

Issued February 16, 1916.

U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE ARKANSAS AGRICULTURAL EXPERIMENT STATION,
MARTIN NELSON, DIRECTOR.

SOIL SURVEY OF COLUMBIA COUNTY,
ARKANSAS.

BY

CLARENCE LOUNSBURY AND E. B. DEETER.

HUGH H. BENNETT AND W. EDWARD HEARN,
INSPECTORS, SOUTHERN DIVISION.

[Advance Sheets—Field Operations of the Bureau of Soils, 1914.]



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1916.

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., July 23, 1915.

SIR: I have the honor to transmit herewith, and to recommend for publication as advance sheets of Field Operations of the Bureau of Soils for 1914, as authorized by law, the manuscript and map covering a soil survey of Columbia County, Ark., which was made in cooperation with the Arkansas Agricultural Experiment Station. The area was selected for survey after conference with State officials.

Very respectfully,

MILTON WHITNEY,
Chief of Bureau.

Hon. D. F. HOUSTON,
Secretary of Agriculture.

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FIGURE.

FIG. 1. Sketch map showing location of the Columbia County area, Arkansas. Page. 5

MAP.

Soil map, Columbia County sheet, Arkansas.

SOIL SURVEY OF COLUMBIA COUNTY, ARKANSAS.

By CLARENCE LOUNSBURY and E. B. DEETER.

DESCRIPTION OF THE AREA.

Columbia County lies along the southern boundary of Arkansas, near the southwestern corner of the State. It is bounded on the north by Nevada and Ouachita Counties, on the east by Union County, on the south by the State of Louisiana, and on the west by Lafayette County. The county is about 31 miles long from north to south, and about 29 miles wide. It has a total area of 496,000 acres, or 775 square miles.

The greater part of the county east of Bayou Dorcheat has a gently rolling and undulating to rolling surface, with occasional hilly areas. Changes in elevation are marked ordinarily by gentle to moderate slopes which usually continue to the stream bottoms or to the stream terraces or low benches which frequently border the streams. Occasionally for short distances along some of the larger stream bottoms there is an abrupt fall of 30 to 50 feet and rarely of 75 to 100 feet, but in most cases the slope is moderate. Most of that part of the county west of Bayou Dorcheat has a much lower elevation, and, with the exception of the few slightly rolling areas occupied chiefly by Ruston and Orangeburg soils, a flat to slightly undulating surface. The more rolling part of the county east of Bayou Dorcheat has an average elevation above sea level of about 300 feet.

Nearly all the drainage of the county is toward the south. The streams in the western part are tributary to the Red River, while those to the east are tributary to the Ouachita River. The divide separating these two stream systems is marked roughly by a line beginning at the northern county boundary, passing southward to McNeil, then southeastward to a point about 5 miles east of Magnolia, and thence southward to the State line. Bayou Dorcheat, with its tributaries, carries the drainage of the western part of the county. Big Cornie Creek carries most of the drainage of the eastern part of the county. The drainage of the northeastern section is carried by Smackover Creek. The streams generally have a uniform fall, and usually follow winding or meandering courses.



FIG. 1.—Sketch map showing location of the Columbia County area, Arkansas.

Throughout practically all of the county the topography is favorable for agriculture. The few more abrupt slopes and broken areas are not so extensive but that they can be well set aside for timber or pasturage. A greater limiting factor is the imperfect drainage in places. The drainage is usually adequate in the more rolling areas, but in the lower and flatter areas, especially those occupied by the Caddo, Lufkin, and Myatt soils, artificial drainage is needed. The drainage of the stream bottoms occupied by the Ocklocknee and Bibb soils also is deficient.

All of the county originally supported a forest growth which consisted of hardwoods, largely oak and hickory, and shortleaf pine. The greater part of this original timber has been removed by lumber companies. Practically all of the first-bottom lands remain in timber. Of the uplands perhaps 40 to 50 per cent has been brought under cultivation.

Some scattering settlements were made prior to 1840 in the area now included in the county. The majority of the early settlers came from other southern States. They brought slaves into the region, and the descendants of these form most of the present colored population. During recent years there has been some influx of northern farmers, principally from the Central States. The county was formed in 1852 from parts of Lafayette, Ouachita, and Union Counties. The present boundaries were established in 1901, when an area west of Bayou Dorcheat in the northwestern part was annexed to Lafayette County.

According to the census of 1910 the county has a population of 23,820, or an average of 30.3 persons per square mile. About 15 per cent of the population live in the towns. Magnolia, the county seat, has a population of 2,045. A cotton compress, oil mill, ice plant, and a few minor industries are located at this place. McNeil, with a population of about 500, and Waldo, with about 600, are located in the northern part of the county. Emerson, with a population of about 500, is the principal town in the southern part of the county, and Taylor is the most important town in the western part. Cotton gins are located at all the towns and at various crossroads.

The county has fair railroad transportation facilities. The main line of the St. Louis Southwestern Railway between St. Louis and points in Texas passes through the northern part of the county, and the Louisiana & North West Railroad runs southward from McNeil through Magnolia to Natchitoches, La. The Louisiana & Arkansas Railway, connecting Hope, Ark., and Alexandria, La., serves the extreme western part of the county.

Comparatively little produce other than cotton is shipped out of the county. This product is shipped to mills in South Carolina and the New England States, and to Liverpool, Bremen, and Japan.

Public roads are in fair condition during the summer months, but in wet seasons, especially during the winter, they are sometimes nearly impassable. Some interest is being manifested in the improvement of the more important roads.

Rural routes extend from the more important towns. Telephones are in common use. Good public schools for both white and colored pupils are located at convenient points. One of the four State agricultural schools is located at Magnolia.

CLIMATE.

The climate of Columbia County is mild and equable. The summers are long and at times hot, while the winters are mild, with only occasional brief cold periods. The annual temperature averages about 63° F.

The total annual precipitation is about 50 inches. The rainfall is fairly well distributed throughout the year, though the larger part of it occurs during the winter and spring months. The heavier rains swell the streams and cause them to overflow the bottoms. During the summer months droughts occasionally occur, but these seldom injure crops where reasonable care is exercised in the preparation and in subsequent cultivation of the land.

According to the records of the Weather Bureau station at Camden, Ouachita County, where the climate is comparable with that of Columbia County, the winter months of December, January, and February have a mean temperature of 44.8° F. The lowest temperature recorded is -10° F. Extremely low temperatures, however, are rare. The ground often freezes to a depth of an inch or two, though for only a few days at a time. Frosty nights are common during the winter. Occasionally there is a snowfall of an inch or two, but some winters pass with only light snow flurries. The average precipitation for the winter months is 13.74 inches. Various kinds of farm work can usually be carried on throughout the winter.

The spring months have a mean temperature of 63.5° F. and a rainfall of 14.67 inches. Sometimes frosts are late and severe enough to injure early fruit blossoms. Second plantings of cotton and corn are necessary some years when cold, wet periods follow the first plantings.

The average temperature for the summer months is 79.8°, with a total precipitation of 11.66 inches. The highest temperature recorded is 109° F. During the fall months the temperature averages 63.4° F., with a precipitation of 10.39 inches.

The average date of the last killing frost in the spring is reported by the Camden station as March 17, and that of the first in the fall as November 9. The average growing season of 237 days is sufficiently

long for a wide range of crops. The latest date of killing frost recorded is April 12, and the earliest October 14.

The data in the following table, compiled from the records of the Weather Bureau station at Camden, in Ouachita County, are fairly representative of the climatic conditions in Columbia County.

Normal monthly, seasonal, and annual temperature and precipitation at Camden, Ouachita County.

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.
	° F.	° F.	° F.	Inches.	Inches.	Inches.
December.....	45.8	79	8	4.54	5.40	7.00
January.....	43.0	80	9	5.29	3.66	5.80
February.....	45.7	81	-10	3.91	1.85	3.98
Winter.....	44.8			13.74	10.91	16.78
March.....	55.2	91	17	5.57	3.48	8.10
April.....	63.6	95	30	4.38	2.60	10.07
May.....	71.7	98	40	4.72	9.50	6.89
Spring.....	63.5			14.67	15.58	25.06
June.....	78.0	102	48	4.90	1.80	8.39
July.....	81.1	106	54	4.42	1.60	7.19
August.....	80.2	109	48	2.34	1.26	4.36
Summer.....	79.8			11.66	4.66	19.94
September.....	74.4	103	38	3.49	2.05	5.55
October.....	63.4	97	21	2.43	2.28	5.27
November.....	52.3	90	18	4.47	2.42	3.46
Fall.....	63.4			10.39	6.75	14.28
Year.....	62.9	109	-10	50.46	37.90	76.06

AGRICULTURE.

With the permanent settlement of the county, which began about 1840, agriculture became the chief industry. Farming at first was carried on inextensively and effort was directed simply toward producing sufficient food and textile materials to meet the home demand.

Considerable development took place prior to the Civil War. The war, however, had a demoralizing effect upon the agriculture of the region, and development was retarded for many years.

Cotton, corn, and wheat early became the chief crops, but were grown principally for home use. At an early date, however, some surplus cotton was grown and exchanged for commodities not easily produced at home. Prior to the advent of the railroads, the first of

which was completed about 1882, cotton was marketed principally at Camden, from which point it was shipped by boat to New Orleans.

Cotton and corn are the leading farm crops. Because of the more successful production of wheat in the Northwestern States, and the low yields obtained in this county, this crop has declined until at present practically none is grown.

