clay subsoil is especially unfavorable to a proper development of the roots.

SUSQUEHANNA CLAY LOAM

The Susquehanna clay loam owes its existence to the destructive erosion of soil which at one time consisted mainly of Susquehanna fine sandy loam. Washing away of the surface soil has left only a thin veneer—1 or 2 inches—of surface soil, or has removed it entirely in spots, leaving a red clay loam to clay exposed. Most commonly the surface layer, 1 to 3 inches thick, is a brown to reddish-brown loam, silt loam, very fine sandy loam, or fine sandy loam, which overlies stiff red clay, becoming mottled with gray at 12 to 15 inches.

In a few places it is difficult to make a satisfactory separation of the soils derived from shale and sandstone (Hanceville) and those derived from the heavy sedimentary clay of the Coastal Plain section (Susquehanna). For instance, on a narrow ridge northwest of Jacksonville, the sandstone outcrops and fragments are strewn over the surface, but the soil is apparently largely from Coastal Plain material. Some areas of the type lie a few miles south of Little Rock. A mile northwest of McAlmont there is an included area of silt loam, with a surface soil of 5 or 6 inches of brown silt loam overlying the typical Susquehanna subsoil.

The type being largely erosional, gullies are not uncommon, and the topography is usually hilly and sloping. Most of the type is used for pasture and timber. The native trees include blackjack oak, red oak, post oak, and hickory. Possibly 5 per cent of the type is used for growing corn and cotton. Only fair yields of corn are obtained even in good seasons. In general the land of this character possesses little agricultural value.

GREENVILLE GRAVELLY LOAM

The Greenville gravelly loam consists of reddish-brown gravelly loam, 5 or 6 inches deep, overlying red friable clay, which passes quickly into deep-red friable clay. Below 24 to 30 inches black iron oxide and yellow limonitic iron are abundant. Small angular iron rock fragments are abundant on the surface and throughout the soil and subsoil and large rock fragments of iron (hematite) are often scattered over the surface, in places forming beds of solid rock. In some places the surface layer, 2 or 3 inches thick, has a rich-brown color. Locally the surface is a sandy loam.

The type is developed 1 to 2 miles northeast of Ironton and one-half mile east of Alexander. It occupies relatively high situations in the Coastal Plain, most noticeably on the high crest of the hill at Alexander. The topography varies from sloping to rather steep, and the drainage is good. At least 95 per cent of the type is forested with blackjack oak, red oak, post oak, hickory, and some pine. The cultivated areas are chiefly on the more gentle lower slopes, with corn, garden vegetables, and strawberries as the leading crops.

At the time of the survey (1922) land of this type was held at $20 to $30 an acre.

Some of this soil is either so gravelly or steep that it can not be profitably cultivated, and its best use is for forestry and grazing. The small percentage of cultivable land is an excellent soil adapted to a variety of crops.

GREENVILLE SILT LOAM

The Greenville silt loam is a reddish-brown, friable silt loam, which passes at about 6 to 14 inches into red, friable silty clay loam. In places the subsoil is yellowish red, becoming more yellowish with depth, and the lower subsoil in such places contains numerous black and limonite-yellow concretions. The patches having this yellowish subsoil represent soil of another series, such as is found in Nevada County. In many places the surface soil contains a high percentage of very fine sand. Some included patches consist of Greenville loam.

Practically all of the Greenville silt loam occurs north of the Missouri Pacific Railroad north of Mabelvale, in scattered areas, none of which are large. It occupies almost level to very gently sloping situations.

This type is well drained and fertile, and is the most highly esteemed soil of the Coastal Plain section of the county. At least 90 per cent of it is in cultivation. It is a general purpose soil, and is adapted to a wide range of crops. The average yield of corn is about 30 bushels per acre, of cotton one-half to two-thirds bale per acre, wheat 20 to 30 bushels, and oats 40 to 60 bushels per acre. Potatoes do well, but sweet potatoes are said to grow too large and to be of somewhat inferior quality. The various truck crops do well.

Farms on this soil are generally well improved, and $100 an acre is not an uncommon price at the time of the survey (1922).

NORFOLK SAND

The Norfolk sand consists of 4 or 5 inches of brownish-gray sand, underlain by yellow or pale-yellow, loose sand to depths of 3 feet or

more. Organic matter in virgin areas imparts a slight degree of loaminess to the surface soil.

This type is found in the sandy or Coastal Plain section, south of Little Rock, in relatively small scattered areas, chiefly along Loran Creek and northwest of Ironton. Its surface varies from almost level to somewhat billowy. Drainage is good to excessive.

Locally the Norfolk sand is important, about 50 per cent of it being in cultivation, with pine and oak on the remainder. It is largely used for trucking. A little corn is grown. Grapes, watermelons, and cantaloupes seem to do especially well on this soil.

This type does not have as high a value as the associated Ruston soils, $20 an acre being about the average price.

Good crops from this soil require the use of manure or fertilizers. Where readily available, fertilizers are used for vegetables or other crops; they probably should be applied in small amounts at a time, because of the rapid leaching on this porous soil. As the drainage is usually excessive, management should include steps to increase the moisture-holding power of the soil and to prevent evaporation from the surface. The growing of legumes, such as cowpeas, and the turning under of occasional crops as green manure will tend to do this.

WAYNESBORO FINE SANDY LOAM

The Waynesboro fine sandy loam is a brown to brownish-red fine sandy loam, which passes at about 8 inches into brownish-red fine sandy clay loam. In places at depths of about 24 or 30 inches it becomes lighter in color, being a more yellowish red.

This is a well-drained second-bottom soil occurring along some of the upland streams. Probably the most important development is along the upper course of Maumelle Creek, chiefly on the north side, but there are some other scattering areas. The general surface has only minor inequalities, although in places the slopes to the first bottom are rather steep.

The type is important in the localities in which it occurs. It has good drainage, is easy to till, and fully 90 per cent of it is in cultivation. The average yields are about one-half bale of cotton and 20 bushels of corn per acre. Cowpeas and some oats and sorgo are grown for hay.

The ordinary price of the Waynesboro fine sandy loam ranges between $30 and $50 an acre, but the price is higher where the location is very desirable. Areas near markets are esteemed for trucking, as the soil warms up fairly early in the spring. Peanuts do well. The soil itself is adapted to peach growing, but its location in the valleys increases the chance of injury by frost.

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

Mechanical analyses of Waynesboro fine sandy loam

Number	Description	Fine gravel	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt	Clay
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
461995	Soil, 0 to 8 inches	0.0	0.6	0.4	41.2	9.6	30.9	17.3
461996	Subsoil, 8 to 36 inches	.2	.6	.6	30.2	32.1	27.1	9.2

WAYNESBORO LOAM

The Waynesboro loam is a light-brown to brownish-red loam to silty loam, passing at 8 or 10 inches into brownish-red to red friable clay to silty clay loam. In places the lower subsoil has a yellowish-red color. Both the soil and subsoil are quite friable and sufficiently open for excellent drainage. Locally there is some quartzite gravel in the substratum and lower subsoil.

This type represents terrace or second-bottom material which has been deposited in irregular areas along the upland streams of the county and is now above all ordinary overflows. Areas of the type are mapped along the Hot Springs highway bordering the Fourche Creek bottoms and also along Rock and Nowlin Creeks and southwest of Maumelle, a station on the Chicago, Rock Island & Pacific Railway. The surface is usually gently undulating to somewhat billowy, with gentle to rather abrupt slopes to the first bottoms. Drainage is generally good.

This type is not extensive, but it is highly esteemed for crop production, and at least 90 per cent of it is in cultivation. The timber growth consists of pine, white oak, red oak, post oak, and hickory. Corn is one of the principal crops, although there are 3 to 4 acres of cotton on almost every farm on the type. Small patches are devoted to truck crops. Yields of corn average 18 to 20 bushels per acre and of cotton about one-half bale per acre. These yields are surpassed where there is a better type of farming.

Much of this land is located on good roads, within easy reach of Little Rock, and commands a price of not less than $100 an acre. In some other sections land of this type can be bought for $30 to $50 an acre.

This is one of the desirable soils of the county, and with proper cropping systems, including the growing of legumes, present satisfactory yields can be maintained. Fertilizers high in phosphoric acid can be used to advantage. These not only make the soil more productive but hasten the maturity of cotton.

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

Mechanical analyses of Waynesboro loam

Number	Description	Fine gravel	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt	Clay
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
461993	Soil, 0 to 8 inches	0.6	1.8	1.8	23.9	8.4	51.8	11.7
461994	Subsoil, 8 to 36 inches	.4	1.4	1.2	12.4	6.6	48.1	30.1

TYLER SILT LOAM

The Tyler silt loam is a light-gray silt loam, slightly mottled with yellowish brown, passing at about 6 inches into light bluish gray silt loam, mottled with yellow. The subsoil at about 15 inches is mottled light bluish gray and yellow silty clay loam which extends to about 30 inches, where it passes into bluish-gray plastic clay, mottled with yellowish brown and limonite yellow. Gravel is present in places in the lower part of the 3-foot section. In many places

there is, at about 24 inches, a claypan or hardpan containing ocherous-yellow concretions and showing some light-gray color. A few small patches of Tyler very fine sandy loam and silty clay loam have been mapped with the silt loam.

The Tyler silt loam is developed in irregular and broken stretches along the Little Rock and Hot Springs highway, where it occupies poorly drained second bottoms along Fourche Creek. Other areas occur along Maumelle Creek, as immediately west and south of Mount Moriah Church, 1½ miles southwest of the church and 2 miles southeast of Martindale. The type also occurs along Nowlin Creek and in other smaller areas.

The soil material, which has been accumulated as stream deposits, has been washed from the residual parts of the region. The type, which belongs in the terrace group, now lies well above all ordinary overflows. The surface is generally flat, with only a few occasional mounds in certain localities. Both surface and internal drainage are poor.

The type is not of large total extent, but has a fairly wide distribution. Possibly 15 per cent of it is in cultivation. The forest consists of pin oak, maple, elm, black gum, sweet gum, and persimmon. Much of the cultivated land is used for growing cotton and corn, and small patches are in gardens. The yields are generally low, although a few areas of fair drainage give moderately good results. Along the Hot Springs highway there is considerable dairying and here the Tyler silt loam is used largely for pasturing dairy cattle.

The more remote areas of the type were held in 1922 at $10 to $20 an acre. Between Little Rock and Red Gate much of the type has been enhanced in value by the improved highway and increased use for building sites.

The chief needs of the soil are drainage, lime, and organic matter. Lespedeza thrives on this soil and good pastures could be maintained by seeding them down to this plant or to a mixture of lespedeza and Bermuda grass, and keeping out weeds. Cowpeas would be effective for soil improvement.

TELLER VERY FINE SANDY LOAM

The Teller very fine sandy loam is a grayish very fine sand to light-brown or yellowish-brown very fine sandy loam, passing into pale-yellow very fine sandy loam, which is underlain at about 10 to 14 inches by red to reddish-yellow friable fine sandy clay, with some yellowish mottling in places in the lower subsoil. Locally the subsoil is a brick-red clay, which passes at about 26 inches into a friable red clay mottled somewhat with yellow and in many places containing layers of grayish to salmon-colored very fine sand. On some of the flat areas the subsoil is more yellowish than typical. Calcareous purplish-red clay occurs in the deep substratum.

