U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE STATE OF ALABAMA, CHARLES HENDERSON, GOVERNOR; J. A. WADE, COMMISSIONER OF AGRICULTURE AND INDUSTRIES; EUGENE A. SMITH, STATE GEOLOGIST.

SOIL SURVEY OF LOWNDES COUNTY, ALABAMA.

BY

L. R. SCHOENMANN, IN CHARGE, AND R. T. AVON BURKE.

W. EDWARD HEARN, INSPECTOR, SOUTHERN DIVISION.

[Advance Sheets—Field Operations of the Bureau of Soils, 1916.]

WASHINGTON:
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1918.

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., December 18, 1917.

SIR: Under the cooperative agreement with the State of Alabama, a soil survey of Lowndes County was carried to completion during the field season of 1916.

I have the honor to transmit herewith the manuscript and map covering this work and to recommend their publication as advance sheets of Field Operations of the Bureau of Soils for 1916, as authorized by law.

Respectfully,

MILTON WHITNEY,
Chief of Bureau.

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

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SOIL SURVEY OF LOWNDES COUNTY, ALABAMA.

By L. R. SCHOENMANN, In Charge, and R. T. AVON BURKE.—Area Inspected by W. EDWARD HEARN.

DESCRIPTION OF THE AREA.

Lowndes County is situated in the south-central part of Alabama, in the third tier of counties north of the Florida line. It is bounded on the north by Autauga County, on the east by Montgomery and Crenshaw Counties, on the south by Crenshaw, Butler, and Wilcox Counties, and on the west by Wilcox and Dallas Counties. The county is regular in outline except on the north, northeast, and northwest, where the boundary is formed by the Alabama River and its tributaries, Pintlalla Creek and Old Town Creek. The county boundary on the northeast is about 12 miles southwest of Montgomery, Ala., the State capital. The total area of the county is approximately 708 square miles, or 453,120 acres.

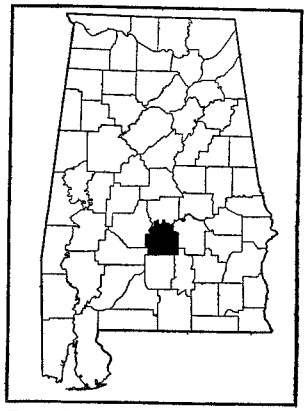

FIG. 1.—Sketch map showing location of the Lowndes County area, Alabama.

Lowndes County lies partly in the Black Belt or Central Lowland Belt of the State and partly on Chunnenuggee Ridge. The northeastern part of the county, all that part lying north and east of a curved line running approximately from Sandy Ridge in the southeastern part almost to Benton in the northwestern corner, lies in the Black Belt or Central Lowland. An area of considerable size in the western part of the county along Cedar Creek lies in an embayment of the same belt. The southern part of the county and a narrow tongue running northward between the curved line described above and the lowland area along Cedar Creek is included in the belt known as Chunnenuggee Ridge. This consists essentially of a low plateau with a gentle southward slope and a steep northerly one. It stands from 150 to 200 feet above the Central Lowland. Along its northern border, where it is drained by the headwaters of streams flowing northward into the Alabama, it is thoroughly dissected, its northern face consisting of a series of narrow, northwardly projecting ridges. The ridge extending northward toward Benton is narrow, slopes rather rapidly to the lowlands on both sides, and decreases in elevation toward the north. South of the watershed, within the area drained by streams flowing southward, the valleys are shallow and the topography relatively smooth.

The Black Belt lowland consists of an undulating to gently rolling plain with shallow but broad valleys, gentle slopes, and rounded upland ridges. The features are typical of those found in all regions of relatively old topography, underlain by soft rocks.

The Alabama River flows in a broad valley with wide belts of both low flood plains and of higher terraces. The latter are especially prominent along the northern part of the county.

In elevation above sea level Lowndes County ranges between 100 and 600 feet. Fort Deposit, in the south-central part of the county, has an elevation of 445 feet. Bargenier Hill, about 2½ miles west of Fort Deposit; County Line Hill, in the southwestern part; and Collirene, in the west-central part, rise to somewhat higher elevations, but the elevation at Fort Deposit is about the general average for the ridges in the southwestern part of the county. Letohatchee and Tyson, both well within the smoother northeastern part of the county, have elevations of 298 and 227 feet, respectively. The broad, level terraces along the Alabama River range in elevation from 129 feet above sea level at Benton to 191 feet at Manack. Benton is situated on one of the lowest terraces and Manack on one of the highest. Robinson and Burkville, in this same general area, have elevations of 152 and 143 feet, respectively.

The uplands, with the exception of a few small areas, are well drained. These exceptions include the flattest areas on the divide in the southeastern part of the county and north of Collirene, and a number of small, widely scattered areas on the foot slopes, which receive seepage water from above. In general, the drainage of the uplands in the northeastern part of the county is adequate, while that of those in the southwestern part is good to excessive. Throughout the level terrace areas in the northern part of the county, effective drainage channels have not yet become established, and those areas having a heavy, impervious subsoil are rather imperfectly drained. The first-bottom lands are overflowed after heavy rains, but between overflows they are moderately well drained.

Lowndes County was created by an act of the general assembly approved January 20, 1830. The early settlers in this region came mainly from the States to the east and northeast, and the present white inhabitants are largely descendants of the original settlers. The population of Lowndes County is given by the census of 1910 as 31,894, of which about 88 per cent are negroes. Since the largest town has a population of less than 2,500, the entire population of the county is classed as rural. The white population is grouped largely in the several small towns and villages. The agricultural population is fairly well distributed throughout the county. It is sparsest in the southwestern part.