During the last three decades the acreage in cotton has gradually increased, without any appreciable increase or decrease in average yields. According to the census, the acreage has increased from 32,427 acres reported in 1880 to 53,423 acres reported in 1910. The production in 1909 was 15,686 bales. The ginners' reports for the 1913 crop slightly exceeded 23,000 bales. Magnolia cotton has a high reputation for quality on the market. The usual methods in growing cotton are those common to the cotton-growing States. The land is prepared during the late winter by turning up the soil into ridges about $3\frac{1}{2}$ feet apart, which is accomplished with a small turning plow, or middle-buster. Commercial fertilizers at the rate of 200 to 300 pounds to the acre are generally distributed in the furrow before the soil is turned in to form the ridges. The ridges are usually smoothed with the light harrow or float, after which the seed is drilled in with the cotton planter in the bed thus formed. Planting takes place the latter part of March or in April. After the plants are well out of the ground the rows are barred off by turning the soil away from each side. Thinning then takes place by "chopping" with hand hoes. Cultivations follow, first with a small turning plow, or bull-tongue plow, and then with sweeps of various widths. Several cultivations are made, and about the middle of July the crop is "laid by." Picking begins the latter part of August and continues during the fall. The boll weevil causes some damage nearly every year, the extent of injury varying with the wetness or dryness of the season.

The acreage of corn, like that of cotton, has increased, with no wide variation in average yield. The 1880 census reports the total area in corn as 28,868 acres, and the 1910 census as 41,883 acres. The average yield per acre is about $12\frac{1}{2}$ bushels. Methods of growing corn are similar to those used for cotton. Planting usually follows that of cotton, ordinarily being made the latter part of April. The corn is often planted later, and some good crops are obtained even when planted early in June. Generally better results are had with earlier plantings, as the crop attains a better growth to resist summer droughts. At the time of the last cultivations it is a common practice to plant cowpeas between the rows. These are either gathered for the seed or left to be turned under on preparing the land for the following crop. Fodder is often obtained by topping the corn stalks or by stripping, or "pulling" the blades from the stalks about the

time the ears have matured. The corn is gathered from the standing stalks and stored in the shuck. Some damage is caused by the corn weevil. All the corn grown is consumed in the county, and many farmers do not produce enough to supply home needs. The present low average yields could be greatly increased by more thorough and careful preparation of the land, shallow intertillage, and careful seed selection.

Oats are of less importance than formerly. This crop is reported on 1,269 acres in 1909. It is moderately successful, better results being obtained on the finer textured soils than on the coarser, deeper, sandy lands. Oats are sown both in the fall and late winter, the earlier seeded crop usually giving best results. The grain is fed with the straw. No thrashing machines are used in the county.

Besides being grown with corn, cowpeas are frequently sown as a separate crop, in some cases for the forage, and in others exclusively as a green-manure crop. Some farmers prefer the latter use, as they consider the crop more valuable as a soil improver than for forage.

Bermuda grass, various other grasses, and lespedeza (Japan clover) thrive on the stream-bottom soils and on the finer textured upland soils. Yields of $1\frac{1}{2}$ to 2 tons of hay per acre are often obtained. The quantity of hay as well as of other rough feeds produced, however, is not great, and many farmers do not grow sufficient hay to feed the small number of live stock kept.

The grasses, including also carpet grass, crab grass, and broom sedge, make excellent pasturage on the stream bottoms and on most of the heavier upland soils. The wild cane ("switch cane") found on some of the stream bottoms, especially along Big Cornie Creek, is valued for the grazing it affords during the winter months.

Sorghum and sugar cane are grown to some extent for sirup. Most of this product is consumed at home, but small quantities are sold, mainly at local markets. Sugar cane is grown on various soil types, but best results are obtained on low-lying soils and in moist depressions.

Peanuts are grown in a small way, mainly as forage for hogs. The Spanish peanut is the most common variety. The sandy loams and the loamy phases of the sand types of soil are best suited to this crop.

Of the vegetable or truck crops sweet potatoes are of first importance. Very few farmers grow them extensively, but enough are produced to supply home needs, some are sold at local markets, and in a few cases some are shipped to northern markets. The 1910 census reports a total of 869 acres in sweet potatoes, with a production of 87,640 bushels.

Irish potatoes do well, but are grown only for local use. Turnips, cabbage, cauliflower, beets, okra, spinach, and several other vegetables do well on the various soils.

Fruit growing has not assumed marked importance. Most of the fruit is consumed at home or disposed of locally. Peaches, plums, pears, figs, blackberries, and grapes (Scuppernong) give satisfactory results. Peach orchards present a thrifty appearance, indicating that an extension of the peach-growing industry might prove profitable where shipping facilities and markets are available. The Ruston fine sandy loam and similar well-drained soils are well suited to the peach. Some Elbertas and a few miscellaneous varieties are grown. Apples, principally the early varieties, are grown, but the climate is not suitable for their successful production.

On the sandier soils watermelons and cantaloupes give excellent results. These are grown in sufficient quantities for home use and to supply local markets.

Dairying is not an important industry. A surplus of butter and milk is occasionally marketed locally. Most of the improved dairy cattle are Jersey, some being purebred. Except in one or two instances silos are not used.

Stock raising, especially the raising of beef cattle, seems to offer good opportunities. The extensive tracts of undeveloped land, especially the stream bottoms and some of the more poorly drained upland soils not well suited to the production of cultivated crops in their present condition, could well be used for this purpose. By clearing the land and seeding with Bermuda and other grasses and lespedeza excellent grazing can be maintained. Some steers and old cattle are marketed each year. The Texas cattle tick is more or less prevalent throughout the county.

Hogs are raised by practically every farmer. Generally they are allowed the freedom of the range, being rounded up when desired for sale or for finishing on concentrated feeds. Poland China and Duroc Jersey are the prevailing breeds. Cholera sometimes causes loss.

There are some sheep and goats in the county, and a small flock of poultry is raised by nearly every farmer. The present local demand for poultry products is greater than the supply. The work stock consists mainly of mules. Some of these are raised at home, but many farmers purchase their draft animals.

Few farmers follow any systematic rotation of crops. Many of them, however, alternate cotton with corn, growing cowpeas with the latter; but usually this is not sufficient to maintain an adequate supply of humus. Other crops could well be introduced, so that the land would not be subjected to continuous clean culture. The effects of continuous cropping are shown by the bleached and eroded surface of some fields. Such conditions indicate low productiveness and a low water-holding capacity.

Commercial fertilizers are used extensively for both cotton and corn, and their use is considered essential for satisfactory results. The fertilizer consists mainly of the ready-mixed brands, usually analyzing 10-1.65-1 or 10-1.65-1.50.¹ In a few cases a phosphoric-acid preparation analyzing 16 per cent is used with success. Some farmers mix their own fertilizers, using chiefly cottonseed meal and acid phosphate. Sodium nitrate is sometimes used, light applications being made to corn and occasionally to cotton. For 1909 the census reports for the county an expenditure of \$75,395 for fertilizers. The value of barnyard manure is recognized by farmers, but owing to the small number of live stock in the county the supply is inadequate.

Most of the hired farm labor is colored, and the supply is usually adequate. Monthly wages range from \$12 to \$20, and occasionally \$25, with board. By the day laborers are paid 75 cents to \$1, usually without board.

The census of 1910 gives a total of 3,543 farms in the county, with an average of nearly 98 acres to the farm, of which about 41 acres are improved. Of these farms 62.8 per cent are operated by owners. The farms, including equipment, have an average value of \$1,477, while the average land value is reported as \$8.47 an acre.

There are two general systems of renting farms. Under one plan the tenant furnishes all the farm equipment and takes one-third of the corn and one-fourth of the cotton crop, the landlord furnishing the fertilizers in proportion to the share of crops he receives. Under another form of agreement the landowner furnishes all work stock and tools and receives one-half the crop. Each party bears equally the fertilizer expense. Occasionally a cash rent is paid. This varies from \$2.50 to \$3 an acre, with more desirable lands commanding \$5 an acre.

SOILS.

Columbia County is situated entirely within the Coastal Plain. The soils, therefore, are primarily of sedimentary origin, having been deposited in comparatively shallow water prior to the final receding of the sea, probably being transported by drainage waters having their source farther north in areas of soils of the Ozark Uplift. The deposits consist largely of unconsolidated sands, mainly of fine texture, clays, and some lignitiferous materials.

These materials in Columbia County have been classified geologically as the Wilcox and Sabine formations and undifferentiated materials of the Eocene period. The northern part of the county is occupied by the Sabine formation and the eastern and southern portions by the undifferentiated deposits.²

¹ These figures represent percentages of phosphoric acid, nitrogen, and potash, respectively.

² Bul. 429, U. S. Geol. Survey, Pl. XII. See also *Underground Water Resources of Northern Louisiana and Southern Arkansas*, Prof. Paper, U. S. Geol. Survey, No. 46.

Besides the above formations, which comprise the upland, more recent deposits, in the form of alluvial materials, have been made. Drainage waters have carried quantities of soil materials in suspension from the uplands and deposited them over the flood plains of the various streams. Some of the streams have cut their channels deeper than they were formerly and do not now overflow former flood plains. The soils on these older terraces, or second bottoms, are regarded as distinct from those of the first bottoms.

The soils of the county thus fall into two provinces—the comparatively old sedimentary soils of the uplands, or Coastal Plain proper, and the stream-bottom and terrace alluvial soils, or River Flood Plains province.