In the vicinity of Highland School, in the northern part of the county, there is included with this type a rather large area which consists mainly of Teller sandy loam, but includes patches of fine sandy loam, loamy fine sand, and loamy sand.

The largest areas of Teller very fine sandy loam are in the vicinity of McAlmont, 2 miles southwest of Jacksonville, in the vicinity of

Roland, north of Rosenbaum Lake, and in the region of Sweet Home. This type occupies high and very ancient terraces of the Arkansas River. In places erosion has proceeded to such an extent that the terrace characteristics have been considerably changed, but purplish-red clay is always present in the deep substratum. In general the surface is almost level or consists of gentle swells and slopes. Usually the type lies from 20 to 30 feet above the Arkansas River bottoms, and the marginal slopes are usually rather steep and abrupt. Drainage conditions range from moderately good to good.

This soil is fairly extensive and widespread, and at least 90 per cent of it is in cultivation. The native trees include red oak, white oak, post oak, hickory, and elm. The chief crops are cotton and corn. The yield of cotton is about one-half bale per acre, and of corn about 15 to 18 bushels per acre. Oats, sorgo, cowpeas, peanuts, and truck crops are also grown.

The average selling price in the year of the survey (1922) ranged from about $50 to $75 an acre. The price is higher for land along good roads and near markets, and it is somewhat lower than these figures for land somewhat distant or badly eroded.

This is a moderately fertile soil which is easily tilled, and where legumes are grown and deep plowing is practiced good yields can be obtained. No doubt some of the flatter areas would be benefited by improvement of drainage conditions. It is very likely that applications of commercial fertilizer would help the growth and fruiting of cotton. Some of the higher, well-drained situations are adapted to the growing of truck crops.

TELLER CLAY LOAM

The Teller clay loam consists of brown or reddish-brown to red clay loam or very fine sandy clay loam, passing quickly into light-red or light purplish red silty clay, which ranges from fairly stiff to rather friable in structure, owing to the presence of varying proportions of fine sand. Locally the deep substratum consists of light purplish red very fine sandy loam. In places, as near Sweet Home, the subsoil is a fairly stiff red clay with a brownish cast. In other places the subsoil is very sticky and is mottled purplish red and gray, such areas representing an approach to the characteristics of the Muskogee soils.

The type includes several small areas of Bastrop clay loam to clay. Here the material is purplish red in color and plastic in structure throughout the soil section and in places contains an abundance of lime nodules. Such areas are found 1½ and 2½ miles east of Pinnacle and about 1 mile north of Roland.

The Teller clay loam occupies slope positions and undulating portions of old terraces formed by the Arkansas River, which are continually changing because of rapid erosion. Probably the best known example is in North Little Rock, just north of the Missouri Pacific shops. The large terrace extending from south of Sweet Home to below Rottaken has a long, narrow belt of the type along its eastern edge, where it descends to the Arkansas River bottoms.

Not over 15 per cent of the type is in cultivation. It is used largely for the production of cotton. The yields are fair. The rest of the

land has considerable value for pasture. Lespedeza, white clover, and Bermuda grass do well and should be grown to a greater extent. The type is usually included in farms with other soils.

MUSKOGEE SILT LOAM

To a depth of about 5 to 8 inches the Muskogee silt loam is a brown to yellowish-brown silt loam, which passes into mottled yellow and gray silty clay loam, and at 8 or 10 inches into mottled yellow and gray, compact silty clay. Below about 15 or 20 inches and extending to 3 feet the subsoil is a tough clay, mottled gray, yellow, and red. In places, as in the vicinity of North Little Rock, the lower subsoil contains concretions of yellowish-brown or ocherous-yellow color, and here the subsoil appears to be so compact that it acts like a hardpan in preventing upward and downward movement of moisture. The red mottling is not everywhere present, but the compact clay in the lower subsoil or the iron hardpan always appears.

On many of the slopes of the drainage ways passing through the type the soil consists of Bastrop silt loam to silty clay loam. Here the soil consists of 3 to 6 inches of brownish silt loam, passing abruptly into plastic purplish-red clay. Where erosion has taken place the red clay is exposed. Because of their small extent the Bastrop soils have not been mapped in Pulaski County. The more extensive areas have been included with the Teller soils, while some small patches have been included with the Muskogee silt loam.

There are also included a few small areas of Muskogee silty clay loam, as 1 mile southwest of Haig, and three-fourths mile east of Rosenbaum Lake, these being too small to map separately.

The Muskogee silt loam occurs on poorly drained second bottoms of the Arkansas River, mainly west of Little Rock. The most typical and largest area is in the vicinity of Marche. Other large areas lie north and west of Roland and in the town of North Little Rock.

The surface is typically that of a terrace, being generally flat, with only occasional low mounds. The soil represents old alluvium of the Arkansas River, now lying above ordinary overflow. The prevailing hardpan or dense clay subsoil causes poor drainage through both surface soil and subsoil.

The type is of some importance agriculturally. Perhaps 25 per cent of it is in cultivation. The rest is forested with pin oak, post oak, red oak, hickory, and a little white oak, pine, elm, and wild plum. Lespedeza is abundant. The principal crops are cotton and corn, the cotton yielding an average of one-fourth to one-third bale per acre, and corn from 8 to 15 bushels per acre. The forest areas are used for pasturing cattle and hogs and they also furnish an important source of winter income through the cutting of timber.

In general the soil is not broken deeply and little attention is paid to maintaining its productiveness, except on some farms immediately about Marche. Because of its wet, soggy nature the soil is cold and slow to warm up in the spring. If plowed when too wet it becomes cloddy and intractable. A number of abandoned fields were noted. Very little, if any, commercial fertilizer is used. Land values for the type range from about $10 to as high as $25 an acre, depending upon location with respect to markets and the character

of roads. This soil type contains many poor secondary roads, which are almost impassable during rainy seasons.

It is almost impossible to obtain even fairly good yields on the Muskogee silt loam unless drainage conditions are improved. In plowing extreme care should be taken to leave numerous water furrows and to place them so as to carry off excess water quickly. Better drainage will promote quicker warming of the soil and allow earlier tillage in the spring. The use of legumes, such as cowpeas and lespedeza, would aid materially in maintaining productiveness. With the exception of a few better drained and higher lying areas, the best use of this soil in its natural condition is for pasture in connection with dairying and cattle and hog raising. Lespedeza, Bermuda grass, and possibly a mixture of alsike and white clover with herd's grass may be made valuable pasture crops.

WRIGHTSVILLE VERY FINE SANDY LOAM

The Wrightsville very fine sandy loam is a mottled light-gray and pale-yellow very fine sandy loam, which passes at 6 to 10 inches into friable very fine sandy clay, mottled light bluish gray, yellow, and yellowish brown. In many places mottlings of rusty brown and yellowish brown also appear in both soil and subsoil. Locally the lower subsoil is compact. In some dome-shaped mounds, which are better drained, there is more yellow and less gray material.

Included with the very fine sandy loam are some low, flat areas of silt loam. Such an area lies 1½ miles south of Sweet Home. Here the soil is a mottled gray to bluish-gray and yellow silt loam, passing quickly into bluish-gray silty clay loam with pale-yellow mottling, and then in the lower subsoil into a silty clay of similar coloring. In a few places this lower subsoil at 28 to 30 inches becomes an ashy-gray tough clay, resembling the subsoil of the Lufkin silt loam, but the type in general has a friable upper subsoil.

The Wrightsville very fine sandy loam occupies an old terrace of the Arkansas River, which has been so thoroughly weathered and leached that none of the material to a depth of 3 feet has a purplish-red color. However, in the deeper substratum, as seen in some slope exposures, purplish-red clay is very common.

The type is mapped in an irregularly shaped triangular area, which begins to widen out about 1¼ miles south of Sweet Home. There is one small area at Marche. The topography is that of typical flatwoods, and both the surface and internal drainage are poor.

Not over 10 per cent of this soil is in cultivation and practically all this is in or near the thickly populated section bordering the Little Rock and Pine Bluff highway. The principal forest tree is shortleaf pine, but there is some oak, hickory, sweet gum, and persimmon. Lespedeza is a common plant in old fields. The chief crops are cotton and corn. The yields of cotton range from one-fourth to one-third bale per acre, and of corn 8 to 12 bushels per acre. Some trucking is done near Sweet Home. Strawberries do especially well on this soil where it is properly drained.

The selling price of the Wrightsville very fine sandy loam ranges from $5 to $20 an acre, depending upon its location.

If properly drained, there is no reason why this type should not form the basis for an important strawberry growing center, as much of it borders a good highway and is traversed by the Missouri Pacific Railroad. In Louisiana the Myatt soils, which are similar in many respects, are used successfully for strawberry production. Rice might be profitable where the necessary water for irrigation can be cheaply procured. In its present poorly drained condition, the type could be most profitably used for the production of hay or for pasture and forestry.

CROWLEY SILT LOAM

The surface soil of the Crowley silt loam consists of about 10 inches of brown silt loam mottled somewhat with gray, dark bluish gray, yellowish brown, and in places with rusty brown. The subsoil is a silty clay loam showing about the same color variation, but generally in lighter shades, passing at about 18 inches into silty clay of the same color and of a somewhat compact nature. At about 32 inches this grades into a mottled bluish-gray and yellowish-brown silty clay faintly streaked or stained with red. This lower layer is heavy and appears to be very impervious to moisture.

Some dark-colored concretions occur locally throughout the soil and subsoil. The characteristic flat surface is interrupted at irregular intervals by rather low, dome-shaped mounds, which consist of brownish-yellow very fine sandy loam, averaging about 18 inches in depth, passing into silt loam of the same color, which grades at about 22 inches into mottled gray and brownish-yellow or bluish-gray and yellowish-brown silty clay loam containing considerable very fine sand.

The Crowley silt loam is confined to the region east and northeast of Jacksonville, where it occupies flattish areas with rather poor surface and internal drainage. Although this type has a very small extent in Pulaski County, it becomes increasingly more extensive in Lonoke County going from west to east. The type in Pulaski County is not typical, in that it is in forest instead of being prairie. The trees include willow oak, water oak, red oak, sweet gum, hickory, elm, and some white oak, post oak, and dogwood.

The type is unimportant both in extent and in its use, not over 5 per cent of its total area being cultivated. The average yields of cotton have been about one-half bale, although larger yields are obtained on freshly cleared land. The yield of corn averages 20 to 25 bushels per acre. Commercial fertilizers are not used. As a rule the soil remains wet in the spring months, and for that reason can not be worked early. However, the type is desirable during the dry months of the growing season, in that it retains moisture. The value of the soil ranges from $15 to $20 an acre.

The main requirement of this type is drainage. In its present condition both the planting and early growth of cotton are delayed, and consequently the crop is subject to greater damage from the boll weevil than where the crop is planted on the lighter textured and better drained soils. The prairie phase, or rather the typical Crowley silt loam, is an ideal rice soil, and undoubtedly the forested phase could be adapted to this crop by clearing and leveling. This is a

good lespedeza soil, and probably a combination of white and alsike clover and herd's grass (redtop) would make a good pasture mixture for cattle, especially dairy cattle.

POPE SILT LOAM

The Pope silt loam is a brown to deep-brown mellow silt loam, grading at 10 to 15 inches into yellow or brownish-yellow silty clay loam, which may continue to depths of more than 36 inches or may pass into a yellow silty clay at depths of about 30 to 36 inches. In a number of places the lower subsoil is mottled gray and yellow. A few narrow strips of Pope gravelly loam are included. The Pope silt loam also includes a number of small bodies of Pope fine sandy loam consisting of 15 to 18 inches of light-textured brown fine sandy loam overlying yellow fine sandy clay. Fine sandy loam areas occur 1¼ miles northwest of Newton Valley School, 1 mile northwest of Catorce, 1½ miles east of Gum Pond, and along Jim Creek.