Hayneville, the county seat, is situated in the central part of the county. It has a population of 600. Hayneville has a cottonseed-oil mill, cotton gin, a gristmill, and a sawmill. Fort Deposit is situated in the south-central part of the county. It has a population of 893, and is the largest town in the county. Fort Deposit is the shipping point for a considerable part of Lowndes and Butler Counties. It has several cotton gins and an oil mill. Letohatchee is a town of 450 population in the east-central part of the county. Calhoun and Tyson are shipping and trading points in the eastern part of the county. Lowndesboro, with a population of 400, is an interior trading point of importance in the northeastern part. Benton, in the extreme northwestern part, has a population of 500. It has shipping facilities through the Western Railway of Alabama and through the steamboats which ply between Montgomery and Mobile on the Alabama River.

Lowndes County is traversed by two railroads. The main line of the Louisville & Nashville Railroad crosses the southeastern part of the county in a northeast-southwest direction. The Western Railway of Alabama crosses the northern part in an east and west direction. The Hayneville & Montgomery Railway connects Hayneville with the Louisville & Nashville Railroad at Tyson, in the eastern part of the county. Transportation facilities are inadequate in the central-western and southwestern parts of the county. This territory is served by a line of the Louisville & Nashville Railroad which parallels the western county line at a distance of about 5 miles.

All parts of the county are reached by public roads. The main highways between the towns and villages are graded and surfaced with gravel or a sand-clay mixture. On these improved roads the streams are spanned by substantial bridges. There are about 75 miles of such improved road in the county. The other public roads are kept in fair condition. They are good in dry weather, but very muddy and hard to travel in wet weather. In the northeastern part of the county the public roads are laid out on section lines to some extent, but elsewhere they largely follow old trails.

Telephone lines reach only a few farming communities, but nearly all the towns and villages have telephone service. Practically all parts of the county are reached by rural mail delivery. Excellent graded schools are maintained in nearly all the towns and villages, and a county high school is located at Fort Deposit.

The local towns and villages offer a market for much of the farm produce. Montgomery, Selma, and Mobile receive most of the cotton and corn marketed. New Orleans is the principal cattle market, but the better grades of beef animals are usually shipped to St. Louis or Louisville. Dairy and poultry products are shipped mainly to Montgomery, Selma, and Auburn.

CLIMATE.

The climate of Lowndes County is characterized by relatively short, mild winters and long, warm summers, with a gradual transition of seasons. The mean annual temperature is 65.5° F. The average date of the last killing frost in the spring is March 10, and that of the first in the fall November 8. The average growing season for tender vegetation is thus 243 days in length.

During the winter months pleasant, sunshiny days with crisp, cool nights are interspersed with periods of cloudy weather or slow, gentle rains, frequently of 2 to 3 days duration. The winter temperatures are more variable than those of any other season. The mean winter temperature is 49.3° F., with recorded extremes of 83° and —5° in February. Though zero weather is extremely rare, sudden cold waves of a few hours to 2 or 3 days duration occur intermittently between the first part of November and the middle of March. These cold waves are marked by a brisk north or northwest wind and a sudden fall in temperature. They are occasionally attended by sleet or snow flurries, but more often by clear, cold weather. At such times the ground may freeze to a depth of 1 or 2 inches.

The mean temperature for the spring is 65.6° F. Warm, pleasant weather, favorable for plowing and seeding, usually prevails during this season. The rains of the early spring months are generally warm and gentle, insuring good seed germination. In late spring thunderstorms of more or less local extent occur with increasing frequency.

The summer season is a long period of continued heat, especially favorable to the growth of the staple crops, cotton and corn. The mean temperature for the summer is 81.3° F. The rainfalls during this part of the year are mainly torrential. The fall months are marked by moderately warm weather. With the approach of winter the heavy local rains characteristic of the summer months become less frequent, and slow, general rains begin.

The mean annual precipitation of 51.16 inches is well distributed throughout the year, and the rainfall is usually adequate for the common crops. In the driest year on record there was a total rainfall of 37 inches, of which more than one-half fell during the months of April to September, inclusive. Periods of light rainfall do occasionally occur. When droughts take place in the growing season crops usually suffer. The months of January, February, and March each have a relatively heavy rainfall. These are the months during which most of the plowing is done, and plowing and other cultural operations are sometimes delayed by heavy rains, especially on the clay loam and clay upland soils and on the bottom-land soils subject to overflow. September and October are the driest months of the year. Their light precipitation is favorable for the maturing and gathering of the staple crops of corn and cotton.

The rains of the winter months, owing to their volume, and those of the summer months, owing to their torrential nature, both cause destructive erosion on unprotected rolling and steeply rolling areas.

In general the climate of Lowndes County is especially favorable to a broadly diversified system of agriculture. The freedom from great extremes of temperature favors dairying and stock and poultry raising. Plowing and other cultural operations can be carried on in every month of the year. The average growing season of 243 days gives ample time for maturing all the staple crops and many varieties of fruit and vegetables, both early and late. It is possible to provide grazing for stock practically the entire year, and where an intensive system of farming is employed two or more crops are often grown on the same field in one season.

There is no Weather Bureau station in Lowndes County, and the table below, giving the normal monthly, seasonal, and annual temperature and precipitation, is compiled from the records of the station at Montgomery, about 12 miles northeast of the Lowndes County line. These records are believed to be closely representative of the climatic conditions in Lowndes County.