The soils derived from these formations differ considerably, varying with the extent of weathering, the degree of erosion, conditions of drainage, and oxidation of the component minerals. Based on these determining factors, twenty-seven soil types are recognized and mapped in Columbia County. These types are grouped into series on the basis of similarity in color, origin, and, to a certain extent, in structure and topography.

There are six such series in the Coastal Plain section of the county—the Susquehanna, Ruston, Orangeburg, Norfolk, Caddo, and Lufkin. The stream-bottom soils of the county fall into two divisions—first-bottom and second-bottom soils, based on their position and liability to or freedom from overflow. Those of the first bottoms are classed in the Ocklocknee and Bibb series, and those of the second bottoms, or terraces, with the Cahaba, Kalmia, and Myatt series.

The following table gives the names of the several soil types, with their extent expressed in acres and percentages:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Susquehanna fine sandy loam.	105,152	21.2	Norfolk sand.....	7,168	1.4
Caddo fine sandy loam.....	86,720	17.5	Norfolk very fine sandy loam.	6,720	1.4
Ocklocknee very fine sandy loam.....	65,664	13.2	Ocklocknee silt loam.....	6,656	1.3
Lufkin silt loam.....	30,080	6.1	Cahaba very fine sandy loam..	5,056	1.0
Norfolk fine sandy loam.....	27,200	5.5	Orangeburg fine sandy loam..	4,992	1.0
Ruston fine sandy loam.....	26,304	5.3	Lufkin clay.....	3,328	.7
Susquehanna sandy loam.....	23,168	4.7	Ruston sand.....	2,688	.5
Caddo very fine sandy loam...	19,520	3.9	Ocklocknee fine sandy loam..	2,304	.5
Susquehanna very fine sandy loam.....	12,736	2.6	Meadow.....	1,856	.4
Myatt very fine sandy loam...	11,264	2.3	Bibb silt loam.....	1,600	.3
Ruston very fine sandy loam..	11,008	2.2	Kalmia fine sandy loam.....	1,536	.3
Ruston sandy loam.....	10,944	2.2	Susquehanna clay.....	1,344	.3
Cahaba fine sandy loam.....	10,432	2.1	Cahaba fine sand.....	576	.1
Bibb very fine sandy loam....	9,984	2.0	Total.....	496,000	-----

SUSQUEHANNA SERIES.

The Susquehanna soils are gray, ranging to reddish. The subsoils are mottled gray and red or gray, red, and yellow, and consist of plastic, heavy clay. The color of the subsoils varies, often being red, white, drab, or yellow, and sometimes purple, although red practically always predominates, the other colors appearing only as mottlings in the lower part of the 3-foot section. The Susquehanna series is most extensively developed in the higher part of the Coastal Plain, from the vicinity of Chesapeake Bay to central Texas. Four members of this series are encountered in Columbia County—the Susquehanna sandy loam, fine sandy loam, very fine sandy loam, and clay.

SUSQUEHANNA SANDY LOAM.

The Susquehanna sandy loam consists of 12 to 18 inches of loam to sandy loam, having in the surface material a grayish color and in the subsurface a yellowish or pale-yellow color. The subsoil usually consists of a yellowish stiff sandy clay which in passing downward soon changes to a stiff, plastic red clay mottled with yellow, the plasticity and mottlings becoming more pronounced with increase in depth. There are included some areas in which small, rounded gravel is scattered over the surface and throughout the soil, and, to a less extent, the subsoil. Where most abundant the gravel offers some hindrance to cultivation.

This type has a rather small development in the county. The largest areas are situated in the southeastern part, immediately to the west of Atlanta and 4 to 5 miles northwest. Small areas of this soil occur here and there in association with several of the other upland soils. The gravelly areas occur in the northwestern, central, and southern parts, the most conspicuous development being along Bayou Dorcheat between Beech Creek and the St. Louis Southwestern Railway.

The surface is rolling to slightly hilly and the soil is usually found on ridges or in situations somewhat more elevated than the Susquehanna fine sandy loam or other associated soils. The drainage is usually good.

White, black, and post oak and pine constitute the prevailing timber growth.

Most of this type is utilized for the production of the general farm crops. It is managed in about the same way as is the Susquehanna fine sandy loam. The coarser texture of the surface soil makes it a little easier to cultivate, but crop yields average slightly less.

SUSQUEHANNA FINE SANDY LOAM.

The Susquehanna fine sandy loam, in its typical development, consists of a brownish-gray loamy fine sand, underlain at 6 to 8 inches by a reddish fine sandy loam, which grades abruptly, usually at

about 10 to 15 inches, into red or dull brick-red, stiff, plastic clay. This grades below into mottled yellow and gray or drab and red very plastic clay. The mottlings become more conspicuous as depth increases, until the very mottled clay is reached at about 20 to 24 inches. Mixed with the surface soil are found occasionally small quantities of waterworn and rounded chert and quartzitic gravel, which are not plentiful enough materially to interfere with cultivation. Well-developed iron concretions are sometimes mixed with the soil material.

There are several minor variations in this type which are not of sufficient importance to be shown separately on the soil map. On the gentler slopes and in more nearly level areas the soil is a yellowish-brown or brownish-yellow loamy fine sand to fine sandy loam, and at about 12 to 18 inches it is underlain either (1) by reddish-yellow to light-buff or even yellow, stiff fine sandy clay, which grades below into heavy plastic clay mottled yellow, red, and gray or drab in color, or (2) immediately by mottled yellow, red, and gray or drab, heavy plastic clay. Frequently ochreous-yellow and bright-red friable material (apparently highly ferruginous) occurs, and this imparts a somewhat friable structure to the subsoil clay at various depths, usually in the lower part. This is frequently noticeable in the case of the typical soil.

A rather poorly drained phase, encountered in flat to somewhat depressed situations, consists of a grayish loamy fine sand, which quickly passes into mottled grayish and yellowish loamy fine sand, and this in turn, at about 12 to 20 inches, into plastic clay, mottled yellow, red, and gray or drab in color. Frequently the upper part of the subsoil of this phase consists of a mottled gray and yellow heavy fine sandy loam to fine sandy clay. Such areas are often found in association with the Caddo fine sandy loam, and in such cases it is difficult to make satisfactory separations.

Toward the northeastern part of the county, notably about 2 miles east of Laughlin, there is a shallow phase, which prevailingly consists of a reddish-brown fine sandy loam containing appreciable quantities of small rough and angular sandstone fragments and gravelly material. This is underlain by a red stiff and more or less plastic clay, such as is typical of the Susquehanna soils.

In places there is a deep phase, differing from the typical soil principally in the greater depth of sandy material over the heavy clay. The soil consists usually of gray to brownish-yellow fine sand or loamy fine sand, which grades at about 6 inches into pale-yellow loamy fine sand or fine sand, and this at about 15 to 20 inches into yellowish fine sandy loam, often mottled with gray. This, in turn, is underlain at about 20 to 30 inches either (1) by mottled gray and yellowish-red stiff fine sandy clay, which passes below into mottled

red and gray plastic clay, or (2) directly by mottled gray, yellow, and red plastic clay. Some reddish-brown ferruginous material occurs in the subsoil in places.

The Susquehanna fine sandy loam is found in practically all the upland portions of the county east of Bayou Dorcheat. It is more extensive in the eastern and northeastern sections, where it occurs in the largest areas. It occupies rolling to gently rolling country, though occasionally the surface is somewhat hilly. Drainage is usually good, except in the flatter areas.

The present forest growth consists largely of shortleaf pine, white oak, red oak, hickory, dogwood, and sweet gum.

A large part of the type is cleared and used more or less regularly for farming. It is regarded as a moderately productive soil, and responds readily to good management. Its productiveness, however, has been reduced by the constant cultivation which has prevailed in this region. Continuous cropping without suitable rotation of crops and without plowing in additional vegetable matter causes diminution of the organic-matter content. Many farmers grow cowpeas either with the corn or as a separate crop. This legume is quite effective in maintaining a desirable organic-matter content. The plan of growing cotton and corn successively year after year is too severe upon the land.

Cotton and corn are the principal crops. Varying with the state of productiveness, which depends upon the methods practiced and the length of time the land has been cultivated, crop yields range from poor to good. On new land or land kept in good condition cotton produces one-half to about 1 bale and corn 25 to 40 bushels per acre. The usual yields are one-third to one-half bale of cotton and 15 to 25 bushels of corn. Oats are not generally grown, but this grain could well receive more attention both for the grain and as a winter cover crop. Other crops, such as sorghum, sugar cane, sweet potatoes, melons, and turnips, are grown successfully, mainly for home use.

Commercial fertilizers are nearly always used for cotton and corn, and their use is considered essential for profitable yields. As is the case with other soils, the preparation of the land is generally insufficient, in that the soil is not broken deeply or thoroughly enough to turn under any organic matter present and to form a suitable seed bed.

In the steeper and more rolling areas the soil has a tendency to wash and form gullies. To counteract this, terraces or hillside ditches are generally constructed, and these when carefully laid out and properly cared for are effective in preventing erosion. Slopes not thus protected are soon ruined when kept in cultivation.

Land values vary widely, depending on improvements and location with respect to railroads and markets. Well-located, improved land of this type is sold for \$25 to \$40 an acre, but the larger part of the type is valued at \$10 to \$20 an acre.

SUSQUEHANNA VERY FINE SANDY LOAM.