The Pope silt loam occupies the first bottoms of streams whose alluvium comes from the residual soils of the county, principally from Hanceville and Talladega. The larger areas are found along Bayou Two Prairie, the upper course of Bayou Meto, Kellogg Creek, the headwaters of Fourche Creek, White Oak Bayou, and numerous other small streams. Most of the type is subject to periodical overflow, and drainage conditions range from fair to good.

The Pope silt loam is important largely for the production of corn, with average yields of 30 to 50 bushels per acre. Some cotton is grown, and under normal conditions yields of one-half to two-thirds bale per acre are obtained. In one instance at least, potatoes of the Triumph variety have yielded 75 to 100 bushels per acre. About 40 per cent of the land is in cultivation, the rest being forested and used extensively for pasture. The principal tree growth consists of white oak, post oak, sweet gum, hickory, elm, hog plum, red oak, black gum, water oak, sycamore, and honey locust, with ash, overcup oak, and maple along streams. There is a scattering of shortleaf pine.

Practically no commercial fertilizer is used, but a few farmers, particularly in the vicinity of Marche, use barnyard manure for cotton and corn. The price of land of this type in 1922, the year of the survey, ranged from about $25 to $35 an acre.

The Pope silt loam is naturally a fertile soil, but under the system of continuous cotton and corn cropping some decrease in the yields has taken place. It is suggested that cowpeas be broadcasted in the corn at the last cultivation and that the land be plowed deep. The lower lying and more frequently overflowed parts of the type if cleared would be well adapted to the production of lespedeza and Bermuda-grass hay.

CASA FINE SANDY LOAM

The typical Casa fine sandy loam consists of 8 to 10 inches of deep-brown to reddish-brown fine sandy loam, which passes into reddish-brown to brownish-red fine sandy clay loam. Locally at a depth of 30 to 36 inches the subsoil has a yellowish-red to reddish-

yellow color. In a very few low small areas faint mottlings of gray appear in the last few inches of the 3-foot section. Gravel and fragments of sandstone and slate are present in places in the soil and subsoil. This soil is more friable and open in structure and redder in color than the Pope soils.

The Casa fine sandy loam is most extensive in the extreme western part of the county, where it occurs in the first bottom of Maumelle Creek. There are other smaller areas along some of the upland streams in various parts of the county, as along Newton Creek, along parts of the upper course of Bayou Meto, and along some other streams where swift overflow waters have deposited their sandy material.

The soil is usually almost entirely free of stone and gravel and the surface is generally flat, and interrupted only by small sloughs or depressions. Occurring as it does along swift-flowing creeks and branches, the type is well drained both in the surface and subsoil.

In the localities in which it is found the Casa fine sandy loam is the chief soil for cultivated crops, the adjacent uplands being generally too rough for farming. At least 80 per cent of the type is used for crop production. The forest growth consists of oak, gum, hickory, ash, hackberry, walnut, mulberry, maple, elm, locust, sycamore, birch, dogwood, and cypress.

The leading crops are cotton and corn, the former yielding from one-fourth to 1 bale per acre, and the latter from 20 to 50 bushels per acre. The minor crops include oats, soybeans, sorgo, potatoes, and sweet potatoes. Wheat does not do well. Lespedeza is a natural growth and is found in abundance. Sudan grass is grown successfully. Small patches are devoted to the production of apples, peaches, plums, grapes, and blackberries mainly for home use. Cowpeas are frequently grown for hay, for human consumption, and for soil improvement. Very little commercial fertilizer is used.

The type is highly esteemed, as it is easy to cultivate and it warms up early in the spring. Some of the more remote areas could be bought at the time of the survey for as little as $20 an acre, but near main roads and where there are some good improvements prices ranged from $40 to $60 an acre.

Probably no other soil in the county responds more readily to good management than the Casa fine sandy loam. In a few instances yields have declined, but the soil can readily be brought back to its former productiveness by the growing of legumes, such as cowpeas and soybeans.

The results of mechanical analyses of samples of the soil and subsoil of the Casa fine sandy loam are given in the following table:

Mechanical analyses of Casa fine sandy loam

Number	Description	Fine gravel	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt	Clay
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
4619146	Soil, 0 to 8 inches	0.4	1.0	3.0	38.6	18.8	28.2	10.2
4619147	Subsoil, 8 inches plus	.2	.6	1.4	33.4	18.4	31.7	14.3

CASA LOAM

The surface soil of the Casa loam is a fine-textured loam having a relatively high content of silt and fine and very fine sand. The color ranges from brown to reddish-brown and the depth from 8 to 10 inches. The subsoil is a friable brownish-red clay loam or silty clay loam becoming lighter in color with depth, the lower part in places being yellowish red, mottled slightly with gray.

The type is subject to overflow. It occurs with other Casa soils along Maumelle Creek, Nowlin Creek, and a few smaller streams.

The generally flat surface and good drainage conditions make the type a good general purpose soil. Not more than 15 or 20 per cent of it is forested, most of the forest land being confined to the smaller streams where floods are more destructive of the land when it is cleared.

The same suggestions for improvement apply to this type as to the other Casa soils. Where commercial fertilizers are used, the nitrogen content probably could best be furnished largely through the medium of barnyard manure or legumes, except where trucking is practiced and quick results are desired in forcing the crops. Where distances are not too great, and roads are sufficiently improved, truck crops could be grown profitably.

CASA SILT LOAM

The surface soil of the Casa silt loam consists of 8 to 15 inches of dark-red or brownish-red to reddish-brown friable or mellow silt loam. This grades into reddish-brown to brownish-red friable silty clay loam, which at about 30 inches becomes lighter in color, assuming a yellowish-red appearance. In places the loam subsoil is a brownish-red or reddish-brown silty clay. In some places, usually along smaller streams, the surface and subsoil contain fragments and more or less rounded gravel of sandstone and slate.

The Casa silt loam is the most extensive type of the Casa series in Pulaski County. It occurs along Maumelle, Little Maumelle, and Fourche Creeks and their tributaries, particularly Nowlin and Neal Creeks, and in smaller strips along some of the less important streams. The greater part of it is subject to overflow. The sediments making up the Casa silt loam have been largely derived from the upland Talladega soils. Along Maumelle Creek the silt loam occupies positions more remote from the main stream channel, the fine sandy loam and loam types occupying strips along the stream banks where flood waters have deposited coarser sediments. The surface is generally flat and drainage conditions range from fair to good. The Casa silt loam is highly esteemed for about the same class of crops as are grown on the Casa fine sandy loam, and at least 80 per cent of it is in cultivation. In the western part of the county some of this type, formerly in cultivation, is now included within the limits of a large cattle ranch and is used for pasture. About the same type of forest is found on the silt loam as on the fine sandy loam, except that there is practically no cypress.

Farm practices and yields are essentially the same as on the other Casa soils. Because of its heavier texture the silt loam can not be plowed very early in the spring, and because it does not warm

up as early as the other Casa types it is less desirable for early truck crops.

The selling price of the Casa silt loam at the time of the survey ranged from about $20 to $60 an acre.

The drainage conditions might be improved over parts of the type, but more important than this in the maintenance of productiveness would be the growing of legumes. Deeper plowing and more frequent cultivation are essential to the best results.

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

Mechanical analyses of Casa silt loam

Number	Description	Fine gravel	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt	Clay
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
461989	Soil, 0 to 10 inches	0.4	1.0	0.6	11.6	7.2	55.8	23.4
461990	Subsoil, 10 to 36 inches	.2	.8	.6	9.0	6.8	52.6	29.8

ATKINS SILT LOAM

The surface soil of the Atkins silt loam consists of about 8 inches of mottled gray and yellowish-brown or rusty-brown silt loam. The subsoil is a mottled gray, rusty-brown, and yellowish-brown or pale-yellow silty clay loam containing black concretions, passing at about 18 to 24 inches into a mottled gray, yellow, and yellowish-brown silty clay, which is rather compact.

The largest area of Atkins silt loam is northeast of Jacksonville along Jack Bayou. Another large area lies along Fourche Creek, south of the State Penitentiary. Only a few other scattered areas are mapped, some of them along Fourche Creek. This type occurs as first bottoms of streams which have their origin in the sandstone, shale, and slate sections of the county. It occupies low areas that are poorly drained and subject to overflow. Because of poor drainage almost none of the type is in cultivation, a very small acreage being used for the production of corn. For the most part it is forested with pin oak, red oak, hickory, sweet gum, black gum, maple, and some white oak. Much of this land could be bought at the time of the survey (1922) for $10 to $15 an acre, but the fairly well located areas were held somewhat higher in price.

Where drainage conditions are improved by ditching some good yields of corn are obtained. Most of the Atkins silt loam could be profitably used for the production of Bermuda grass and lespedeza hay and as permanent pasture. A mixture of white clover, alsike clover, and herd's grass has been suggested as a desirable seeding for pastures intended for dairy cattle.

ATKINS SILTY CLAY LOAM

The Atkins silty clay loam consists of 8 to 10 inches of mottled gray, rusty-brown, and yellowish-brown silty clay loam, containing some dark-colored concretionary material, passing into mottled gray and yellowish-brown, heavy silty clay, also containing concretions. An included area of Atkins clay occurs just east of Fears Lake.

The largest areas of the Atkins silty clay loam occur along Maumelle Creek, with a particularly large development south of Mount Moriah Church. Other areas are mapped along White Oak Bayou (north of Marche), along the lower course of Kellogg Creek, and in less extensive areas along Bayou Meto and other streams. This is a poorly drained first-bottom soil made up of alluvium derived from the Hanceville and Talladega soils. None of it is in cultivation, its principal use being for timber and range for cattle and hogs. The forest commonly consists of pin oak, elm, maple, post oak, red oak, overcup oak, and sweet gum. In 1922, at the time the survey was in progress, this land could be had for $10 to $15 an acre, somewhat more being asked where the stand of timber was especially good.

This is a strong soil, which when drained, as in other counties of the State, produces good crops of cotton and corn. Unless the drainage is improved, the land has little value for cultivated crops.

OCHLOCKONEE SILT LOAM

The Ochlockonee silt loam is a brown, mellow silt loam, passing at about 10 or 12 inches into lighter brown or yellowish-brown silty clay loam, and this into yellow silty clay loam with a little gray mottling at about 36 inches. In places no gray mottling appears within 3 feet of the surface and in others rusty-brown concretions are found in the lower subsoil. Some areas of very fine sandy loam have been included with the silt loam; these lie southwest of Farrell and southwest of Ferguson Lake.

This type occupies the well-drained first bottoms of streams in the Coastal Plain region, with fair developments along Otter Creek, Fish Creek, and the Carl Branch north of Jacksonville. The type is of little importance either in extent or present use; all of it is in forest or pasture. Sweet gum, black gum, red oak, water oak, white oak, hickory, swamp maple, beech, ironwood, dogwood, and red haw predominate in the forest, although there is some pine. The type is usually included in farms consisting mainly of upland.

Conditions are fairly good on this soil, and it has inherently good qualities for the growing of corn, but before it can be profitably farmed the land must be protected against the frequent overflow. In its present condition it can best be utilized as forest or pasture land.