Normal monthly, seasonal, and annual temperature and precipitation at Montgomery, Montgomery 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	49.2	79	8	4.50	3.04	4.71
January	47.8	79	5	5.11	4.31	17.78
February	51.0	83	−5	5.52	5.78	3.04
Winter	49.3	83	−5	15.13	13.13	25.53
March	58.2	90	21	6.38	2.30	11.89
April	65.2	92	30	4.25	1.82	1.14
May	73.4	98	43	3.82	3.47	2.55
Spring	65.6	98	21	14.45	7.59	15.58
June	79.9	106	48	4.21	2.19	3.83
July	82.1	107	61	4.68	3.91	9.56
August	80.8	103	58	4.24	6.81	7.82
Summer	81.3	107	48	13.13	12.91	21.21
September	76.3	99	45	2.88	0.78	2.68
October	65.7	96	31	2.44	T.	0.45
November	55.9	85	21	3.13	2.59	4.40
Fall	66.0	99	21	8.45	3.37	7.53
Year	65.5	107	−5	51.16	37.00	69.85

AGRICULTURE.

The early settlers of Lowndes County were farmers, and from the first the interests of the county have been almost wholly agricultural. The sandy uplands in the northern part of the county were first to be developed. Cotton, corn, wheat, oats, hay, and vegetables were grown by the pioneer farmers. Such pork, beef, and mutton as was needed was produced at home, and the farms were practically self-sustaining. Most of the wheat and part of the corn were ground into flour and meal at a mill near Lowndesboro. Cotton early became the most important cash crop, but subsistence crops continued to hold an important place until after the close of the Civil War. Mobile was the principal outside market for cotton and other surplus products.

The period from 1830 to 1850 was marked by agricultural expansion. As the upland soils decreased in productiveness through continued cultivation, new fields were taken up, and the so-called "worn-out" lands were allowed to grow up in field pine. It was during this period of agricultural expansion that the development of the bottom lands was undertaken on an important scale.

With the close of the Civil War, which deprived the plantations of their organized labor, a large total acreage was thrown out of cultivation. A tenant system of farming gradually developed. As the negro tenants are better qualified to grow cotton and corn than other crops, these staples have increased in importance almost to the exclusion of other crops. The census of 1880 reports over 51 per cent of the improved land of the county in cotton, and over 21 per cent in corn. The building of railroads across the eastern and northern parts of the county in 1861 and 1870, respectively, had considerable effect in reducing the acreage devoted to subsistence crops. As a result of growing cotton on the same land year after year, or alternating it with corn, another cultivated crop, the upland soils gradually declined in productiveness. The use of commercial fertilizers was resorted to, and the growing of leguminous crops, such as cowpeas, beans, and peanuts, in conjunction with corn, became general.

The census of 1880 reports 98,200 acres in cotton, with a production of 29,356 bales. Corn occupied 41,169 acres and produced 611,184 bushels. Oats were grown on 3,630 acres, producing 43,922 bushels. There were 1,004 acres in sweet potatoes, which produced 68,587 bushels, and 201 acres in sugar cane, which produced 23,356 gallons of sirup.

The census of 1890 showed an increase in the acreage of all staple and food crops, including cotton, corn, oats, sweet potatoes, and

sugar cane. Hay, peanuts, and cowpeas each occupied a small total area in 1889.

The census of 1900 reports 128,358 acres in cotton, with a production of 39,839 bales. This was a slight decrease from the production reported in 1890, in spite of an increase in acreage of over 15,000 acres. The 1900 census showed 50,224 acres devoted to corn, with a production of 852,791 bushels. The acreage of this crop was practically the same as that reported in the 1890 census, but there was a material decrease in the production. Oats were grown on 1,921 acres in 1899, producing 19,890 bushels. There were 370 tons of hay and forage produced on 313 acres, of which 202 acres were in tame grasses. Nearly 70,000 gallons of sirup were manufactured from sugar cane and 7,602 gallons from sorghum. There were 4,316 apple trees in the county, and 10,288 peach trees.

The census reports cotton grown on 122,629 acres in 1909, with a production of 27,945 bales. This crop occupied about 60 per cent of the improved land of the county. In the last 2 or 3 years there has been a large reduction in the total area devoted to cotton. The average annual production of this crop for the decade 1905 to 1914, inclusive, was 36,000 bales.

The advent of the boll weevil in 1914 has had an important influence on the agriculture. The ravages of the weevil were very severe during the season of 1915. The decrease in yield resulted in a material reduction of the cotton acreage for 1916. Corn and Johnson grass have very largely displaced cotton on the heavy bottom lands, and a greater variety of crops is being grown on the upland soils than heretofore. The adjustment to boll-weevil conditions is not yet complete, but the trend is toward a more diversified form of agriculture in which subsistence crops will hold a more important place and in which cotton will be largely a surplus cash crop rather than the only source of revenue. In the vicinity of shipping points the production of milk and cream for shipment is rapidly growing. In the more remote districts large areas are being fenced for the grazing of cattle.

Corn has always been the crop of second importance. The census of 1910 reports 35,463 acres in corn, with a production of 424,963 bushels, the yield averaging 11.9 bushels per acre. In 1909 corn occupied about 17 per cent of the improved land of the county. Since the advent of the cotton-boll weevil the acreage of corn has increased considerably. A large proportion of the bottom land which was formerly planted to cotton is now being used for corn. This crop is grown primarily for subsistence. It is used largely for feeding work stock and to a less extent hogs. Corn forms an important part of the rations of the colored population. Part of the crop is made

into ensilage for beef and dairy cattle. The remainder is shipped to Montgomery and Selma for sale.