The Susquehanna very fine sandy loam has a surface soil consisting of light-gray or yellowish-gray very fine sandy loam. This has a yellowish or pale-red cast below 4 to 6 inches. The subsoil, beginning at about 8 to 15 inches, consists of a dull-red, stiff, tough clay, which grades quickly into an intensely mottled gray, red, and yellow, tough, plastic clay, and this continues to depths of more than 3 feet. Usually in the lower part of the 3-foot section the gray and yellow mottlings are very pronounced and generally the substratum at about 4 or 5 feet is decidedly gray and yellow, with mottlings or streaks of red. Frequently on slopes the surface material has been washed away, exposing areas of the stiff subsoil clay, locally known as "gall spots." These areas, if sufficiently extensive to warrant separation, would be mapped as the Susquehanna clay.

Owing to its very fine sandy texture, the surface soil of this type is somewhat more compact than that of the closely related Susquehanna fine sandy loam, and it is slightly more difficult to till. These two types appear to have about the same power to resist drought.

The principal developments of this type are to the east of Milner and to the north of College Hill. A few small areas occur in the western and southern parts of the county. The type occupies gently rolling areas and slopes. Most of it is well suited to cultivation. The surface drainage is well established, but the tough, impervious character of the subsoil causes poor internal drainage.

Cotton and corn are the principal crops. These give about the same returns as on the Susquehanna fine sandy loam. Cowpeas, lespedeza, grasses, and other forage crops do well. Peanuts and vegetables also succeed.

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

Mechanical analyses of Susquehanna very fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
460905.....	Soil.....	0.8	0.6	0.6	14.2	34.6	43.4	5.5
460906.....	Subsoil.....	.2	.2	.2	8.0	22.6	31.6	36.9

SUSQUEHANNA CLAY.

The Susquehanna clay is somewhat variable as to the character of the surface material. Usually there is a surface soil of not over 4 or 5 inches, varying from a grayish to reddish fine sandy loam through grayish loam to reddish clay loam. This is underlain by a tough red or light-red clay which becomes plastic and sticky in the

lower part and mottled red and gray or drab to red, gray, drab, and yellow. Frequently the red clay appears at the surface.

The Susquehanna clay has a limited development in the county. It occurs in 18 or 20 small areas found in all parts of the county, covering in all about 2 square miles.

The surface is mostly sloping and in places rather rough and broken, favoring washing. There are a few flat areas in the southwestern part of the county.

Some of the type is being cultivated, with but low to moderate yields. The rougher developments are used for pasture, to which this soil is probably best adapted. In growing cultivated crops much better results than those prevailing can be had by plowing deeper and using other means to produce a deep, mellow seed bed.

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

Mechanical analyses of Susquehanna clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
460947.....	Soil.....	0.4	1.6	0.6	2.4	41.5	46.3	7.3
460948.....	Subsoil.....	.0	.2	.1	.6	17.6	29.0	52.4

RUSTON SERIES.

The Ruston soils are gray, ranging to grayish brown. The subsoils are reddish yellow to yellowish red or dull red, and are moderately friable, consisting generally of sandy clay. Occasionally the lower subsoils are mottled with gray and shades of yellow. This series is intermediate between the Orangeburg and Norfolk series in the color of the subsoil, and between the Orangeburg and Norfolk on the one hand and the Susquehanna on the other in point of subsoil structure. All these soils are derived from material of similar origin, namely, unconsolidated deposits of the Coastal Plain. The Ruston series is represented in Columbia County by four types, the sand, sandy loam, fine sandy loam, and very fine sandy loam.

RUSTON FINE SANDY LOAM.

The surface soil of the Ruston fine sandy loam is a gray to brownish-gray fine sand or loamy fine sand, grading at about 6 to 8 inches into a pale-yellow loamy fine sand to fine sandy loam, and at 12 to 20 inches into reddish-yellow to yellowish-red friable fine sandy clay. This material in the lower part of the 3-foot section often becomes lighter colored and frequently shows mottlings of bright red, yellow, and brown. The lower subsoil is often somewhat plastic, but charac-

teristically not nearly so plastic as the Susquehanna clay. In places small chert and ironstone gravel and pebbles occur on the surface and mixed with the soil mass. Reddish iron concretions are sometimes present in the subsoil. Patches of Orangeburg fine sandy loam too small to separate are sometimes mapped with this type.

This soil is developed mainly in rather small, disconnected areas distributed throughout the county. The largest continuous bodies lie in the vicinity of Magnolia and along the west side of Big Creek to the west of that place. The surface for the most part is undulating to gently rolling. The type usually occupies upper slopes, above areas of Norfolk or Caddo fine sandy loam. In the broader areas of the Caddo fine sandy loam small areas of Ruston fine sandy loam often occupy knolls and low, narrow ridges.

The drainage is usually good, though in some depressions, as at the heads of branches, it may be deficient. Surface washing on some of the steeper slopes sometimes causes damage, but where cultivated slopes are protected by hillside ditches erosion is not serious. The open, sandy surface soil and the comparatively porous structure of the subsoil permit the ready absorption and retention of rainfall, which enables the soil to withstand drought well where careful cultural methods are practiced.

The original timber was largely oak and shortleaf pine. Over most of the type the timber has been removed and the soil brought under cultivation. It is devoted principally to cotton, corn, and miscellaneous crops common to the region. Cotton yields one-fourth to one-half bale or more per acre, and corn 10 to 30 bushels. Oats are not commonly grown, but should give good returns. Sugar cane sorghum, peanuts, and vegetables are well suited to this soil. Irish potatoes and sweet potatoes are successfully grown and the type seems well adapted to them. Tree fruits, especially peaches, thrive, and if it were desired to extend peach growing in the county the Ruston fine sandy loam would apparently prove well suited for this purpose.

Land of this type is valued at \$8 to \$25 an acre, depending on improvements and location.

RUSTON VERY FINE SANDY LOAM.

The Ruston very fine sandy loam consists of a very fine sandy loam varying from about 10 to 18 inches in depth. The upper portion is gray to yellowish gray; below 5 to 8 inches the color is pale yellow to reddish yellow. The subsoil is a reddish-yellow or yellowish-red friable fine sandy clay. Frequently below 28 to 30 inches the color is lighter and sometimes is mottled with gray and brown or red.

Nearly all of this type is in the southwestern part of the county. Some small, scattered areas occur along the southern boundary and a few others north of McNeil. The surface is undulating to gently

rolling. When found in association with the Orangeburg fine sandy loam this type has a lower elevation and often occupies lower slopes, with the Orangeburg type prevailing at the higher levels. Low, rounded mounds are a feature in the low-lying areas northwest of Sharman. Except in some of the lower, flatter areas, the drainage is good.

Most of the type has been cleared and brought under cultivation. It is a strong, productive soil, easy to cultivate and to keep in good tilth. Probably better results are obtained than on the Ruston fine sandy loam. Cotton yields range from one-third to three-fourths bale and occasionally exceed 1 bale per acre. Corn under careful management produces 40 to 50 bushels, but the usual yield is much lower. All the forage and cover crops are easily grown. Vegetables and melons are well suited to this soil, as are peaches, plums, and certain small fruits. Peanuts would probably do well. The type is more productive than the Ruston fine sandy loam. Land of this type is valued at \$15 to \$25 an acre.

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

Mechanical analyses of Ruston very fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
460927.....	Soil.....	0.2	0.2	0.2	3.6	54.4	35.8	5.4
460928.....	Subsoil.....	.0	.2	.2	2.4	42.7	30.4	24.0

RUSTON SANDY LOAM.

The typical Ruston sandy loam is a gray or light-gray sand or loamy sand of medium texture, 6 to 8 inches deep, which below becomes a pale-yellow loamy sand to a depth varying from 12 to 20 inches. This is underlain by reddish-yellow to dull-red friable sandy clay. The lower part of the subsoil is often decidedly compact and mottled with yellowish and bright-red colors. The surface soil and, to a less extent, the subsoil often contain some quartzitic gravel and ferruginous pebbles. In a few places the surface sand has a rather coarse texture, as, for example, on the hill northeast of Chalybeate Springs Church. The organic-matter content is generally low, as is evident from the incoherent structure of the surface soil and its frequently bleached, whitish appearance. Surface washing and gullyng often become serious on slopes not protected with terraces or hillside ditches. Some included small areas are quite gravelly, the gravel consisting of small waterworn chert and quartzite. These interfere somewhat with cultural operations where most plentiful.

Areas of this type are mostly rather small and scattered. The largest development is in the eastern part of the county between Village and Hurricane Creeks and in the western part in the vicinity of Box Springs. It is not found in the extreme northern part nor west of Bayou Dorcheat.

Generally the elevation is comparatively high and the topography is rolling to slightly hilly. With the exception of occasional depressions, the drainage is well established and in the more rolling situations it is excessive.

The Ruston sandy loam is probably better suited to cotton than to corn, as corn is more likely to be affected in dry weather, on account of its low power to resist drought. Cotton gives yields of one-third to two-thirds of a bale and corn 8 to 20 bushels an acre. Many farmers say that crop yields are now much lower than when the land was first brought under cultivation. The greatest need apparently is an increase in organic-matter content, to improve the soil structure and make the soil more retentive of moisture. It is a good soil for melons and peanuts, and in general for truck and forage crops.

RUSTON SAND.

The Ruston sand consists of a gray or brownish-gray sand, underlain at 6 to 12 inches by reddish-yellow to dull-red sand or slightly loamy sand which continues to a depth of 36 inches or more. In a few places the subsoil at 24 to 30 inches becomes distinctly loamy and often approximates a sandy clay. The structure of both surface soil and subsoil is loose and the soil is easy to cultivate.