BIBB FINE SANDY LOAM

The Bibb fine sandy loam exhibits many differences, both in color and in depth of the various soil horizons. Generally it is a light-gray fine sand or loamy fine sand, somewhat mottled with yellow and brownish yellow, passing at 6 to 8 inches into bluish-gray fine sandy loam, showing some yellow or pale-yellow mottling. This material extends through the profile but becomes rather compact at depths of 24 to 30 inches. In places the soil is a rather dark gray fine sandy loam, mottled with yellowish-brown and rusty-brown stains, underlain by an almost white to light-gray fine sandy loam mottled with yellowish brown and rusty brown. Included areas of Bibb very fine sandy loam occur southwest of Farrell and south of Loran Creek.

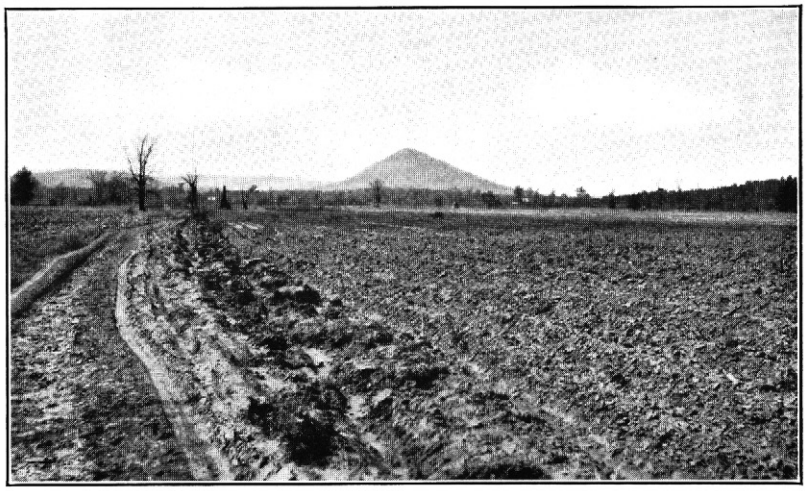

FIG. 1.—TOPOGRAPHY OF THE ARKANSAS RIVER BOTTOM LANDS

Pulaski very fine sandy loam in the foreground, Portland silty clay loam in the near background, and mountains in the distance

FIG. 2.—OATS ON THE LONOKE VERY FINE SANDY LOAM, SOUTHWEST OF GALLOWAY

The principal areas of Bibb fine sandy loam occur in wet creek bottoms and along the heads of many of the Coastal Plain drainage ways, where swift headwaters have deposited coarser sediments than in the wider bottoms having less swift currents. Drainage conditions are poor and overflows are so frequent that practically none of the type is cultivated.

The forest growth consists of sweet gum, black gum, tupelo, ash, pin oak, and some pine. The chief value of this soil is for pasturage.

BIBB SILT LOAM

The Bibb silt loam consists of about 10 to 12 inches of light-gray silt loam, with mottlings of light brown and yellowish brown, passing into a mottled light bluish gray, rusty-brown, and yellowish-brown silt loam or silty clay loam. Below about 24 inches the subsoil consists of mottled light bluish gray and rusty-brown silty clay containing black concretions. Often there is a surface layer of 1 or more inches having a little darker color than the subsurface, which is mottled brown, dark bluish gray, and yellowish brown.

Included with the silt loam are some areas of Bibb silty clay loam, as along Fish Creek (northwest of Wrightsville), southeast of Farrell, along Ferguson Lake, and southwest of Big Lake.

The Bibb silt loam occupies poorly drained first bottoms of streams draining the sandy or Coastal Plain section south and southwest of Little Rock. The principal areas are along Little Fourche, Loran, Bunch, and Otter Creeks, and east of Terrytown. The type also has an extensive development along the streams draining the Coastal Plain remnant about Jacksonville, northeast of Little Rock.

The Bibb silt loam is not important agriculturally, and very little if any of it is in cultivation, its principal use being for pasture. The timber growth consists of sweet gum and tupelo,[3] oak, and scattering pine. The soil is probably best adapted to hay production and pasture. Lespedeza does well.

The value of this soil is ordinarily $10 or $15 an acre, except especially well situated areas.

MILLER CLAY

The entire 3-foot section of the Miller clay consists of a purplish-red, calcareous clay, plastic when wet, but with a tendency to crumble into small granules at the surface on drying. In places the surface layer of a few inches has a darker purplish red color than the subsoil. Lime nodules are scattered about some of the exposures along stream banks or slopes. The lower subsoil is usually calcareous, and probably has a rather high lime content even where it does not effervesce with acid.

In a few places, as 1¼ miles northeast of Woodson, the type includes spots of Yahola clay, in which salmon-colored sand is encountered at depths of 2 to 3 feet. Small areas of silty clay loam are also included with the clay. Some of these are at Charity and 1 mile northwest of Baucum.

[3] Locally known as black gum.

Typical areas of Miller clay occur along the lower course of Maumelle Creek, along White Oak Bayou, and along Fourche Creek south of Biddle. In practically all areas the Miller clay represents the alluvium deposited by the quiet backwaters of the Arkansas River, which explains its occurrence along streams that deposit the local upland sediments. Its position is variable. For instance, along Fourche Creek it occupies a very low position, is frequently overflowed, and is not cultivable. In other areas, as in the one at Charity, or the one 1¼ miles northeast of Woodson, the land is a high first bottom and esteemed for crop production. Drainage conditions are generally good, only a few local areas having poor drainage. Practically all the high bottoms of this soil are in cultivation. The frequently overflowed land, constituting about 25 per cent of the total area, is forested with cypress, scaly-bark hickory, elm, red oak, ash, post oak, and pin oak.

The Miller clay is considered a good strong soil, with alfalfa, cotton, and corn as the chief crops. Four or five cuttings of alfalfa are made annually. Cotton averages two-thirds bale, and corn 30 to 35 bushels per acre. The methods employed are similar to those on the Portland clay.

The cultivated areas are valued around $100 an acre, but are usually not for sale. Forested areas, which commonly are subject to frequent overflow, have a much lower value.

This soil type is especially benefited by deep plowing. Its natural fertility can readily be maintained by good management. An occasional legume crop should be turned under. Under the present conditions of boll-weevil infestation the land of this type can probably be used for alfalfa more profitably than for any other crop.

PORTLAND LOAMY VERY FINE SAND

The Portland loamy very fine sand is a brown loamy very fine sand, passing at 6 or 8 inches into light salmon colored loamy very fine sand. In places the lower subsoil is a pale-yellow to grayish, loose, very fine sand, representing inclusions of the Yahola very fine sand. Near Willow Beach the texture is a loamy fine sand.

This type is of small area. It is developed along or near the banks of the Arkansas River, or some of its old channels, where overflow waters have been swift and have deposited the coarser sediments carried. The surface in many places is decidedly billowy and uneven. Drainage is good to excessive.

About 80 per cent of the type is used for Bermuda-grass pasture, cotton, and corn. Watermelons do well. The yields of cotton vary from very poor on the more sandy areas to one-half or two-thirds bale per acre where there is an appreciable proportion of silt mixed with the sand. Corn yields range from 15 to 25 bushels per acre. Most of the type is included with larger holdings of more valuable land.

This soil is especially adapted to the growing of peanuts, watermelons, and truck crops. One factor in this adaptation is the tendency to warm up early. Manure and legume crops, especially cowpeas, must be used to maintain the land in a state to produce good yields of the general farm crops.

PORTLAND VERY FINE SANDY LOAM

The Portland very fine sandy loam is a brown to chocolate-brown very fine sandy loam to loamy very fine sand, 12 to 15 inches deep, grading into chocolate-brown to purplish-red very fine sandy clay.

There are some inclusions of Pulaski very fine sandy loam, in which the surface layer passes into light purplish red or salmon-red very fine sandy loam, which grades into light purplish red, heavy very fine sandy loam at about 22 inches and into purplish-red or light purplish red clay or very fine sandy clay at 26 or 30 inches.

In the general region north of Galloway the surface soil in many places is not so deep as typical and the subsoil in some places is inclined to be rather heavy and plastic. There are also included some areas in which drainage is deficient, mottlings of gray appearing in the lower subsoil. The most important of these occur north of Picron, 1¼ miles southwest of Amboy, and east of Wrightsville. The large area north of Picron, in the sections of imperfect drainage, consists of 12 to 18 inches of brown to reddish-brown very fine sandy loam, passing into red very fine sandy clay mottled somewhat with gray in the lower part. In places of very poor drainage the soil is a gray very fine sandy loam, passing into mottled gray and rusty-brown to brown very fine sandy clay. This really constitutes patches of Perry very fine sandy loam which were not large enough to show on the map.

The characteristic position of the Portland very fine sandy loam is on relatively narrow ridges in the Arkansas River bottoms, but it also occupies almost level to very gently sloping areas. In general, the drainage conditions are excellent.

About 90 per cent of the type is in cultivation. Much of the forested land is in the southeastern part of the county, where it occupies a low position outside of the levee and is overflowed one or more times each year. The timber includes sweet gum, tupelo, red oak, sycamore, elm, and cottonwood. The principal crops are cotton, corn, oats, and truck crops. The yields of cotton range from one-half to three-fourths bale per acre, and of corn from 25 to 40 bushels per acre. Ordinarily the yields of oats range from 20 to 30 bushels per acre, but the use of commercial fertilizers has resulted in much larger yields. In the vicinity of Little Rock and North Little Rock the trucking industry is fairly well developed, and small farms are tilled intensively to such crops as kale, turnips, cabbage, onions, tomatoes, and strawberries. Several good fields of red clover were noted during the course of the survey. Cowpeas are commonly sown between the rows of corn.

Generally speaking, the methods of preparing land and cultivating crops are fair to good, being similar to those used on the Pulaski very fine sandy loam. In the last few years some planters have used commercial fertilizers on cotton and oats with good success. In one instance the yield of cotton was profitably increased by the application of acid phosphate, with a later side application of nitrate of soda.

The Portland very fine sandy loam at the time of the survey (1922) was valued at about $50 to $75 an acre for the overflowed and more remote areas, and $100 to $200 an acre for the well-improved farms, sufficiently distant from the city not to be influenced by its growth.

The variety and fertilizer tests conducted near Scott should be of interest and much benefit to farmers. The discussion of fertilizers under the Pulaski very fine sandy loam also applies to this type. An intelligent use of commercial fertilizers, coupled with a crop rotation containing legumes, would furnish the basis for a permanent agriculture.

In the table below are given the results of mechanical analyses of samples of the soil and subsoil of the Portland very fine sandy loam:

Mechanical analyses of Portland very fine sandy loam

Number	Description	Fine gravel	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt	Clay
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
461951	Soil, 0 to 15 inches	0.0	0.0	0.0	1.9	55.6	36.4	6.3
461952	Subsoil, 15 to 36 inches	.0	.0	.0	1.4	24.6	55.8	18.6

PORTLAND SILT LOAM

The Portland silt loam consists of 6 to 10 inches of brown or chocolate-brown silt loam, grading into chocolate-brown silty clay loam and at about 12 to 16 inches into chocolate-brown silty clay, which in places has a decidedly purplish red cast in the lower part. Some of the included patches show a considerable content of very fine sand in the surface soil and occasionally a layer of very fine sandy loam in the subsoil, these inclusions representing the Pulaski silt loam. One mile southeast of Baucum the chocolate-brown silt loam is underlain at about 12 to 14 inches by brown or chocolate-brown silty clay, with ashy-gray and light-gray mottlings coming in below, the lower subsoil being a bluish-gray silty clay with some rusty-brown mottling and coarser material.