According to the census, 2,521 acres were devoted to oats in 1909, with a production of 36,503 bushels. This crop is being grown more extensively since the advent of the boll weevil, especially on farms operated by owners. Part of the crop is thrashed, the remainder being cut green for hay or harvested when ripe and fed in the sheaf. Most of the oat fields are grazed more or less throughout the winter.

The census of 1910 reports 3,444 acres in hay or forage crops. Of this total, 3,197 acres were in tame or cultivated grasses, which produced 3,395 tons. Johnson grass is the principal hay crop. Its acreage has increased considerably since 1914. Practically all the hay produced is fed on the farm to work stock and cattle.

The census reports 989 acres in cowpeas in 1909, from which 5,731 bushels of seed were gathered. There were also 368 acres in peanuts, producing 5,835 bushels, and a small acreage in velvet beans. These crops are all grown more extensively under boll-weevil conditions than formerly. The largest increase has probably been in the acreage of velvet beans. Cowpeas, velvet beans, and peanuts are grown mainly as feed for work stock, cattle, and hogs.

Sweet potatoes were grown on 1,101 acres in 1909, and produced 46,505 bushels. Only 68 acres were devoted to Irish potatoes, which produced 3,810 bushels. These crops are grown almost exclusively for home use or for sale on the local markets. There has been only a small increase in their acreage in the last few years. In 1909 there were 392 acres devoted to sugar cane and 91 acres to sorghum. These crops are grown on a somewhat larger acreage at present. Some of the sorghum is utilized as forage, but both these crops are grown mainly for the manufacture of sirup on the farm.

There were 4,242 apple trees and 13,062 peach trees in Lowndes County in 1909. The peach orchards, which were set out principally in the vicinity of Fort Deposit and Lowndesboro from 1889 to 1899, have largely died or been cut down in recent years. In favorable years a small quantity of peaches is shipped from these towns, but ordinarily the supply does not equal the local demand. There were 2,227 nut-bearing trees in the county in 1909, according to the census, of which 2,166 were pecans. These produced 11,784 pounds of nuts.

In the summer of 1916 "Russian" sunflowers were grown in an experimental way on several hundred acres, in place of cotton. The sunflowers are grown either in conjunction with corn or alone. They are cultivated in the same way as corn. The seed is to be used for poultry feed and as a sale product.

The receipts from animals sold or slaughtered in 1909 amounted to $121,767. Dairy products were produced to the value of $75,867,

and poultry and eggs to the value of $70,807. There were 632 calves sold or slaughtered in 1909, 2,723 other cattle, 7,454 hogs, and 707 sheep and goats. The number of cattle raised for beef purposes is increasing steadily. There are several excellent herds of pure-bred Shorthorn, Hereford, and Polled Durham beef cattle, but most of the animals are native stock of no particular breed. Beef cattle are raised mainly on the farms of the large landowners, and the quality is being improved by using pure-bred sires of the standard beef breeds to head the herds of native stock.

The hogs kept are largely grades of the Duroc Jersey, Poland China, and Berkshire breeds. There are several excellent herds of pure-bred hogs throughout the county. Hogs are raised to some extent on nearly all the farms operated by owners, and on many of the tenant farms. They are raised principally to supply pork products for home consumption.

The annual production of milk, cream, and butter is increasing rapidly. The butter produced is marketed locally. Most of the milk and cream is shipped to Auburn, Selma and Montgomery. On one large dairy farm near Lowndesboro 100 pure-bred or good grade Jersey cows are kept. The growth of dairying, however, is taking place largely among the small farmers, who milk 3 to 10 cows each. The milk cows are largely Jerseys and Jersey grades.

Poultry and eggs are produced in a small way on nearly every farm, for sale on the local markets.

The agriculture of Lowndes County is influenced to some extent by differences in the topography from place to place. That portion of the southwestern part of the county mapped as Rough stony land is devoted largely to grazing and stock raising. The eroded phases of the Sumter and Oktibbeha clays are used to a very important extent for permanent pasture. Over the remainder of the county cotton and corn are grown without much regard for soil adaptation. Contour cultivation is employed on all but the bottom-land soils and the level terrace and upland soils in the northern and northeastern parts of the county. Terraces are in common use on the steeper slopes. Probably a larger proportion of the bottom-land soils is cultivated than of the upland soils. The former have been ditched and diked quite extensively to improve the drainage and reduce the damage from overflows. They are devoted mainly to corn and Johnson-grass hay and to a lesser extent to cotton.

The farmers of Lowndes County recognize that the Houston clay. Catalpa clay loam, and Catalpa clay are well suited to corn and Johnson grass. The Sumter and Oktibbeha clays are recognized as natural pasture soils. The Orangeburg and Greenville soils are considered the best cotton types in the county. The heavy bottom-

land soils are known to be well adapted to cotton, but the crop reaches maturity too late to be profitable under boll-weevil conditions. The sandy loams and fine sandy loams of the uplands are considered best for cotton, under boll-weevil conditions, and cowpeas, velvet beans, soy beans, sweet potatoes, and peanuts. The lighter textured soils of the stream bottoms and the Leaf fine sandy loam are best adapted to sugar cane and sorghum. Watermelon production is practically confined to the well-drained sandy soils of the uplands and terraces.