A few areas of this type of unimportant extent are not shown separately on the map. The largest and most typical area is that in the vicinity of Calhoun. Only a few other scattered areas were mapped. This type has a nearly level to gently rolling surface, and the prevailing open structure insures good to excessive drainage. On the finer soil, crops may be expected to withstand drought somewhat better.

The characteristic timber includes white oak, blackjack oak, hickory, pine, and sweet gum. Nearly all of the type is cultivated, with fairly good success. Crops are said not to suffer unduly in droughty seasons, though the soil is not so drought resistant as are the types having heavier textured subsoils. Yields of cotton ordinarily range from one-fourth to one-half bale per acre and of corn from 5 to 20 bushels an acre. The soil is fairly well suited to cowpeas, sorghum, and forage crops. It is well suited to vegetables and truck. As with most of the soils of the county, it is desirable to increase the content of organic matter.

ORANGEBURG SERIES.

The Orangeburg soils are predominantly gray, ranging to reddish brown. The soils are open structured and the subsoils consist of friable sandy clay. This series is confined to the uplands of the Coastal Plain, being most extensively developed in a belt reaching from southern North Carolina to central Texas. The soils are sedimentary in origin and, like the Norfolk soils, are derived from unconsolidated sands and clays. Only one member of this series, the Orangeburg fine sandy loam, is encountered in Columbia County.

ORANGEBURG FINE SANDY LOAM.

The Orangeburg fine sandy loam consists of a gray to brownish-gray fine sandy loam or loamy fine sand changing at about 6 or 7 inches to a reddish-yellow fine sandy loam, which continues downward to depths ranging from about 8 to 15 inches. The subsoil consists of a bright-red, friable fine sandy clay, extending to a depth of 36 inches or more. Occasionally the texture of the surface soil approaches a very fine sandy loam and in other places the subsoil contains less sand, approximating a loamy clay, of brittle, friable structure. In places there are some scattered, angular fine gravel and rounded pebbles. There are included a few small areas of a coarser soil—Orangeburg sandy loam—which is not of sufficient importance to warrant separate mapping. This soil occurs 9 or 10 miles west of Magnolia and about 4 miles southeast of Atlanta. The soil is probably a little less retentive of moisture than the fine sandy loam.

The Orangeburg fine sandy loam has a limited development in the county. Most of it is found in small areas in the southern part. The largest areas occur in the vicinity of Welcome and Bussey.

The topography is gently rolling to rolling, and drainage is well established. The type is generally found closely associated with soils of the Ruston series and usually occupies the higher elevations, with the Ruston types occupying the lower slopes. It sometimes occurs in areas too small to map, and such are included with the Ruston fine sandy loam.

Most of this soil has been brought under cultivation. It is easily cultivated and generally productive, and resists drought well. It is well suited to the staple crops and to a wide variety of special ones. Yields do not vary much from those obtained on the Ruston fine sandy loam.

NORFOLK SERIES.

The surface soils of the Norfolk series are prevailingly gray, ranging from light gray to grayish yellow. The subsoils are yellow and have a friable structure. These soils occupy nearly level to rolling uplands

throughout the Coastal Plain. They are derived from unconsolidated deposits of sands and clays. Three types of the Norfolk series are recognized in Columbia County—the sand, fine sandy loam, and very fine sandy loam.

NORFOLK FINE SANDY LOAM.

Typically the Norfolk fine sandy loam is a gray to yellowish-gray fine sand, underlain at about 6 to 8 inches by pale-yellow loamy fine sand, which grades at 12 to 15 inches into yellow fine sandy loam, this in turn quickly passing into yellow, friable fine sandy clay. A phase of the type, representing a transitional soil between the Norfolk fine sandy loam and the Ruston fine sandy loam, has a compact structure in the lower subsoil, and often shows reddish mottlings in this lower portion. In places there are some pebbles of chert and ferruginous material. There are included some small bodies of a coarser soil—Norfolk sandy loam—of insufficient extent and importance for separate mapping. This coarser soil is found in the northern part of the county.

This soil type occurs for the most part as small scattered areas in association with soils of the Susquehanna, Ruston, and Caddo series. There are no extensive bodies in this county such as occur in some nearby areas in the Coastal Plain region. The surface characteristically is gently rolling, sloping, or nearly level. The soil is frequently found along lower slopes, with the more elevated situations occupied by types of the Ruston or Susquehanna series, into which the change is gradual in many places. The more sloping and rolling areas usually have good drainage, but some of the lower lying areas are somewhat deficient in this respect. The coarse soil—the included sandy loam—is probably less retentive of moisture.

The principal timber growth consists of white and red oak, dogwood, sweet gum, and shortleaf pine. When first cleared the soil has a fair supply of humus, and where this is maintained it is productive. A considerable proportion of the type is cultivated. Cotton yields about one-fourth bale to 1 bale or more per acre, averaging about one-half bale. Corn yields 10 to 30 bushels, averaging not over 15 bushels an acre. Less important crops, such as cowpeas, sorghum, sugar cane, oats, and peanuts, and pastures of lespedeza and Bermuda grass do well.

Commercial fertilizers used on this soil are probably not quite so effective as on types with the heavier clay subsoils. Some farmers state that the beneficial effects are not so lasting.

The value of this type is usually fixed in connection with adjoining types. Reasonably improved lands at present are valued at about \$15 to \$20 an acre.

NORFOLK VERY FINE SANDY LOAM.

The Norfolk very fine sandy loam consists of a grayish, friable very fine sandy loam, passing below into pale-yellow very fine sandy loam. This at depths varying from about 10 to 18 inches is underlain by yellow, friable fine sandy clay which becomes heavier and a little more plastic in the lower part. Below 30 inches slight mottlings of red and yellow are of frequent occurrence.

This type occurs principally in two localities—in the southern part of the county as irregular areas in the territory drained by tributaries of Cypress Creek, and in the low divide extending northwest between Bayou Dorcheat and Crooked Creek. Small areas are found in the vicinity of McNeil and in a few other localities.

The surface is prevailingly gently rolling, and drainage is good. There are a few low mounds, especially in the flatter low-lying positions, similar to those on the Caddo soils. In such areas the drainage is sometimes deficient. Such areas really represent occurrences of Caddo soil which are not mapped, on account of their small size.

The type is productive of cotton, corn, and other crops ordinarily grown in the region. It has a finer texture and somewhat more compact structure than the Norfolk fine sandy loam, and is slightly more difficult to cultivate.

NORFOLK SAND.

The material composing the Norfolk sand consists of a light-gray sand, underlain at an average depth of about 5 inches by pale-yellow or yellowish-gray, incoherent sand which continues to a depth of 3 feet or more. Some included lower lying spots have a sticky sand or sandy clay in the lower subsoil. Darker or more grayish surface colors are found in the flatter, lower lying places, and lighter colors on the higher situations where drainage is more thorough and the content of organic matter smaller. There are included small areas of soil of a finer texture—Norfolk fine sand.

The Norfolk sand is rather inextensive, occurring mostly in small scattered areas. It is not found in the extreme northern or southwestern parts of the county. The largest and most typical area is located about 5 miles west of Magnolia. The largest areas of included fine sand are those west and south of Milner. The soil here is somewhat more retentive of moisture than the typical sand.

The type usually occupies rather high, undulating and gently rolling areas. Owing to the loose, incoherent structure, drainage is generally so excessive that crops soon suffer during dry weather. The open soil structure permits the ready entrance of rain water, so that surface wash seldom causes damage. Where fields are exposed to the prevailing winds, the loose sand sometimes drifts and tends to beat down and smother young plants.

A considerable proportion of this type has been brought under cultivation, and is devoted principally to the staple crops. For this purpose it is regarded as a poor soil and but low yields are obtained. Constant use of fertilizer is necessary, as its effects are not lasting. Yields of cotton do not often exceed one-fourth to one-third bale, and of corn 15 to 20 bushels, an acre. In the drier seasons the yields are much lower. Though of low productiveness, this soil has the advantage of warming up early in the spring and permitting early planting. It is thus much better suited for use in growing early truck crops than the staples. Sweet and Irish potatoes, cantaloupes, and melons are good crops for this soil. Winter cover crops are advantageous, since they reduce drifting to a minimum and furnish much-needed vegetable matter to be worked into the soil.

CADDO SERIES.

The soils of the Caddo series are gray to yellow, and the subsoils mottled gray and yellow or gray, yellow, and red. The series is characterized by low sandy mounds or hummocks. These soils are typically developed in slightly depressed upland areas of imperfect drainage, frequently about the heads of streams. Water frequently stands in the depressions between the mounds, making artificial drainage necessary. The Caddo series is most extensively and typically developed in northwestern Louisiana and northeastern Texas, where loessial material has been reworked and spread out. It is represented in Columbia County by two types, the fine sandy loam and very fine sandy loam.

CADDO FINE SANDY LOAM.

The Caddo fine sandy loam has a surface soil 6 to 8 inches deep. It consists of fine sand or loamy fine sand to fine sandy loam of a grayish or yellowish-gray color, which grades downward into pale-yellow material of about the same texture. The subsoil, beginning usually at about 10 to 20 inches, is composed of a yellow or slightly reddish yellow, somewhat friable fine sandy clay, nearly always mottled with gray. Below, it grades into somewhat plastic fine sandy clay, mottled yellow and gray or drab and often red. In places the subsoil is dense and compact and quite impervious to water. Faint mottlings of grayish brown are present in the immediate surface soil, and in places rusty-brown iron concretions are encountered.