The soil occurs in the bottoms of the Arkansas River, and 90 per cent of its area is in cultivation. The trees include elm, sweet gum, mulberry, willow, oak, maple, and hickory. The surface varies from that of low ridges and depressions to billowy and almost level. Drainage is generally good, although some low places should be drained. Cotton and corn are the main crops, with a fair acreage of alfalfa. Some land is in pasture of Bermuda grass and white clover. The average yield of cotton is three-fourths bale and of corn about 40 bushels per acre. The type is valued at about $125 to $150 an acre.

In the sections north of Galloway the Portland silt loam is so intimately associated with numerous cypress brakes and the difference in elevation between the two is often so small that extensive drainage operations would benefit this particular soil as well as the region in general. Here, too, the subsoil is unusually dense, and deep plowing or even subsoiling should be practiced. This would increase aeration and provide more favorable conditions for root growth. Cowpeas, soybeans, and alfalfa would materially aid in maintaining the supply of organic matter.

PORTLAND SILTY CLAY LOAM

The Portland silty clay loam consists of a brown to chocolate-brown silty clay loam, passing at about 6 to 8 inches into chocolate-

brown silty clay, which may continue to 3 feet or may pass into purplish-red silty clay at depths of 28 to 30 inches. While typically the subsoil is heavy, there are some areas in which salmon-colored loamy very fine sand to heavy very fine sandy loam appears at about 30 inches. Such inclusions represent the Pulaski silty clay loam in bodies too small to separate. There are also a few places, as 1¼ miles northeast of Rottaken, where mottlings of gray appear in the lower part of the 3-foot soil section.

While not as large in area as the Portland clay, the silty clay loam is found occupying low positions in almost every part of the Arkansas River bottoms. The surface varies from almost flat to slightly sloping, the fall being so gradual as to be hardly discernible. Probably the most typical arrangement of soil types of the Arkansas River bottoms is seen near Scott. Going northward from the lake just south of this town the first and highest lying soil is the Pulaski very fine sandy loam, from which there is a very gradual downward slope through the Portland very fine sandy loam, silt loam, silty clay loam, and clay, the descent ending in a swampy cypress brake containing Perry clay.

At least 90 per cent of the Portland silty clay loam is in cultivation, with elm, pecan, sweet gum, mulberry, sycamore, locust, and pin oak on the rest. Cotton, corn, and alfalfa are important in the order named. The yields and methods are almost the same as on the Portland clay. It is not uncommon to plant corn in the water furrow. Land of this type, often called "mixed land," is fully as valuable as the Portland clay or "buckshot soil."

PORTLAND CLAY

The Portland clay is a chocolate-brown to dark chocolate brown silty clay which passes at 24 to 30 inches into purplish-red clay. In places the lower subsoil contains lime nodules. The type is often referred to locally as "black buckshot" land.

In some localities, as three-fourths mile northeast of Rottaken, there are low areas, bordering areas of the poorly drained Perry clay, in which the lower subsoil becomes mottled with gray to bluish gray at 28 to 30 inches, but above this the soil has too much of the chocolate-brown color to be mapped as Perry.

Some small areas of Portland clay occupy such low positions that they are covered with water during all or a greater part of the year. Such areas are shown on the map with swamp symbols.

In places it was difficult to separate areas of Pulaski clay (sandy subsoil) and Portland clay, because there were changes from one to the other within short distances. Such areas mapped as Portland clay are predominantly that type, but include patches that have the sandy lower subsoil of the Pulaski clay.

The Portland clay has a widespread development throughout almost every part of the Arkansas River bottoms, the larger areas being situated southeast of Little Rock. Most commonly it is somewhat removed from the main river channel, where flood waters of less swift current have deposited the finer sediments. When viewed from a distance, the surface appears to be almost flat, but it is interspersed with innumerable low ridges and depressions, some of which represent old stream channels that have been nearly filled.

The soil is generally well drained, but there are many low depressions and basinlike areas from which water is not quickly removed.

The Portland clay is one of the important soil types of the county, as it is remarkably fertile and highly esteemed for growing cotton, corn, and alfalfa. About 90 per cent is in cultivation, the rest supporting a growth of cypress, hackberry, elm, cottonwood, red oak, overcup oak, hickory, and pecan. Cotton is the principal crop, and the average yield is about three-fourths bale per acre, although one bale per acre has been obtained. Corn also has a large acreage, with yields ranging from 40 to 60 bushels per acre. This is one of the best alfalfa soils in the county, and the acreage of this crop is being rapidly increased. Four or five cuttings are made annually. Sweet potatoes appear to grow well, but do not keep well. Potatoes are reported as not successful. The soil is too heavy for most truck crops. It is difficult to maintain a mulched surface, and the vegetable crops suffer severely in droughts.

Cotton land is commonly prepared by plowing on each side of the row to the middle and then plowing the rows with a "middle buster." Plowing may be done when the soil is quite wet, as the clods break down into small particles (buckshot) at the first rainfall. The boll weevil does considerable damage, but early planting aids in preventing this. If the spring is cool and wet, the cotton, after it has come up, remains almost stationary until warm growing weather begins. This delay in the maturity of cotton favors serious boll-weevil injury and has brought the sandy soil types into increasing favor for cotton growing. Some experiments in poisoning the weevil are now in progress.

In 1922 improved land of this type was selling for $75 to $150 an acre, the price depending upon the character of improvements and the location of the particular tract.

Strong land of this type has been known to produce good crops for many years, but in some cases the yields have been declining. In at least one instance commercial fertilizers have proved profitable. The planting of improved varieties of cotton and corn should become more general. Legumes, such as alfalfa, cowpeas, and soybeans, will maintain or increase productiveness, and in conjunction with hog raising these crops can be made additionally profitable as factors in the production of sale products.

PULASKI VERY FINE SANDY LOAM

The Pulaski very fine sandy loam includes many local variations, but in the most typical areas it consists of 18 to 24 inches of light chocolate-brown very fine sandy loam passing into heavier chocolate-brown very fine sandy loam to very fine sandy clay, and underlain at about 30 inches by salmon-colored or light reddish brown very fine sandy loam. In places the lower part of the 3-foot section consists of loamy very fine sand.

In a number of places, as north of Charity, freshly plowed fields have a distinct reddish cast suggestive of Yahola very fine sandy loam. As a matter of fact, this type, as mapped near the Arkansas River channel, particularly south of Old River Lake and on The Island, includes patches of Yahola very fine sandy loam. Here the sandy lower subsoil frequently is a gray to yellowish-gray loamy

very fine sand, indicating rather recent deposits of the river, and locally this material is referred to as "river sand."

In a number of places the type grades from the higher and lighter textured soil along stream channels or old river lakes to lower positions occupied by Portland soils. (See Pl. XXII, fig. 1.) Here the surface soil averages 10 to 15 inches deep over chocolate-brown sandy clay loam or silty clay, which grades into chocolate-brown very fine sandy loam at about 30 inches.

This type is one of the most extensive soils of the Arkansas River bottoms and is found along the entire course of the river through Pulaski County. It is chiefly this type which constitutes the fertile lands in the Scott community and along part of the pike east of Picron. Its position is usually along the river bank, or it may be separated from the bank by areas of Riverwash. It also occurs along old river lakes, the edge of cypress brakes, and the numerous minor drainage ways of the river bottoms.

Exceptionally high overflows would inundate the greater part of the Pulaski very fine sandy loam, if it were not protected by an extensive levee system. The surface in many places is almost level, or the slope to lower levels is so gentle as to be almost imperceptible. Locally the surface is billowy in appearance. The margins along small streams and sloughs have steep slopes. Both the surface drainage and underdrainage are excellent. It would seem that the light sandy subsoil would cause excessive drainage, but the soil appears to retain moisture readily.

This is one of the most important soils of the county, and at least 95 per cent of it is cultivated. Cotton and corn are the principal crops. Cotton growing is finding increased favor on this type; formerly the heavy "buckshot" land (Portland clay) was preferred. This change has been largely brought about by the boll-weevil invasion. This type can be plowed earlier and warms up more quickly in the spring than the heavier soils and consequently cotton starts more rapidly and thus tends to mature earlier, before the weevil has entered so many squares. Express, Rowden, Webber, Mebane Triumph, Victor, Kings Improved, and Acala are some of the varieties of cotton grown. The average yield is two-thirds to three-fourths bale, but yields as high as 1¼ bales per acre have been obtained without fertilization. The ordinary yield of corn ranges between 25 and 35 bushels per acre. Strains of the Mosby variety are well adapted to this soil. A considerable acreage is devoted to oats. Excellent truck crops are grown. On a number of small farms near Little Rock potatoes, strawberries, melons, and practically all garden vegetables do well. Cowpeas are often sown between the rows of corn at the last cultivation. Some relatively small patches are devoted to soybeans. Some of the areas outside of the levees are given over to Bermuda-grass pasture. There are a few plantings of pecans. Some small peach orchards seem to do well.

The methods of handling this soil are similar to those employed on other types of the Arkansas River bottoms, particularly the lighter textured types.

Land intended for cotton is prepared in a number of ways. A common method is to plow the land flat in the spring, then throw it into ridges with a heavy plow along each side of the cotton rows. The beds are made by a "middle buster" taking out the stalks, then

harrowed with 2-section harrows, spliced together and covering two rows, and smoothed off by a 2 by 6 inch plank fastened behind the harrows. The planting is done with 1-horse planters having a fertilizer attachment in front. The first cultivation is made with a side harrow. The cotton is then "chopped," and later it is "dirted up" with a 14 or 16 inch shovel plow. Following this a sweep is used to cultivate an average of four times. The final cultivation or "laying by" is done with a large, heavy shovel plow having about a 20-inch sweep.

For corn the land is first center furrowed with a "middle buster" and then listed with a heavy turning plow. Rows are then run with a "middle buster," forming the bed. On the sandy soils the ridges are usually harrowed with a small "A" harrow and then planted. The corn plants are first side harrowed and chopped to secure an even stand. Corn is usually left closer in the row than on hill land. A 12 or 16 inch plow is used to hill up the corn, and the middles are run out with an 18 or 20 inch shovel plow. There are four or five subsequent cultivations with walking or riding cultivators. Very often peas are broadcasted between the rows at the last cultivation. In some cases the peas and corn are used to fill silos, in other cases the peas are picked and the vines are grazed.

In some cases corn is not planted on a bed but in a furrow, and a small shovel plow is run on each side of the row to cover it, then it is harrowed with a small harrow, and a bed is then thrown over toward the corn with a heavy turning plow. It is side harrowed, hoed, cultivated about four times, and laid by with a single-stock shovel plow.

Until recently commercial fertilizers have not been used, but some planters have experimented with them. In one instance 6 acres were fertilized with 500 pounds per acre of a 10–3–4[4] fertilizer, with a yield of 8,060 pounds of seed cotton. Five acres of the check or unfertilized plot yielded 4,900 pounds of seed cotton. The use of commercial fertilizer showed an increased return of $25.23 per acre. During another trial the yields were 8,554 pounds and 4,605 pounds of seed cotton, respectively. Another experiment using the same kind and quantity of fertilizer per acre returned yields of 1,397 pounds of seed cotton on the fertilized land against 1,105 pounds of seed cotton per acre for the check plot.