Only a small part of the farm land is plowed during the fall. Most farmers prepare the seed bed immediately before planting, and the fields are usually left bare and unprotected during the winter. In most cases the old cotton or corn stalks are gathered and burned just before the land is plowed for the succeeding crop. The depth of plowing ranges from 3 to 5 inches. Intertilled crops are usually given ridge cultivation, and considerable care is used to lay out the rows on contour lines. Flat breaking is done only for grain crops and for those forage crops which are sown broadcast.

Plowing for cotton is done mainly during the latter part of January and February. For corn the land is generally prepared late in the winter or in early spring. The crop is given clean cultivation until it is laid by. The leaves are stripped from the stalks and cured in bundles for fodder. The ears are pulled and stored unhusked. Where velvet beans are to be grown with corn the rows of corn are double spaced and alternated with rows of beans. Oats are fall sown on land which has been flat broken. The crop is pastured more or less during the winter. Oats ripen about June 1 to 10. They are either cut for hay before fully matured or allowed to ripen and are harvested to be thrashed or fed in the sheaf. This crop is usually followed by cowpeas, or cowpeas and millet, sown broadcast, to be cut for hay or pastured. Frequently oats are followed by velvet beans and corn, or by cowpeas and corn seeded in rows and cultivated. Part of the legume seed is usually gathered at maturity, and after the corn has been pulled the vines and stalks are grazed down by work stock and hogs. Johnson-grass lands are often allowed to remain for a number of years. Disking is said to improve the grass stand. Some farmers seed the hay lands to oats every second or third year, and then allow them to revert to Johnson grass. About three cuttings of hay are obtained annually.

The buildings on the tenant farms are usually cheaply constructed, consisting of a cabin and several outbuildings for the shelter of implements and stock and the storage of feed. Little, if any, land is fenced on rented farms. Plows, planters, sweeps, and shovels of one-horse draft are the implements in most common use. A plow cutting

a furrow about 7½ inches wide seems to be most generally used in plowing and cultivating. One mule is used with this implement in plowing sandy land and two mules or a yoke of oxen on the heavy clay soils. On farms operated by owners the farm buildings are larger and better constructed. The cultivated and pasture land is generally well fenced. Concrete silos have been built on a number of farms in the eastern and northern parts of the county. On the better farms improved implements are used, including riding plows, harrows, seeders, drills, and grain binders. Practically the same implements are used for cultivating cotton and corn as on the tenant farms.

The work stock used consists of horses, mules, and oxen. Horses are used to some extent for farm work, but mainly for riding and driving purposes. Mules of light to medium weight are used very largely for ordinary farm work. Oxen are used principally for heavy hauling and for farm work on the heavy clay soils.

Definite systems of crop rotation are not very generally followed. On many fields cotton and corn have been grown for a number of years in succession or in alternation. The advent of the boll weevil has encouraged the rotation of crops, especially on the upland soils and the well-drained terrace soils. Velvet beans, oats, cowpeas, peanuts, and other legumes are now more generally grown than ever before, but they do not occupy a large enough acreage on most tenant farms to allow a satisfactory rotation of crops. On the farms operated by owners a greater variety of crops is commonly grown and a rotation is more generally practiced. On many of these farms corn is followed by fall-sown oats, and the following summer the land is prepared for cowpeas, which are sown alone, with sorghum for hay, or with peanuts for hog pasture. The land is returned to corn or cotton the following year for an indefinite period. Frequently corn and velvet beans displace cowpeas in this rotation. A rotation more generally used consists of cotton followed by corn and velvet beans.

The use of commercial fertilizer has developed principally since 1879. The census of 1880 reports an expenditure of $3,421 for fertilizer. This increased to $24,764 in 1889, $17,030 in 1899, and $86,369 in 1909. In the latter year 1,200 farms, or 18.6 per cent of the entire number in the county, used commercial fertilizer, at an average expenditure of $71.97 each. Fertilizers are applied principally to corn and cotton on the uplands and terraces. The bottom-land soils are not very generally fertilized. Since the advent of the boll weevil the purchase of fertilizers has declined markedly. The reduction of the cotton acreage on the bottom-land soils has made available for corn production a considerable area of land which is not ordinarily fertilized. The general practice has been to purchase cottonseed

meal, acid phosphate, kainit, and sodium nitrate, to be mixed at home. Cottonseed meal usually forms one-half to two-thirds of the mixture. In general, cottonseed meal and kainit are used on the sandy soils, and acid phosphate and cottonseed meal on the heavier soils, but kainit and acid phosphate are used more or less indiscriminately on all textures of soil. The usual application for corn or cotton varies from 300 to 500 pounds per acre. Cotton probably receives somewhat the heavier application. For corn and cotton the fertilizer is placed in the drill with a fertilizer distributor, just before planting. Frequently it is more thoroughly mixed with the soil by following the distributor with a narrow-heel sweep. In fertilizing oats, acid phosphate alone or acid phosphate and cottonseed meal are scattered broadcast by hand or distributed through a fertilizer attachment on the drill or seeder. From 50 to 75 pounds per acre of sodium nitrate is often applied to oats as a top dressing in the late spring. A similar application is often made for corn at tasseling time. Kainit is used when cotton shows evidence of blight or "rust."

Over 27 per cent of all the farms in the county reported an expenditure for labor in 1909, the outlay averaging $155.37 per farm reporting. The farm labor is almost entirely colored. This class of labor is plentiful and generally efficient under proper supervision. Farm hands employed by the month are paid $8 to $15, with board or rations. Hands employed for short periods are usually paid 50 to 75 cents a day. Forty cents per hundred pounds is the average price paid for cotton picking.