Scattered more or less plentifully over the surface are rounded low mounds about 1 foot to 4 feet high and 20 to 50 feet in diameter. These mounds resemble small dunes and give the surface a billowy configuration. They occur in greater numbers in the lower, more nearly level areas. The mounds are prevailingly sandy, and consist of fine sand, grayish yellow at the surface and yellow beneath, the

depth depending usually on the height of the mound. The material resembles that of the Norfolk soils. Where the mounds are numerous the soil of the intervening depressions is ordinarily less well drained and of a darker color than elsewhere. It is usually a dark-brown to dark-gray fine sandy loam, often mottled with rusty brown, and underlain at about 20 to 30 inches by a mottled yellow and gray or drab fine sandy loam which passes below into fine sandy clay. In places, more particularly in the higher, flat situations and on most of the gentler slopes, the mounds are not present.

Typically the surface is low and flat, except for the mounds, or gently rolling. The type often occurs in small tracts at the heads of streams or as strips along lower slopes bordering streams. The broader areas often are interrupted by small elevations or low ridges, the soil of which is usually the Ruston or Susquehanna fine sandy loam or some member of the Norfolk series. These situations are usually selected for the location of farmsteads.

The Caddo fine sandy loam is found mainly in scattered areas in association with the various other upland soils of the county. It is not found west of Bayou Dorcheat. Its largest development extends from the vicinity of Emerson eastward toward the Union County line, with an extension northward to Calhoun. Because of the characteristic low, flat topography and frequently compact nature of the subsoil the drainage is deficient. The more poorly drained areas are known locally as "crawfish land."

The principal trees are white and red oak, and, in the less well drained situations, water and pin oak, black gum, sweet gum, and hickory. Myrtle bushes are common.

The greater part of this type remains uncleared. Much of it is successfully used for the production of cotton, corn, and other crops. Cotton yields from one-fourth to two-thirds of a bale, and corn 5 to 25 bushels, averaging about 10 bushels, per acre. Oats yield an average of about 15 bushels per acre. The soil is fairly well suited to sorghum and sweet potatoes. In level areas, where the mounds are not too numerous, rice would perhaps be a satisfactory crop. Good pasturage can be maintained with such grasses as Bermuda and carpet grass and with lespedeza.

One of the principal needs of this soil is improvement of the drainage. In its present condition most of it is "cold" and backward in the spring. Well-constructed ditches would greatly improve large areas of the type, but tile drains would probably be more effective. Deep breaking of the land and the application of lime are beneficial. With improved drainage conditions the Caddo fine sandy loam should prove a strong, durable soil. Land of this type is valued at \$5 to \$20 an acre.

CADDO VERY FINE SANDY LOAM.

The Caddo very fine sandy loam is a grayish to pale-yellow, moderately compact very fine sandy loam, underlain at a depth of 6 or 7 inches by mottled yellow and gray, heavy very fine sandy loam, which grades at about 12 to 15 inches into a distinctly mottled gray, yellow, and light-brown, friable to slightly plastic very fine sandy clay. Some red mottlings often appear below 30 inches.

This type has a much more limited development than has the fine sandy loam of this series. It occurs mostly in the southern part of the county. The more important areas are the one extending from the vicinity of Corinth Church northeasterly for about 3 miles, that lying south of Horsehead, and that 3 or 4 miles west of Ware. West of Bayou Dorcheat the type is found largely as a transitional soil between the Ruston and Norfolk very fine sandy loams and the Lufkin silt loam.

The surface is characteristically low and flat, the type frequently lying lower than the adjoining areas of the Caddo fine sandy loam. Circular mounds are nearly always present. Drainage is poor, and in places water stands for considerable periods following rains. Such areas generally have a whitish or ashy-gray soil and support a timber growth consisting principally of water oak and pin oak.

A small proportion of this type where drainage is best is cultivated, principally to cotton and corn. The larger part is unimproved and remains in forest. Where cultivated, about the same returns are obtained as on the Caddo fine sandy loam.

LUFKIN SERIES.

The Lufkin series includes light-gray surface soils with gray to mottled gray and yellow, impervious, plastic subsoils. The difference in texture between the surface soil and subsoil in the case of the sandy members is very marked. The topography is prevailingly flat, and this, together with the impervious subsoils, renders both the surface drainage and underdrainage poor, water often standing for long periods after heavy rains. The soils are locally known as "flatwoods land" and "dead land." Their agricultural value is considerably below that of the Norfolk soils. Two members of this series—the silt loam and clay—are recognized in Columbia County.

LUFKIN SILT LOAM.

The surface soil of the Lufkin silt loam consists of 6 to 10 inches of a dark-gray to light-gray compact silt loam, darker at the immediate surface and lighter beneath, and sometimes slightly mottled with yellow or yellowish brown. This is underlain by a lighter gray or drab, compact, plastic silty clay with distinct mottlings of yellow or yellowish brown. In places the upper subsoil is a silty clay loam.

Some areas show in the lower subsoil mottlings of red or pale red. Low, circular mounds, similar to those found on the Caddo soils, are a common surface feature.

The close structure makes the soil difficult to work. It compacts on drying, and if plowed when too wet clods are likely to be formed with subsequent cultivation.

A higher lying phase, generally found bordering streams and drainage courses, has a surface soil approximating a very fine sandy loam, 8 to 10 inches deep, resting on a brownish or dull-yellow silty clay loam. This sometimes continues to a depth of 3 feet or more, but often in the lower part of the subsoil the material consists of a light-gray silty clay mottled with gray and yellow.

Underlying this soil type, at 6 to 15 feet below the surface, as observed in well excavations and occasional cuts, there is a substratum of stiff red clay, varied occasionally with some fine sandy material.

This type is encountered west of Bayou Dorcheat. In the vicinity of Experiment it occurs in a strip about 2 miles wide, which south of Bussey broadens out to the bayou, whence it continues southward in a nearly continuous area almost to the State line. The surface is low and nearly flat, varying from undulating to nearly level in places. Poor drainage is characteristic of the type, and in the flatter areas water stands for considerable periods after rains.

Most of the type is forested with different varieties of oak, sweet gum, and black gum, with hickory and pine on the better drained phases.

Usually the slightly better drained situations have been selected for cultivation. Although not well adapted to this soil, cotton and corn are the principal crops. Cotton yields one-fourth to one-half bale and sometimes more on the better drained phases with proper soil management. Corn does not make a thrifty growth. It yields from 5 to 10 bushels where drainage is poor and 25 or 30 bushels on the better drained land. Fairly satisfactory results are obtained with sorghum, sugar cane, and cowpeas. Excellent pasturage is afforded by an abundance of lespedeza, Bermuda grass, and carpet grass. Although rice has not been grown in this county, there is every indication that the more nearly level areas of this soil could be successfully used for this cereal. The impervious structure of the subsoil would favor the retention of the flood waters necessary to rice production. Rice is successfully grown on the same soil type just west of the county line.

For the successful production of general crops this type needs extensive artificial drainage. Well-constructed open ditches to remove surface waters would greatly aid, while tile drains, should circumstances justify the greater expense, would probably be even more efficient. Deeper and more thorough breaking of the land is

needed, such as could be accomplished by the use of larger turning or disk plows. Liberal application of lime undoubtedly would improve the tilth.

The present value of this soil is low. Unimproved land can be purchased for \$3 to \$8 an acre, and improved and well-located land for \$10 to \$20 an acre.

LUFKIN CLAY.

The surface soil of the Lufkin clay to a depth of about 1 inch to 5 inches is a grayish or grayish-brown clay loam or silty clay loam with mottlings of darker gray and brown. Below this is encountered a stiff, dense clay or silty clay of light-gray or drab color, mottled with gray, yellow, and yellowish brown. Reddish mottlings are common in the lower subsoil. When dry the soil is hard and intractable, and when wet it is plastic and sticky. Lower depressions, where water collects, have a whitish, bleached appearance.

This type occurs west of Taylor, along the county line, and north-east of the confluence of Horsehead Creek and Bayou Dorcheat. It occupies low, flat situations having poor drainage.

Nearly all the type remains in timber, of which water oak and pin oak are characteristic. Under existing drainage conditions it has little value other than for forestry and pasturage. The soil probably could be used for rice production. Portions of the area east of Bayou Dorcheat are better drained and are used to some extent for crops.

OCKLOCKNEE SERIES.

The Ocklocknee soils are prevailing brown, ranging to dark gray. The subsoils are brownish or mottled brownish, yellowish, and gray. This series comprises the darker colored soils of the first bottoms of Coastal Plain streams. The soils are composed mainly of wash from the Coastal Plain soils. They are generally subject to overflow. Three members of this series, the fine sandy loam, very fine sandy loam, and silt loam, are mapped in Columbia County.

OCKLOCKNEE FINE SANDY LOAM.

The Ocklocknee fine sandy loam is prevailing a brownish loamy fine sand to fine sandy loam 8 to 12 inches deep, underlain by material varying from yellowish fine sand or loamy fine sand to gray or drab and mottled grayish and brownish fine sandy loam, which is often compact. Frequently strata of heavy material alternate with strata of lighter material in the subsoil. Small areas of other types, usually the Ocklocknee very fine sandy loam, are sometimes included. Sandy mounds occur in places.

The type occurs in small areas along some of the smaller streams of the county. This soil is sometimes found in the downstream angle formed by the junction of two streams.

The broader areas have some fairly well drained tracts, but in most of the narrow ones drainage is somewhat deficient.