The use of soybeans is becoming more general. In one case 36 acres of soybeans were planted in alternate rows of corn. The corn was harvested and the beans furnished grazing for 200 hogs and 34 mules. The grazing period continued from September 15 to January 1, when some of the hogs were killed, and some fed a few weeks longer on corn. In a few cases soybeans, drilled in rows, yielded 25 to 30 bushels per acre. The Biloxi variety is favored, as it is desirable for grazing, and the seed remains in the pods until eaten by the animals or harvested for seed.

In one instance cottonseed meal was used with success in fertilizing cotton, corn, and potatoes.

Most of the land of this type is held in rather large areas. Its present valuation ranges from about $100 to $150 an acre. Near

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

Little Rock prices have been as high as $300 to $400 an acre for small tracts.

On a valuable soil like this type, the yield per acre is of the utmost importance. Some of the Pulaski very fine sandy loam has been under cultivation for years, and here commercial fertilizers can be used with profit, and legumes should be introduced in the rotation. It is believed that acid phosphate used at the rate of 250 pounds per acre for cotton will hasten its maturity and help to combat the boll weevil. Possibly a small quantity of readily available nitrogen used at planting time would give the plants a quicker start. It is likely that a fertilizer carrying 9 to 12 per cent of phosphoric acid and 2 to 4 per cent of nitrogen, used at the rate of about 400 pounds per acre, would often prove profitable. This type is usually considered to have sufficient potash, but in one test at the Scott Branch Station the use of potash gave a good increase of cotton. It should be especially noted that wilt had been prevalent in this field, and that further experiments may indicate the value of potash in controlling wilt. It would seem that the combination of corn, soybeans, and hogs would be very profitable on this soil. Efforts should be continued to secure improved strains of cotton and corn. High yields can not be obtained if poor seed is used.

This type is one of the most valuable trucking soils in the county, and its location along many good roads and in close proximity to Little Rock, make it especially desirable for this industry. It is easily tilled, warms up early in the spring, and is responsive to the use of commercial fertilizers or manure.

Many valuable areas have been lost by caving in of the river banks, which in some places has occurred for distances as much as one-fourth mile or more. This has become a serious problem, and some measures should be taken to protect the river banks.

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

Mechanical analyses of Pulaski very fine sandy loam

Number	Description	Fine gravel	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt	Clay
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
461946	Soil, 0 to 24 inches	0.0	0.0	0.0	0.7	46.5	44.1	9.0
461947	Subsoil, 24 to 30 inches	.1	.0	.0	.4	32.2	41.4	25.8
461948	Subsoil, 30 to 36 inches	.0	.0	.0	1.2	69.6	23.3	5.8

PULASKI SILT LOAM

The Pulaski silt loam is a light chocolate brown silt loam, passing at 8 to 10 inches into chocolate-brown silty clay loam, and at about 15 inches into reddish-brown silty clay. At about 24 inches the subsoil becomes gradually lighter in texture with increase in depth, passing into purplish-reddish to salmon-colored very fine sandy loam. The content of very fine sand increases with depth.

This type is confined to fairly small areas southeast of Little Rock. Some of these lie west of Scott, and others are scattered in the bottoms east of Sweet Home and Woodson. The type occupies gently sloping areas or depressions that have fair to good drainage.

Its total extent is not large. It is a strong river-bottom soil, and about 90 per cent of it is in cultivation. The main crops are cotton and corn, with about two-thirds bale of cotton and 35 bushels of corn per acre as the average yields. The natural fertility should be maintained through some of the methods suggested for other types. In 1922 land of this type ranged in price from about $75 to $125 an acre.

The table below gives the results of mechanical analyses of samples representing different depths of the Pulaski silt loam:

Mechanical analyses of Pulaski silt loam

Number	Description	Fine gravel	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt	Clay
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
4619120	Soil, 0 to 8 inches	0.2	0.2	0.0	0.4	5.8	73.6	20.0
4619121	Subsurface, 8 to 15 inches	.2	.2	.2	.4	3.6	69.5	26.0
4619122	Subsoil, 15 to 24 inches	.2	.2	.1	.4	5.6	62.5	30.9
4619123	Subsoil, 24 to 30 inches	.0	.2	.0	.5	11.4	44.2	43.7
4619124	Subsoil, 30 to 36 inches	.4	.4	.4	3.8	29.9	49.5	15.6

PULASKI SILTY CLAY LOAM

The Pulaski silty clay loam consists of chocolate-brown silty clay loam about 6 inches deep, overlying silty clay of about the same color, passing at about 20 inches into purplish-red very fine sandy clay, and at 28 inches into purplish-red or salmon-colored very fine sandy loam which becomes lighter textured with depth.

This soil occupies some of the lower parts of the Arkansas River bottoms. Most of it lies on the west side of the river southeast of Little Rock. Drainage conditions are fair to good. Some of the forested areas are still overflowed several times a year. The cultivated areas for the most part represent older alluvium which has been built up to relatively high levels and is not overflowed very often. At least 90 per cent of this type is in cultivation to cotton and corn and some alfalfa. The soil is equal in yielding capacity to most of the other bottom soils and is fully as valuable.

The suggestions offered for the improvement of the Pulaski clay are applicable to this type. Johnson grass is extremely troublesome in cultivated crops, and the first appearance of this grass should bring thoroughgoing means for its eradication.

The results of mechanical analyses of samples representing various depths of the Pulaski silty clay loam are given in the following table:

Mechanical analyses of Pulaski silty clay loam

Number	Description	Fine gravel	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt	Clay
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
4619132	Soil, 0 to 6 inches	0.2	0.2	0.0	2.6	21.0	52.2	23.9
4619133	Subsurface, 6 to 20 inches	.1	.1	.0	1.1	2.4	54.7	41.6
4619134	Subsoil, 20 to 28 inches	.0	.1	.2	9.0	13.2	50.4	27.2
4619135	Subsoil, 28 to 36 inches	1.2	1.2	2.3	36.8	14.4	33.9	10.3

PULASKI CLAY

The Pulaski clay consists of chocolate-brown silty clay, passing at about 12 to 18 inches into chocolate-brown to purplish-red very fine sandy clay, and at 20 to 24 inches into light chocolate brown, light purplish red, or salmon-colored very fine sandy loam, which becomes lighter in color with depth. This type has many variations, but is always characterized by the lighter textured subsoil. In some places the sandy material of the subsoil is made up of fine to medium sand. The soil has about the same color as the Portland clay, but differs in not having a heavy subsoil.

In many places the Pulaski clay is so intimately associated with other types that it was impossible to separate it. In other places the soil boundaries are somewhat arbitrarily drawn. The boundary between the Pulaski and the Portland clay was especially difficult to place. In a section of the Arkansas River bottoms, beginning about three-fourths mile southeast of College Station and extending to within 2 miles northeast of Wrightsville, there is a complicated system of cypress brakes and intervening slightly higher ridges. On a scale of 1 inch to the mile it was impossible to show on the map the boundaries of the cypress brakes (Perry clay) and the narrow ridges (Pulaski clay). Where the brakes could not be shown the areas have been mapped as Pulaski clay and distinguished by swamp symbols.

The Pulaski clay occupies first-bottom positions along the Arkansas River, with its greatest development southeast of Little Rock, between the Sweet Home pike and the Arkansas River. There are some other scattered areas. Locally the type is called "black buckshot land." Most of the type is subject to overflow, but typically it occupies well-defined ridges, from 1 to 5 or 6 feet above the associated Perry clay. Drainage of both the surface soil and subsoil is usually adequate for crop production. The drainage has been improved by ditching.

The type is fairly extensive, and probably 70 per cent of it is in cultivation. The forested areas usually represent lands in low positions and frequently overflowed. The large area lying 3 miles northeast of Woodson is typical of this condition. The trees consist of cypress, pecan, oak, hackberry, elm, hickory, ash, and honey locust.

Cotton and corn are the principal crops grown on the Pulaski clay, with a fair acreage of alfalfa. Fall plowing is gaining in favor. Commercial fertilizers are not commonly used on this soil.

The price of land of this type ranges from $50 to $100 an acre, tending more toward the higher figure.

Before the advent of the boll weevil the Pulaski clay was one of the most highly esteemed soils for cotton growing. With the need of maturing the crop early to escape weevil injury, this soil has become less desirable for cotton, and corn and alfalfa are increasing in acreage. There is no reason why farmers should continue cotton growing at a loss. The combination of corn, soybeans, and hogs should become a profitable system for this soil. This would tend to maintain the productiveness of the soil. Although this type is believed to be extremely fertile, and rightly so, yields on some areas have suffered marked declines. Alfalfa seems to be grown with

very good yields, but the heavier subsoil of the Portland clay would seem to favor a more enduring stand.

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

Mechanical analyses of Pulaski clay

Number	Description	Fine gravel	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt	Clay
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
4619143	Soil, 0 to 12 inches	0.0	0.2	0.2	5.8	4.0	57.1	32.7
4619144	Subsurface, 12 to 20 inches	.0	.0	.1	35.6	21.3	25.3	17.7
4619145	Subsoil, 20 to 36 inches	.0	.0	.2	58.6	21.4	12.2	7.6

YAHOLA SILT LOAM

The Yahola silt loam is a chocolate-brown silt loam, passing at 6 to 10 inches into a reddish-brown silty clay loam. At about 12 inches there appears a salmon-colored very fine sandy loam and at 20 inches a salmon-colored very fine sand. In places at about 18 or 20 inches there is a thin layer of purplish-red very fine sandy clay to heavy very fine sandy loam 18 to 20 inches below the surface, and below this a salmon-colored very fine sand. Naturally there are some variations in the depth and color of the various soil layers, but the lighter textured subsoil is everywhere present.

The principal areas of the type occur within the bend of Old River Lake, 1½ miles southwest of Alexanders Store, and 3 miles east of Farrell. The surface is marked by local ridges and depressions. The type lies at different elevations above overflow and all of it is well drained.

About 30 per cent of the Yahola silt loam is in cultivation, with cotton and corn as the principal crops. The yields and the methods employed are on a par with those on other good river-bottom soils. Land values are also about the same.

YAHOLA SILTY CLAY LOAM

The Yahola silty clay loam consists of 6 to 8 inches of chocolate-brown to reddish-brown silty clay loam, passing into dark purplish red silty clay or chocolate-brown silty clay having a reddish cast, which grades at about 12 to 20 inches into purplish-red or dark reddish brown very fine silty clay and at about 24 to 26 inches into salmon-colored very fine sandy loam. In places the surface soil contains a considerable quantity of very fine sand. The type also includes patches of Yahola clay and silt loam and Portland soils of various textures.

The Yahola silty clay loam occurs in scattered areas in the Arkansas River bottoms, mainly within a radius of 3 miles of Campbells Store. One area lies about midway between Rose City and Baucum. The topography varies from almost level or very gently sloping to ridgy, with intervening depressions. Drainage conditions are good.

The total area of the type is not large, but at least 80 per cent of it is in cultivation to cotton and corn, with some alfalfa, of

which good yields are obtained. One fairly large pecan planting has been made, cotton being grown between the trees. Land of this kind can be bought for about $100 to $150 an acre.