The census of 1910 reports 65.1 per cent of the area of the county in farms. The average size of the farms is 47.8 acres, of which 31.8 acres are improved. Individual land holdings range in general from several hundred acres to several thousand acres. The classing of each tenancy on the large plantations as a "farm" accounts for the small average size of farms reported by the census.

According to the 1910 census 88.6 per cent of the farms are operated by tenants, 11.2 per cent by owners, and 2 per cent by managers. The percentage of farms operated by tenants increased from 79.6 per cent in 1880 to 87.7 per cent in 1890, but since the latter year has remained practically constant. The share system of renting is most common. Where the landloard furnishes the implements, work stock, and buildings, and allows the tenant a garden plot and wood for fuel, he receives one-half the crops. Where the tenant furnishes tools, work stock, and labor, the landlord receives one-third of the cotton and one-fourth of the corn. Under either system of share renting the landlord generally takes a lien on the tenant's share of the prospective crop and gives, or procures for, the tenant credit for necessary supplies during the growing of the crops.

Cash rents vary from $1 to $3 an acre, depending largely upon the location and the character of the land. The white tenants often prefer to rent for cash.

The census of 1910 reports the average assessed value of farm property in Lowndes County as $974 per farm. The average assessed value of farm land increased from $7.16 an acre in 1900 to $11.78 an acre in 1910. The character of the soil, the topography, the location with respect to towns and transportation facilities, and the nature of the improvements, which include buildings, fences, ditches, dikes, terraces, etc., all are factors which influence the selling price of farm lands. Rough land fit only for grazing is valued at $2.50 to $3.50 an acre. Improved bottom land is valued at $15 to $30 an acre, depending on the location. Arable land on the uplands and terraces ranges in value from $3.50 to $40 or more an acre.

SOILS.

Lowndes County lies within the inner or higher part of the Coastal Plain division of the United States. The formations giving rise to the upland soils are the result of marine or lacustrine deposition. The oldest of these formations influencing the soils of Lowndes County is a pale-bluish, soft, argillaceous limestone of Cretaceous age, geologically known as the Selma chalk. Throughout this soft limestone embedded fossil remains are of common occurrence. The other deposits of the county consist of sediments derived largely from the older and higher land formations to the north. They owe their variable character to variations in the source and character of the original material and to the varying conditions attendant upon their deposition. These later formations consist of interbedded, unconsolidated sands, sandy clays, and heavy clays, with local developments of quartz gravel and ferruginous sandstone pebbles.

The erosion to which the several formations of limestone, sand, sandy clay, clay, and other material have been subjected since their final uplift above the sea has been an important factor in determining the distribution of the upland soils. Over approximately the central and northeastern half of the county the overlying beds of sand, sandy clay, clay, etc., have been largely removed, and the Selma chalk exposed. Over the remainder of the county, where the more recent formations have not been removed, they have been so dissected and gullied as to expose the various strata of sand, sandy clay, and clay, and often isolated patches of the Selma chalk.

The upland soils of the county have been derived by weathering from the exposed portions of these several strata of limestone, sand,

sandy clay, and other material. The characteristics of the various soils show a close relationship to the lithological character of the material from which they have been derived. Aeration, oxidation, and vegetative growth have effected differences in the color of the soil from place to place to a greater or less extent, and erosion has altered the texture and depth of the surface material by washing soil particles from one area to another, occasionally exposing the subsoil and increasing the depth of the soil elsewhere by redeposition. The dominant characteristics of the soils, however, are primarily dependent upon the nature of the parent material.

The various soils of the county are separated into types on the basis of texture—i. e., the relative proportion of sand, silt, and clay. The types are grouped into series on the basis of similarity in color, origin, and structural characteristics. The upland soils derived wholly or in part from the chalk are classed in the Houston, Sumter, and Oktibbeha series. The unconsolidated beds of sand, sandy clay, and heavy clay have given rise to soils of the Norfolk, Ruston, Orangeburg, Greenville, Susquehanna, Lufkin, and Guin series.

Lowndes County is situated on the margin of the "Black Prairie Belt" or "Black Belt" of Alabama and Mississippi. The limestone soils of the county are typical of this extensive Black Prairie region. The other upland soils are collectively designated as "piny-woods lands." In a general way the limestone soils are most extensively developed in the central and northeastern parts of the county, while the "piny-woods" soils occur mainly in the southern, southwestern, and western parts. The principal exceptions to this distribution are the occurrence of considerable areas of Ruston, Orangeburg, and Greenville soils in the vicinity of Lowndesboro, and the development of Rough stony land (Houston material) in the extreme southwestern part of the county.

The soils of the Houston series are dark gray to black. The subsoils are drab to greenish-yellow, plastic clays, highly calcareous. Frequently the rotten limestone is reached within the 3-foot section. The clay is the only type of this series mapped in Lowndes County.

The soils of the Sumter series are predominantly yellowish to light gray. The subsoils are yellowish to white, and usually grade at 12 to 36 inches into the rotten limestone or Selma chalk from which the material is derived. The subsoils and occasionally the soils are highly calcareous. The Sumter series includes the light-colored prairie soils of the limestone region of Alabama and Mississippi. One type, the clay, with an eroded phase, is mapped in Lowndes County.

In the Oktibbeha series the soils are prevailingly dull brown to yellowish brown. The subsoils are composed of yellowish-brown to

somewhat mottled yellow, gray, and red, rather plastic silty clay. The members of this series are developed in close association with the Houston soils. They are underlain at varying depths below 3 feet by soft, rotten limestone. The Oktibbeha clay, with an eroded phase, a mixed phase, and an eroded-mixed phase, is mapped in this survey.