Some of the better drained land has been cleared and is regularly cultivated. The type is well adapted to corn, which sometimes yields as much as 45 to 50 bushels an acre. It is considered less well suited to cotton. Oats, sorghum, and sugar cane do well where the land is well drained. Bermuda, Johnson, and carpet grasses and lespedeza are well suited to this soil for pasturage or hay.

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

Mechanical analyses of Ocklocknee fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
460949.....	Soil.....	0.1	0.3	0.5	16.0	31.7	42.3	8.9
460950.....	Subsoil.....	.2	1.0	2.0	19.8	24.4	42.6	9.6

OCKLOCKNEE VERY FINE SANDY LOAM.

The Ocklocknee very fine sandy loam is a brown or slightly grayish brown, somewhat compact but friable, very fine sandy loam, 6 to 12 inches deep. Generally there are some streaks or mottlings of light gray and rusty brown. The surface soil gradually passes into the subsoil material, which consists of a lighter colored, compact very fine sandy loam mottled with brownish and grayish colors. Frequently this grades into drab silty clay at lower depths. Sometimes the subsoil contains small, well-developed iron concretions. This type as mapped includes spots and swales of silt loam and narrow strips of very fine sand. Upon drying out much of the type has a grayish appearance, resembling in color the Bibb soils.

The Ocklocknee very fine sandy loam is the predominant first-bottom soil of the county. It is developed along nearly every important stream, the largest areas occurring along Bayou Dorcheat, and Big, Horsehead, and Big Cornie Creeks.

For the most part the type remains forested with willow, water and white oak, sweet gum, black gum, holly, ironwood, beech, and switch cane as the predominant growth. Along Bayou Dorcheat and its larger tributaries cypress is common.

Because of frequent overflows and the compact soil structure, this type has poor drainage, and little effort has been made to bring the land under cultivation. Where overflows can be prevented, it should prove a good soil for corn, oats, cowpeas, and sorghum. In its present condition cleared areas could be used to good advantage for lespedeza and Bermuda and Johnson grass. Successful reclamation would necessitate the construction of levees and a sys-

tematic series of ditches to protect the type from overflows and to carry away excess rainfall. It is now used principally as a range for cattle and other live stock.

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

Mechanical analyses of Ocklocknee very fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
460951.....	Soil.....	0.3	1.0	0.6	16.8	25.0	41.0	15.2
460952.....	Subsoil.....	.4	.6	.6	21.4	29.0	29.9	17.9

OCKLOCKNEE SILT LOAM.

The Ocklocknee silt loam is a brown or rusty-brown to mottled rusty-brown and grayish silt loam which grades below into lighter colored material, usually consisting of grayish and mottled grayish and rusty-brown silt loam or silty clay loam.

This type is found in but four localities in the county. It occurs along Bayou Dorcheat at the northwestern border of the county, along Big Creek west of McNeil, along Smackover Creek in the north-eastern part of the county, and along Cypress and Otter Creeks.

With the exception of occasional sloughs, the surface is smooth and nearly level. The type is subject to periodical overflows. Practically all of it is forested with about the same species as occur on the Ocklocknee very fine sandy loam. In its present condition it is best adapted to forestry and pasturage.

BIBB SERIES.

The soils of the Bibb series consist typically of white, compact material, and the subsoils are white or mottled white and yellowish and are compact and plastic. These soils occupy the first bottoms of streams. They are subject to overflow and to intermittent wet and dry stages. The material is derived mainly from Coastal Plain soils. Drainage is poor. The Bibb series is represented in this county by two members—the very fine sandy loam and the silt loam.

BIBB VERY FINE SANDY LOAM.

The Bibb very fine sandy loam is a light-gray to whitish, moderately compact very fine sandy loam, 5 to 8 inches deep, which grades into mottled grayish and yellow or yellowish-brown very fine sandy loam, and this at about 18 to 20 inches into mottled grayish, rather compact and somewhat plastic fine sandy clay. Sometimes the subsoil shows reddish-brown mottlings and contains black iron concretions or accretions.

Most of this type is found along Bayou Dorcheat and along Little Cornie Creek in the southeastern part of the county. Its characteristic position is at the outer border of the stream bottom, while the area bordering the stream course is usually the Ocklocknee very fine sandy loam. Generally the soil occupies a somewhat higher position than the associated Ocklocknee type, but it is subject to overflow.

Like the Ocklocknee very fine sandy loam, most of this type is forested, and with about the same species. It is probably best suited to forestry and pasturage. Lespedeza, carpet grass, and Bermuda grass do well.

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

Mechanical analyses of Bibb very fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
460953.....	Soil.....	0.0	0.6	0.4	14.4	28.0	47.3	9.2
460954.....	Subsoil.....	.1	.2	.2	16.0	34.2	36.6	12.5

BIBB SILT LOAM.

The Bibb silt loam has a surface soil 8 to 18 inches in depth, consisting of a whitish or light-gray silt loam which has a soft, floury feel when dry. Generally some yellowish or yellowish-brown mottlings are present. The surface soil changes gradually with depth into a white to light-gray or mottled light-gray and yellow, compact silt loam or silty clay. In some places the silt loam continues throughout the 3-foot section, while in others a drab, rather plastic clay or silty clay is encountered. This heavier textured material usually occurs below 24 to 30 inches.

This type is encountered in small areas along Horsehead, Big Cornie, and Cypress Creeks. It occupies the same relative position as the Bibb very fine sandy loam. All of it is forested and subject to protracted overflows. The agricultural value is low.

MYATT SERIES.

The Myatt soils are gray. The subsoils range from gray to mottled gray and yellow, and are practically impervious. These soils occupy the most poorly drained areas of the Coastal Plain stream terraces. They are mainly above overflow, but the surface is so flat that they remain inundated for long periods after heavy rains. They are closely associated with the Cahaba and Kalmia soils, and are composed of old alluvium, consisting of water-laid Coastal Plain material. The very fine sandy loam is the only type of this series encountered in Columbia County.

MYATT VERY FINE SANDY LOAM.

The typical soil of the Myatt very fine sandy loam to a depth of about 8 to 10 inches consists of a light, moderately compact, gray very fine sandy loam or loamy very fine sand, usually mottled with yellowish colors. This passes into a whitish or light-gray fine sandy clay mottled with gray, yellow, and yellowish brown, and usually plastic and compact in the lower part. Low sandy mounds similar to those common to the Caddo soils are present.

This soil type is found bordering the larger streams of the county, occurring in small strips or irregular areas. The largest single area is located on the west side of Big Cornie Creek to the east of Atlanta. The larger areas generally front directly on the outer edge of the first bottoms, but in the case of the smaller areas Cahaba soils usually are interposed.

The surface is characteristically flat and nearly level, and most of the type lies 10 to 15 feet above the first bottom. While the type is rarely subject to overflow, the nearly level, flat surface prevents ready run-off, and it is frequently inundated for considerable periods after rains.

The greater part of the type is forested, mainly with black gum, sweet gum, water oak, pin oak, white oak, and pine. Occasional better drained areas are cultivated, with a fair degree of success. Some trouble is caused by the boll weevil and by rust, but where these are not too injurious cotton often yields one-half bale an acre. Corn does not do well on this soil. Rice might prove a successful crop. Aside from improvement in drainage, the soil needs lime and probably fertilizers high in phosphoric acid. Its present use is mainly for pasturage, to which it is well adapted. With artificial drainage this soil should prove well suited to a variety of crops.

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

Mechanical analyses of Myatt very fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
460943, 460945.....	Soil.....	0.1	0.5	1.0	13.9	23.9	54.9	5.4
460944, 460946.....	Subsoil.....	.0	.5	.9	11.8	22.1	52.8	11.8

CAHABA SERIES.

The surface soils of the Cahaba series are brown, ranging to reddish brown, and the subsoils are yellowish red to reddish brown. The Cahaba soils occupy old stream terraces. They are largely above

overflow, and comprise the best drained lands of these terraces. They are most extensively and typically developed in the Gulf Coastal Plain region of Alabama and Mississippi. The soil material consists of wash from the Coastal Plain soils, with some admixture along the larger streams from the Appalachian Mountains and Piedmont Plateau of material from the soils of those regions. In Columbia County three members of the Cahaba series are recognized—the fine sand, fine sandy loam, and very fine sandy loam.

CAHABA FINE SAND.

The surface soil of the Cahaba fine sand is composed of a brown, rather incoherent fine sand. Generally there is no distinct line of demarcation between soil and subsoil, and at depths varying from 8 to 14 inches the soil grades into brown or reddish-brown loamy fine sand, which usually continues to a depth of 3 feet or more.

This type is encountered along Bayou Dorcheat in small areas. They all stand above overflow, most of them being 15 to 20 feet above the first bottoms which they adjoin. The surface is level to undulating and drainage is well established.

Probably over half the total area of this type is cultivated, while the remainder supports a forest growth consisting mainly of hardwoods. The type is used for corn, with some cotton and miscellaneous crops. Corn yields are low, usually not exceeding 15 bushels an acre. The soil is well suited to melons, potatoes, and early vegetables.

CAHABA FINE SANDY LOAM.

The surface soil of the Cahaba fine sandy loam consists of a brownish-gray to light-brown mellow fine sandy loam or loamy fine sand. Below 6 or 7 inches the color changes to yellowish red or yellowish brown. The subsoil begins quite abruptly at a depth of 10 to 18 inches and consists of a mellow and friable fine sandy clay to clay loam, yellowish red in color. In places grayish mottlings occur in the subsoil below 28 to 30 inches. There are included some small strips and patches of fine sandy loam which have the characteristics of the *Kalmia* or *Myatt* soils.