It is believed that alfalfa will endure longer on the heavier Portland soils than on the Yahola soils, with their light sandy subsoil. Johnson grass should be brought under control, as it is already troublesome in cultivated crops and spreads rapidly unless control measures are taken. Deep plowing and thorough seed-bed preparation should be the rule. Maximum yields can be obtained only where cover crops are plowed under and commercial fertilizers applied.

YAHOLA CLAY

The typical Yahola clay is a purplish-red to brownish-red silty clay, passing at depths of about 18 to 24 inches into lighter purplish red very fine sandy clay and at about 24 to 30 inches into salmon-colored or light purplish red very fine sandy loam to silt loam, which frequently becomes lighter textured with depth. In some places the top layer of red silty clay overlies the lighter textured purplish-red very fine sandy loam to silt loam layer, which in turn passes into a layer of purplish-red clay and this into lighter textured material. The material within the 3-foot section rarely effervesces in hydrochloric acid.

Some patches have a thin layer of silt loam or very fine sandy loam at the surface and a brownish color like that of the Portland clay. A shallow variation of the Yahola clay occurs 2 miles southwest of Alexanders Store and 1½ miles northwest of that store. Here the surface layer consists of only 4 to 6 inches of the heavy clay, over gray to yellowish-gray loamy very fine sand.

The Yahola clay occurs mainly in the southeastern part of the county, near Estes Store, west of Old River Lake, northeast of Woodson, and in a number of other smaller areas. There is a considerable development northwest of Baucum. The type has been formed by deposition of sediments from the Arkansas River, and the many variations in color and depth of the various soil layers are due to the vagaries of the stream currents that deposited this material. Levees now protect much of the type from overflow. The results of stream action are evident in a billowy to gently sloping topography, with some lower lying situations marking the old stream channels. Drainage is generally good.

About 35 per cent of the type is in cultivation. The remaining areas, which are forested, lie outside of the levees and generally occupy relatively low positions subject to overflow. These receive deep deposits of sediment and consequently are still in process of formation. The vegetation consists of rattan vines, sweet gum, ash, mulberry, sycamore, maple, water oak, pecan, elm, willow, and cottonwood. These areas are an important source of firewood.

The cultivated land is considered valuable soil, with cotton, corn, and alfalfa as the chief crops. Commercial fertilizers are not used. Cotton produces one-half to three-fourths bale per acre, and corn 30 to 35 bushels per acre. Some good stands of alfalfa were observed, but it is believed that stands are not as permanent on this lighter textured or sandy subsoil type as on the Miller clay. The

well-developed areas are now valued at about $100 to $150 an acre, whereas the frequently-overflowed sections are held at considerably less than this.

Although little effervescence is obtained in the 3-foot soil section, the ease with which an alfalfa stand is obtained indicates that the soil is not in need of lime. This type responds readily to the effects of deep plowing and subsoiling.

LONOKE VERY FINE SANDY LOAM

The Lonoke very fine sandy loam consists of brown to dark-brown very fine sandy loam, grading at 5 or 6 inches into dark-brown very fine sandy loam and at about 18 to 22 inches into brown very fine sandy loam, changing to chocolate brown below. The subsurface, which is dark brown, is apparently high in organic matter. In places it grades at variable depths, usually not more than 15 to 18 inches below the surface, into chocolate-brown, reddish-brown, or salmon-colored very fine sandy loam. Locally the type is called "black loamy sand" and "black sand." The texture of the surface soil ranges here and there to a loamy very fine sand. In some places the lower few inches of the 3-foot section show slight mottlings of rusty brown and traces of gray, indicating a somewhat deficient underdrainage. The type also includes some patches of Portland very fine sandy loam and Pulaski very fine sandy loam.

Some of the largest areas of this type are in the vicinity of Galloway and Baucum. It also occurs within the bend of Old River Lake, in the vicinity of Horseshoe Lake, 2½ miles southeast of College Station, 1½ miles east of Roland, and in a few other scattering areas. The soil occupies generally flat positions on high first bottoms of the Arkansas River. As a rule the drainage conditions are good.

The Lonoke very fine sandy loam is one of the best soils in Pulaski County, and practically all of it is in cultivation. Some of the very few small forested areas were observed to contain sweet gum, tupelo, red and white oak, scaly bark and pignut hickory, ash, dogwood, pecan, black and red haw, hackberry, walnut, mulberry, honey locust, elm, and maple.

This type is used largely for cotton and corn, with a very small part devoted to alfalfa and red clover. A considerable acreage is used for oats, with average yields of 30 to 40 bushels per acre. (See Pl. XXII, fig. 2.) Some plantings of pecans have been made. Under normal conditions the average yield of cotton is almost one-half to three-fourths bale per acre without the use of fertilizers. The boll-weevil inroads have cut yields below this. Express and Rowden are the principal kinds of cotton grown at this time. Victor and Kings Improved are also grown. The ordinary yield of corn is 20 to 35 bushels per acre. The farm methods are similar to those described under the Pulaski very fine sandy loam.

This type, which is inherently fertile, has been injudiciously cropped, and crop yields have declined as a result. Some planters are attempting to restore the yields to their former level by applying commercial fertilizers. In one experiment on corn an application of 500 pounds per acre of a 9–4–1 fertilizer was made. The fertilized plot returned a yield of 40 bushels per acre, at a cost of 51 cents

per bushel, whereas the check plot yielded but 20 bushels per acre at a cost of $1.25 per bushel. Serious losses have been sustained by cotton through attack by wilt, which is rather prevalent. A field was treated with 500 pounds per acre of a 10–3–0 fertilizer and with 500 pounds per acre of kainit, the combination analyzing 5–1.5–6.25. The fertilized plot yielded 1,127 pounds of seed cotton per acre, whereas the check plot yielded only 225.5 pounds per acre.

Oats production has been somewhat on the increase. Just over the line in Lonoke County an interesting experiment was conducted on this soil type. A clover and Bermuda-grass sod was plowed and sowed in the fall with oats, the seed being a pure strain of the Red Appler variety. In the spring an application of 500 pounds of a 12–1–2 fertilizer per acre was made. The average yield was 91.3 bushels per acre.

Most of the Lonoke very fine sandy loam is held by planters who control relatively large acreages of land. Much of it is easily accessible and its present value ranges from about $100 to $150 an acre.

Although this type is normally productive it is possible to increase the present yields. This can be done either by growing legumes, such as red clover, alfalfa, cowpeas, or soybeans, or by applying fertilizers. The results of further experiments should determine the best and most economical course to be followed. A few small areas would be benefited by improved drainage. Where oats is the crop, it is possible to sow lespedeza in the oats and produce a good hay crop the same season, or Mexican June corn can be planted on the land as soon as the oats are harvested.

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

Mechanical analyses of Lonoke very fine sandy loam

Number	Description	Fine gravel	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt	Clay
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
461904	Soil, 0 to 6 inches	0.1	3.8	1.8	44.5	8.8	31.9	8.2
461905	Subsurface, 6 to 15 inches	.1	2.8	3.5	44.8	8.2	29.6	10.4
461906	Subsoil, 15 to 30 inches	.0	.0	.3	35.2	32.0	26.2	6.4
461907	Subsoil, 30 to 36 inches	.0	.0	.4	25.0	29.4	33.4	11.9

LONOKE SILT LOAM

The Lonoke silt loam is a dark-brown silt loam, passing at 8 or 10 inches into dark-brown silty clay loam and at about 12 to 14 inches into chocolate-brown to reddish-brown very fine sandy clay to silty clay, the reddish cast becoming more pronounced in the lower subsoil. In a number of places the material is a salmon-colored, heavy, very fine sandy loam, in which case there is a gradation toward the Yahola soils.

Included with the silt loam are patches of silty clay loam. Some of these occur 1 mile and 2¼ miles southeast of Alexander's Store and 1¾ miles northeast of the same place. The soil in these areas averages 3 to 4 inches of dark-brown heavy silt loam over lighter

brown silty clay loam and grades at 6 to 8 inches into plastic purplish-red silty clay.

About 2 miles south of Jacksonville the soil includes a variation consisting of about 5 or 6 inches of dark-brown or mottled dark-brown and gray silt loam, passing through dark-bluish silt loam and dark-bluish silty clay loam into dark-bluish silty clay, becoming lighter colored with depth and underlain at 18 to 20 inches by a mottled chocolate-brown and gray silty clay. There are in this area some mounds of very fine sandy loam. This variation is a gradation toward the Perry soils, which are developed in this part of the county.

The largest and most typical areas of Lonoke silt loam occur in the vicinity of Wampoo and near Horseshoe Lake. One area lies 3 miles northeast of Galloway, and a number of smaller areas are in the vicinity of Rixey. This is a first-bottom soil of the Arkansas River. In many places it occupies positions intermediate between the higher lying Portland or Lonoke very fine sandy loam on one side and the lower and heavier Perry or Portland soils on the other. The surface has an almost imperceptible slope from the higher to the lower soils, and drainage conditions are, in general, fairly good; a few areas are imperfectly drained, particularly in some of those described as variations.

This type is not very extensive, but it is well liked by the farmers and at least 95 per cent of it is in cultivation. The tree growth consists of pecan, locust, elm, white oak, ash, maple, hickory, sweet gum, red oak, and pin oak. Cotton and corn are the main crops and a little sorgo and oats secondary crops. The average yield of cotton is about three-fourths bale per acre, and of corn 20 to 40 bushels. One farmer on this soil reports that he has not obtained good results with commercial fertilizer; another states that an application of 250 pounds per acre of a 10–5–0 mixture on cotton has given increased yields. Very little of this land can be bought, but the good, typical Lonoke silt loam is considered worth not less than $150 an acre.

A number of areas of this type are in need of drainage and will produce better crops if the drainage is improved. In general, more attention should be given to the selection of improved varieties of cotton and corn, to deeper plowing, and to the growing of legumes.

PERRY SILTY CLAY LOAM

The surface soil of the Perry silty clay loam consists of 6 or 7 inches of light-gray silty clay loam mottled with yellowish brown and rusty brown. The subsoil is a bluish-gray, plastic silty clay, mottled with yellow and yellowish brown. In places purplish-red clay appears in the lower subsoil, as in some of the areas 1½ to 3 miles north of Scott.

Included with the Perry silty clay loam are some patches of Perry silt loam, the principal difference being in texture. Areas of silt loam texture occur 2 and 3 miles north of Scott, 2½ miles northeast of Galloway, and 1¼ and 2½ miles east of Rixey. The area 1¼ miles east of Rixey is characterized by a number of dome-shaped mounds.

The Perry silty clay loam occurs in low, wet parts of the Arkansas River bottoms, mainly between North Little Rock and the county line to the east. The soil is not important in extent or use. About 70 per cent of it is forested with pin oak, sweet gum, and hickory. The average yield of cotton on the cultivated, better drained areas is one-half to two-thirds bale per acre, and of corn 25 to 30 bushels per acre. The land values and the need for improved drainage conditions are about the same as for the Perry clay.

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

Mechanical analyses of Perry silty clay loam

Number	Description	Fine gravel	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt	Clay
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
4619118	Soil, 0 to 7 inches	0.2	0.2	0.1	1.2	35.6	42.4	20.2
4619119	Subsoil, 7 to 36 inches	.0	.6	.2	4.2	10.0	56.0	28.9

PERRY CLAY

The typical Perry clay consists of 8 to 10 inches of mottled dark bluish gray and brown or rusty-brown clay, very high in silt, overlying bluish-gray or dark bluish gray clay, which passes at about 24 inches into light bluish gray clay, both relatively high in silt, mottled with brown or rusty brown. The clay is quite plastic when wet, but crumbles at the surface on drying.