The Norfolk series is characterized by the grayish color, loose structure, and sandy texture of the surface soils, and by the yellow color, friable structure, and sand to sandy clay texture of the subsoil. This series is represented in Lowndes County by the sand and fine sandy loam types.

The Ruston series is characterized by the gray to grayish-brown color of the surface soils, and the reddish-yellow to dull-red color, the moderately friable structure, and the prevailingly sandy clay texture of the subsoil. The series holds an intermediate place between the Norfolk on the one side, and the Orangeburg and Greenville on the other, in point of subsoil color. The Ruston series is represented by three types, the gravelly sandy loam, sandy loam, and fine sandy loam.

The Orangeburg series is characterized by the gray to reddish-brown color, open structure, and sandy texture of the surface soils, and the red color, friable structure, and sandy clay texture of the subsoils. The series is represented in Lowndes County by the fine sandy loam type.

The soils of the Greenville series are reddish brown to dark red, and the subsoils are red, friable sandy clays. The fine sandy loam and clay loam members of this series are mapped in Lowndes County.

The Susquehanna series is characterized by the gray to reddish color of the surface soils, and by the plastic, sticky nature of the heavy clay subsoil, which is typically red in the upper part and mottled red, gray, and yellow below. The series is represented in this county by the gravelly fine sandy loam and fine sandy loam types.

The Lufkin series consists of light-gray surface soils underlain by gray to mottled gray and yellow, plastic, impervious, subsoils. The prevailingly flat topography and impervious nature of the subsoil render surface drainage and underdrainage poor. The fine sandy loam is the only type of this series mapped in Lowndes County.

The Guin series represents areas in which patches of Ruston, Orangeburg, Greenville, Susquehanna, and Norfolk soil are so intricately associated and so variable in texture and color that no

definite types could be mapped separately. This soil is mapped as the Guin fine sandy loam. It occurs in badly dissected, rough areas.

Alluvial soils are developed in widely varying strips along the rivers and smaller streams of Lowndes County. They are composed of material washed from the drainage basins of the streams and deposited over their flood plains at times of overflow. These soils may be separated, according to age and position, into two groups—namely, terrace or old-alluvial soils, and first-bottom or recent-alluvial soils.

The terraces represent flat to undulating remnants of deposits laid down when the streams were flowing at a higher level than at present. They now lie mainly above the reach of normal overflows. Each terrace represents a different stage in the history of the stream. These terraces are most extensively developed along the Alabama River, where they occupy a belt, several miles wide, extending across the northern part of the county. The smaller streams usually have formed only one or two distinct terraces, but along the Alabama River a number of terraces have been developed. In some places these rise one above another in steplike succession, while in other places all or any of those terraces intermediate between the oldest or highest terrace and the present flood plain may be lacking. The higher terraces along the Alabama River probably lie 70 to 100 feet above normal overflow.

Although the material from which the terrace soils have been developed was accumulated at a later period than that from which the upland soils have been developed, yet the former have reached, as a whole, as advanced a stage in their development as the latter. In fact the Cahaba, Chattahoochee, and Amite soils correspond, in their stage of development, to the Ruston, Orangeburg, and Greenville series and are farther advanced than the Susquehanna, Houston, Sumter, or Lufkin series. On account of their smooth topography and the absence of erosion they have been more thoroughly weathered than the latter soils, which have been exposed to erosion.

The terrace soils are classed in the Leaf, Kalmia, Cahaba, Chattahoochee, and Amite series.

The soils of the Leaf series are light gray to brown in color. The subsoils characteristically consist of compact, gray to mottled gray and yellow, silty clay, which grades downward into a mottled red and gray or red and yellow, plastic, rather impervious clay. Iron concretions are of common occurrence on the surface. The Leaf fine sandy loam and silt loam are mapped in Lowndes County.

The soils of the Kalmia series are gray to grayish yellow. The subsoils are yellow or mottled yellow and gray sands or friable sandy clays. Two types of this series, the sand and fine sandy loam, are recognized in Lowndes County.

The soils of the Cahaba series are brown to reddish brown, and the subsoils yellowish red to reddish brown. These soils occupy some of the better land of the terraces on which they occur. The Cahaba fine sandy loam and silt loam types, the former with a light phase, are mapped in Lowndes County.

The Chattahoochee series is characterized by brown or gray soils and red, friable sandy clay subsoils. It is the terrace equivalent of the Orangeburg series of the uplands. Only the fine sandy loam member of the Chattahoochee series is mapped in this survey.

The Amite series consists of brown to chocolate-brown or reddish-brown soils underlain by reddish-brown to red subsoils. Occasionally a substratum of water-rounded gravel occurs at a considerable depth below the surface. The fine sandy loam is the only type of this series mapped in Lowndes County.

Flat areas of first-bottom soils occur along all the streams of the county. These soils are still in process of formation, being added to at each successive overflow through the deposition of predominantly fine material washed from the various soils occurring in the drainage basins of the respective streams. The bottoms vary in width from over 1 mile, along the principal streams, to a few rods along the smaller intermittent drainage ways. The largest area of first-bottom soil occurs along Big Swamp Creek. Owing to their frequent inundations, flat surface, and heavy texture, the first-bottom soils are not as well drained or as completely weathered as either the terrace soils or the upland soils.