This type occurs generally in narrow and disconnected strips bordering the first bottoms of the larger streams. Broader areas occur in the forks of streams.

The surface is undulating and generally elevated 8 to 12 feet above the first bottoms. The areas usually slope back toward the uplands, frequently with intervening strips of *Myatt* very fine sandy loam. The drainage is good.

The characteristic forest growth includes white oak, water oak, pine, sweet gum, and black gum, with smilax and yellow jasmine vines.

This is considered a productive soil, and most of it has been brought under cultivation. Cotton is often affected with rust, but usually yields one-third to two-thirds bale per acre. Corn makes a thrifty growth and yields from 15 to 25 bushels. Cowpeas, sorghum, sugar cane, and forage crops do well. It is possible that alfalfa could be made successful, since the soil is well drained, friable, and productive.

CAHABA VERY FINE SANDY LOAM.

The Cahaba very fine sandy loam consists of a brownish-gray to brown very fine sandy loam, passing into a pale-reddish to yellowish very fine sandy loam a few inches below the surface. This passes at about 12 to 16 inches into a yellowish-red or brownish-red, friable fine sandy clay. Below 30 inches the color is sometimes a little lighter and is in places mottled with gray. The chief difference between this type and the Cahaba fine sandy loam is in its finer texture.

This type occupies the same relative positions and has about the same elevation and topography as the closely related fine sandy loam. The total area is much less. Its most extensive development is in the central and southern parts of the county.

Its agricultural value is about the same as that of the Cahaba fine sandy loam. Most of the type is cleared and cultivated.

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

Mechanical analyses of Cahaba very fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
460939.....	Soil.....	0.2	0.2	0.2	12.0	40.0	42.8	4.4
460940.....	Subsoil.....	.0	.2	.2	8.6	34.0	40.1	16.5

KALMIA SERIES.

The surface soils of the Kalmia series are gray, ranging to grayish yellow, and the subsoils are mottled gray and yellow. The series is developed along streams of the Coastal Plain region on terraces lying largely above overflow. It occurs most extensively in Mississippi and Alabama. The soils are composed largely of material washed from Coastal Plain soils, although along the larger streams issuing from the Appalachian Mountains and Piedmont Plateau more or less sediment from these regions is mixed with the deposits. In the better drained situations the subsoils are yellow, the types of such areas resembling very closely the corresponding members of the Norfolk series. In Columbia County the Kalmia series is represented by a single type, the fine sandy loam.

KALMIA FINE SANDY LOAM.

The Kalmia fine sandy loam consists of a gray to brownish-gray loamy fine sand which usually grades at 5 or 6 inches into yellow fine sandy loam. At a depth of about 10 to 16 inches a yellow, friable fine sandy clay is encountered. The lower part of the 3-foot section is often mottled with gray. There are occasional spots of deeper sandy material having less subsoil mottling. In places there are small spots of gray, compact material, generally of finer texture, with a compact subsoil mottled with gray and yellow. This phase usually occupies slightly lower positions and represents a gradation toward the Myatt.

The Kalmia fine sandy loam is found on stream terraces, mainly in the southern part of the county, occurring in small areas along Little Cypress and Horsehead Creeks. It has practically the same relative position, topography, and elevation as the soils of the Cahaba series. In typical areas the drainage is good.

The soil is probably better adapted to corn than to cotton. It is a satisfactory soil for melons, sugar cane, and forage crops.

MISCELLANEOUS MATERIAL.

MEADOW.

The areas mapped as Meadow comprise first-bottom alluvial and colluvial material and occur characteristically along small streams. Meadow consists of soil material widely variable, both in texture and color, throughout the 3-foot section. There is so much variation that satisfactory separation into types is impracticable. The soil as a rule is poorly drained between overflows. It is largely covered with willow, alder, and other water-loving vegetation. Some pasturage is afforded, and if the drainage were improved a part of the type might be cultivated with some success.

SUMMARY.

Columbia County—area 775 square miles, or 496,000 acres—is located in the southwestern part of Arkansas, adjoining the southern State line. In general the county has a gently rolling to rolling surface with an average elevation of about 300 feet above sea level. The drainage is southward and is divided into the Red and Ouachita River systems.

In 1910 the population was reported as 23,820. Magnolia, the county seat, with a population of 2,045, is the largest town.

The county has fair transportation facilities. The public highways are not systematically improved.

The climate is mild, with a normal growing season of 237 days. The mean annual rainfall is about 50 inches.

Cotton and corn early became and continue to be the leading crops. Other crops, grown mainly for local use, are oats, sorghum, sugar cane, cowpeas, peanuts, potatoes, and a wide variety of vegetables. Some sweet potatoes are shipped to northern markets. Tree fruits do well on the well-drained soils. Dairying and stock raising are of minor importance but could be extended profitably. Commercial fertilizers are used extensively.

The average size of the farms is nearly 98 acres, and about 63 per cent of the farms are operated by the owners.

As the county lies within the Gulf Coastal Plain, the upland soils are of sedimentary origin. Including Meadow, 27 soil types are mapped. The upland, sedimentary soils are classed in the Susquehanna, Ruston, Orangeburg, Norfolk, Caddo, and Lufkin series and the stream-bottom alluvial soils in the Ocklocknee and Bibb series and Meadow on the first bottoms, and in the Myatt, Cahaba, and Kalmia series on the second bottoms, or terraces.

The Susquehanna fine sandy loam and very fine sandy loam are extensively and successfully used in producing cotton, corn, and miscellaneous crops. The Susquehanna sandy loam is used for the same purposes, but it is not quite so productive. The Susquehanna clay is of small extent and is the result chiefly of erosion. The rougher areas are best suited to pasturage, while smoother portions are fairly suitable for cultivation.

The Ruston fine sandy loam and very fine sandy loam are productive soils, used for cotton, corn, and miscellaneous crops. These soils appear well suited to peaches and various fruits. The Ruston sandy loam is better suited to cotton than to corn, owing to its somewhat droughty nature. The Ruston sand is a deep sandy soil, inclined to be droughty. It is used for general crops, but is better adapted to vegetables and early truck crops.

The Orangeburg fine sandy loam is a well-drained soil, well suited to general farm and fruit crops.

The Norfolk fine sandy loam and very fine sandy loam are productive soils, well suited to general farm crops. The Norfolk sand is a loose sandy soil, rather droughty and not very productive. It is used for general farming, but is better adapted to early truck.

The Caddo fine sandy loam and very fine sandy loam are low, flat, poorly drained soils. The better drained phases are cleared and used for general farming. These soils afford good pasturage, but are in need of artificial drainage.

The Lufkin silt loam is a low, flat, poorly drained soil of compact structure, mainly forested. The better phases are cultivated with some success. General farm crops are grown, and rice probably would prove successful. The Lufkin clay is mostly timbered and not suited for general crops. It could probably be used for rice.

The Ocklocknee fine sandy loam has a small development, but most of it is well suited to corn and forage crops. The Ocklocknee very fine sandy loam and silt loam are brown soils, practically all forested, the former type including most of the overflowed stream bottoms. The poor drainage and frequent occurrence of overflows preclude their extensive development. They are used as a range for stock.

The Bibb very fine sandy loam and silt loam are light-colored soils which are forested and subject to periodical overflows. They afford some pasturage.

The Myatt very fine sandy loam is flat and poorly drained. Some of it is used for cotton and corn, but most of it is forested and used for stock range.

The Cahaba fine sandy loam and very fine sandy loam and the Kalmia fine sandy loam are generally well drained terrace soils, well suited to the general farm crops. Alfalfa might be successfully grown on these soils.

The Cahaba fine sand is a porous sandy soil. It gives fair results with corn and cotton, but is better adapted to early vegetables.

Meadow is a poorly drained, first-bottom type of variable soil material, which is best suited for pasturage.



[PUBLIC RESOLUTION—No. 9.]

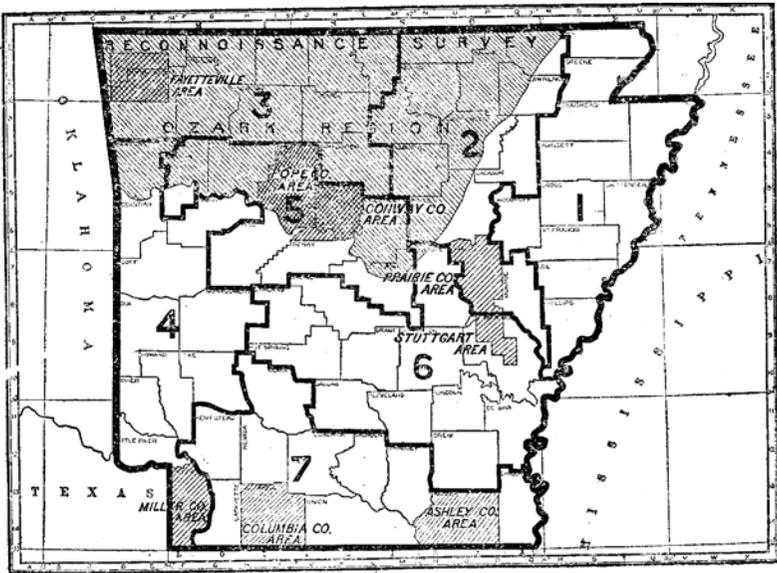
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

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

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

Approved, March 14, 1904.

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



Areas surveyed in Arkansas.

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