There are some variations from the typical soil. The most common is that which has a purplish-red silty clay in the subsoil at depths ranging from 15 to 24 inches. Purplish-red calcareous silty clay is present everywhere in the deep substratum. As shown in a well located on this type the gray to bluish silty clay extended to a depth of 18 feet before the red calcareous layer was encountered. Some areas have purplish-red clay within the 3-foot section, as along North Bayou, 2 miles west and southwest of Campbells Store, and in the vicinity of Possum Flat. Another variation is a chocolate-brown silty clay in the surface 6 to 10 inches, passing into mottled gray and bluish material beneath. Such areas are extremely patchy. In a few places, as just north of Woodson, sandy material occurs in the lower subsoil.

In the two large areas of Perry clay south of Jacksonville, along Bayou Meto, the surface layer, 4 or 5 inches thick, consists of very dark bluish clay, which passes into lighter bluish clay mottled and streaked with yellowish brown or rusty brown.

Two swampy areas are shown on the map with swamp symbols. One of these occupies part of what formerly was the bed of Faulkner Lake. Drainage ditches have lowered the level of the lake to such an extent that part of the old lake bed is now a soft spongy mass of decayed vegetation covering a wet, gray to bluish mud, the entire mass being water-logged during the greater part of the year. All of it is forested with tupelo and cypress. The other area lies at the northern end of Big Lake, where it receives the drainage from

Loran and Fish Creeks. This area is submerged almost all the time and has a dense growth of tupelo and cypress.

The Perry clay is found throughout the Arkansas River bottoms, being developed in the lowest and most poorly drained parts. One of its typical occurrences is in the tupelo and cypress brakes, most of which have water in them during all or at least a greater part of the year. It is also developed in wide, poorly drained areas that do not have such quantities of water upon them. Large areas of Perry clay are developed along streams tributary to the Arkansas River, such as Maumelle Creek, Fourche Creek, and Bayou Meto. These areas are covered with forest consisting of pin oak, hickory, elm, post oak, ash, and overcup oak. In places sloughs and swampy depressions are common. In many parts of the river bottoms, as, for example, north of Galloway, there is a perfect maze of cypress brakes with intervening ridges of Portland soils.

At least 95 per cent of the Perry clay is in forest. Much of the cultivated land has been reclaimed by ditching, and after a few years of cultivation the surface soil often assumes a chocolate-brown appearance. Land formerly under 1 to 2 feet of water but reclaimed by ditches now produces an average of 25 to 35 bushels of corn per acre and one-half to three-fourths bale of cotton per acre. Oats planted in the spring are said to do well. The forest areas are used for cattle and hog pasture.

Water often remains on this type until late in the spring, and consequently plowing is often delayed. However, some farmers were seen plowing the soil when it was so wet that they were wearing rubber boots. As this is a "buckshot" soil, the clods formed in plowing with the land in this condition soon crumble and fall apart. There is also an advantage in plowing the soil wet, for when dry plowing is very difficult. The soil, however, is not droughty. The cotton rows are usually bedded high, and it is not uncommon to see water standing deep between the ridges.

Forested areas of the Perry clay are valued at $20 to $25 an acre; cleared land ranges from $50 to $100 an acre, depending upon its location.

Most of this soil type still remains in a virgin condition, and must not only be cleared but drained before it can be used for farming. The expense of draining some areas now under cultivation has ranged from $15 to $20 an acre. Some areas, as along Bayou Meto, will be more difficult to drain properly.

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

Mechanical analyses of Perry clay

Number	Description	Fine gravel	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt	Clay
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
461901	Soil, 0 to 8 inches	0.0	0.1	0.1	0.0	0.3	42.9	56.7
461902	Subsoil, 8 to 24 inches	.0	.0	.0	.2	1.4	48.4	49.9
461903	Subsoil, 24 to 36 inches	.2	.1	.2	.4	1.2	48.8	48.9

ROUGH STONY LAND

The Rough stony land includes areas of steep rocky slopes where the soil contains bowlders in large quantities and the surface is cut by extensive outcrops of bedrock. The largest development is on the peaks and ridges in the vicinity of Maumelle Pinnacles and Shinall Mountain. Smaller areas occupy the isolated knobs 3 to 4 miles south and southwest of Marche. Other areas lie 1 to 2 miles west of Geyer Springs, in the extreme northwestern corner of the county, and scattered in other parts of the mountainous region.

This type is not in cultivation and has very little agricultural use. A small part of it furnishes pasturage for cattle and hogs. Most of the timber has been cut, but second-growth pine is rapidly reforesting large areas. The principal timber growth consists of shortleaf pine, blackjack oak, red oak, post oak, and hickory.

Much of the type is owned by large lumber companies and is largely considered open range. The cut-over land of this type does not command more than $2.50 an acre, with the exception of a few parts desired for their scenic beauty. The policy of reforesting untillable areas of this kind has been followed in other States, and this is the only practicable use for the Rough stony land.

MEADOW (OCHLOCKONEE AND BIBB MATERIAL)

Meadow includes strips of wet soils having such varied texture and color characteristics, both through the vertical section and from place to place within short distances, as to preclude their being mapped as a definite soil type. The soils include mixed brown, gray, and reddish material of sandy loam, silt loam, silty clay loam, and other textures.

Meadow occurs along a number of the small branches draining the Coastal Plain country. It has been mapped principally west and southwest of Ironton and east of Jacksonville. The total extent is small, and the land has little value except for pasture. Maple, sweet gum, post oak, and pin oak are common trees in these areas.

RIVERWASH

Riverwash includes areas of land along the banks of the Arkansas River which are subject to frequent overflows and are undergoing changes, not only in texture and composition, but in actual extent. In places Riverwash consists of coarse sand and gravel; in others of very fine sand to clay, and there is no consistency in the depth of these various soil materials or in their mode of occurrence.

Riverwash occupies interrupted but relatively long belts or bars throughout the course of the Arkansas River in Pulaski County. Its subjection to many and swift overflows have given it a billowy topography not unlike that of dunesand. It has little agricultural value, but it furnishes much fuel to the inhabitants of the near-by fertile Arkansas River bottom lands, the fuel consisting of driftwood and also of the willow and cottonwood that grow in some places.

SUMMARY

Pulaski County is aproximately in the center of Arkansas. It comprises an area of 779 square miles, or 498,560 acres. There are three

principal topographic divisions: (1) The Arkansas River and its tributary stream bottoms and terraces; (2) the highlands or hilly to mountainous country; (3) the rolling lands of the Coastal Plain. The range in elevation is from about 225 feet, where the Arkansas River leaves the county, to 1,055 feet on Shinall Mountain.

The Arkansas River bottoms, which attain a maximum width of 10 miles in the county, are essentially flat, but are locally marked by numerous low ridges and depressions, with only a few feet difference in elevation. The tributary stream bottoms vary from very narrow to a mile or more in width. The river lands are the most fertile and widely cultivated of any lands in the county.

The mountainous part of the county is rough to hilly. There is some gently rolling to gently sloping land in the valleys and on some of the broader ridges, and some valley floors are almost flat. The smoother and less stony areas are suitable for agriculture and are moderately productive. The Coastal Plain is gently rolling and most of it is suitable for cultivation.

The Arkansas River, with its tributaries, drains the entire area. While the county is generally well drained, poor drainage occurs in some of the larger creek bottoms, in flat valley areas, in the flat parts of the Coastal Plain, and on some second bottoms and low areas in the Arkansas River bottoms.

Little Rock, the county seat, is also the State capital, and the largest and most important city in the State. It is on the Missouri Pacific, Chicago, Rock Island & Pacific, and the St. Louis Southwestern (Cotton Belt) Railroads.

The climate is generally favorable to agriculture. The mean annual precipitation is 49.98 inches, and the mean annual temperature is 61.5° F.

In 1920, 241,831 acres, or 48.5 per cent of the area of the county, represented the land in farms, and 150,419 acres, or 62.2 per cent of this farm land was classed as improved land.

The land not in farms is principally forest land, consisting largely of steep, stony ridge land or poorly drained land in the flatwoods and stream bottoms. At least 60 to 70 per cent of this land is adapted only to grazing and forestry; drainage would reclaim the rest for agriculture.

Cotton and corn are the principal crops, followed by hay and forage crops. Other common crops are sweet potatoes and potatoes, sorgo (sweet sorghum), vegetables, and strawberries. The livestock and dairying industries are increasing in importance.

Many farms are not self-sustaining and feed and foodstuffs are imported in large quantities.

The best equipment and methods of cultivation are usually found in the Arkansas River bottoms. The most serious drawback to agricultural progress is an unbalanced type of agriculture and a lack of rotation. The use of legumes and commercial fertilizers is becoming somewhat more general.

In 1919, 63.2 per cent of the farms in Pulaski County were operated by tenants, 36.4 per cent by owners, and 0.4 per cent by managers.

Land prices range from $2.50 an acre for rough mountain land in large tracts to $150 an acre for good river-bottom land. A much more common range is from $25 to $75 an acre.

The highland soils include the types of the Talladega series, derived from slate (novaculite); the well-drained Hanceville soils and the poorly drained Conway soils, derived from sandstones and shales; and the Porters soils, derived from granite (syenite).

The Talladega gravelly silt loam is used for farming and produces fair yields. The Hanceville gravelly fine sandy loam, fine sandy loam, loam, and valley phase of the loam are cultivable, and the yields are moderately good. The Conway silt loam, although not very well drained, is free of rock and extensively tilled. The Porters silt loam is an excellent general purpose soil.

The Talladega stony silt loam, and stony silt loam, steep phase, the Hanceville stony loam, and stony loam, steep phase, and the Porters stony silt loam are not farmed to any appreciable extent.

The Coastal Plain region represents marine sediments which have given rise to soils of good to moderate productivity.

The Greenville silt loam is an excellent soil, suited to a wide range of crops.

The sandy types of the Ruston, Susquehanna, and Norfolk series are well adapted to trucking.

The Caddo soils are in need of drainage, but produce well where drainage has been improved.

The better drained alluvial or first-bottom soils, consisting of material from Hanceville and Talladega soils, belong to the Pope and Casa series; they are fertile and extensively tilled. The Atkins soils represent the same character of material but have poor drainage.

The Waynesboro types are second-bottom soils derived from slate, sandstone, and shale material, the same as the Pope and Casa series. They are highly esteemed. The Tyler soils are the poorly drained equivalents of the Waynesboro.

The first-bottom soils that consist of alluvium from Coastal Plain material include the Ochlockonee series (well drained) and the Bibb series (poorly drained).

The Arkansas River bottom soils are characterized by their distinct purplish-red color and the presence of lime carbonate either in the surface, subsoil, or substratum. These first bottoms, including the Miller, Portland, Pulaski, Yahola, and Lonoke series, constitute the most fertile and extensively farmed soils in the county. The Perry soils are poorly drained, but are gradually being drained. When drained they constitute good farm lands.

Four series of soils are recognized as belonging to the terraces or second bottoms of the Arkansas River.

The Teller very fine sandy loam is well drained and produces good average crops. The Teller clay loam is badly eroded.

The Muskogee silt loam is poorly drained and produces only moderate yields.

The Wrightsville very fine sandy loam is very poorly drained. Strawberries will do well on this soil when well drained and where manured.

The Crowley silt loam is lacking in drainage, but parts of the type give fairly good yields.

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