The first-bottom soils are grouped into two series, the Catalpa and the Ochlockonee. The principal difference between these series is the calcareous nature of the Catalpa soils. Practically all the streams of the county receive sufficient drainage from the calcareous uplands to develop calcareous bottom soils typical of the Catalpa series. The most important exception occurs in the first bottoms of the Alabama River and in a small area in the southeastern part of the county, where the material is predominantly noncalcareous.

The Catalpa soils are dark gray to brown, with mottled gray and brown to almost black, silty clay subsoils. They are developed in the first bottoms of streams flowing through areas of Houston, Sumter, and Oktibbeha soils. Two members of the Catalpa series are mapped in Lowndes County, the clay loam and clay.

The soils of the Ochlockonee series are dark gray to brownish, with brownish or mottled brownish, yellowish, and gray subsoils. This series includes the darker colored soils of the first bottoms, subject to overflows. Two members of this series are mapped, the silt loam and silty clay loam.

Rough stony land includes areas so rough and dissected as to be practically valueless for cultivated crops.

In the following pages of this report the various soils mapped in Lowndes County are described in detail. The table below shows the actual and proportionate extent of each:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Oktibbeha clay	61,760		Guin fine sandy loam	7,936	1.8
Mixed phase	34,048	25.9	Rough stony land	7,424	1.6
Eroded phase	11,584		Houston clay	7,168	1.6
Eroded-mixed phase	9,856		Greenville fine sandy loam	6,912	1.5
Sumter clay	55,168	12.4	Ochlockonee silty clay loam	5,248	1.1
Eroded phase	1,024		Norfolk sand	3,904	.9
Catalpa clay	50,624	11.2	Chattahoochee fine sandy loam	3,456	.8
Catalpa clay loam	40,192	8.9	Ochlockonee silt loam	3,136	.7
Susquehanna fine sandy loam	29,952	6.6	Lufkin fine sandy loam	2,816	.6
Leaf fine sandy loam	19,136	4.2	Orangeburg fine sandy loam	2,496	.5
Ruston sandy loam	16,576	3.7	Amite fine sandy loam	1,920	.4
Ruston fine sandy loam	16,256	3.6	Kalmia fine sandy loam	1,856	.4
Ruston gravelly sandy loam	13,184	2.9	Norfolk fine sandy loam	1,856	.4
Cahaba fine sandy loam	11,072	2.8	Greenville clay loam	1,472	.3
Light phase	1,600		Cahaba silt loam	1,216	.3
Leaf silt loam	12,288	2.7	Kalmia sand	768	.2
Susquehanna gravelly fine sandy loam	9,216	2.0	Total	453,120	

HOUSTON CLAY.

The surface soil of the Houston clay consists of 4 to 10 inches of dark-brown to dark-gray, heavy clay loam to waxy clay, which appears nearly black when wet. The subsoil is a greenish-yellow to yellowish-brown or mottled drab, yellow, and brown, heavy plastic clay. It becomes somewhat lighter colored, steel gray to drab, below 20 to 24 inches. The parent stratum of rotten limestone (Selma chalk), which underlies the greater part of the type at a depth of 4 to 15 feet below the surface, frequently comes within the 3-foot section on slopes and knolls, or near the margin of areas of the type. Both soil and subsoil are calcareous, and lime concretions or accretions are of common occurrence in the subsoil. The dark color of the surface soil is due to a high content of organic matter.

A few small areas of Houston black clay are included with the Houston clay. They occur around the heads of minor drainage ways. The Houston black clay differs from the Houston clay in having a black, heavy clay loam to clay surface soil, 12 to 15 inches in depth.

The Houston clay is a moderately extensive soil. It occurs principally in the west-central part of the county, between Drane and the county boundary, in a broad belt interrupted by other upland soils. A smaller area is mapped about 2 miles west of Collirene. The type

occurs in a large number of relatively small, scattered areas in the northeastern part of the county. The areas in the west-central part occupy undulating to gently or broadly rolling uplands between the tributaries of Dry Cedar Creek. In the northeastern part of the county the type occupies a different position, being developed mainly in depressions around the heads of minor drainage ways. The surface is gently sloping.

In the lower lying portions and downstream extensions of the areas mapped in the northeastern part of the county the soil is probably partly alluvial in origin. It represents a variation toward the Trinity clay, but is not subject to heavy overflows like the typical Trinity clay. This soil is in few places extensive enough to be separated from the surrounding areas of Houston clay, into which it grades in an almost imperceptible manner. It apparently differs from the typical soil only in the darker color and somewhat deeper character of the surface soil.

The surface drainage of the Houston clay is in general adequate. The heavy texture of the soil and subsoil, however, retards internal drainage. This results in a heavy run-off, which causes serious erosion in places. The type as a whole is not subject to pronounced erosion, but the gullies or ravines common to the adjoining types are encroaching on this soil to some extent around the margins of the areas, and the surface soil has been partly or wholly removed from some of the knolls and more pronounced slopes.

This soil is locally known as "black prairie." It is treeless except for a scattered growth of white oak, red oak, post oak, and walnut, and an occasional locust or cedar.

This type was at one time very completely utilized for the production of cotton and corn, but at present probably less than 30 per cent of it is devoted to these crops. In recent years a large part of the type in the western part of the county has been put into pasture. The cultivated land is used mainly for corn and Johnson-grass hay, and to a lesser extent for cotton. Prior to the advent of the boll weevil, cotton yielded one-half to 1 bale per acre. Johnson grass, melilotus, and a number of wild prairie grasses furnish good summer grazing. The permanent pastures have been improved in many places by seeding bur clover and "Black Medic," a species of alfalfa.

This soil is rather heavy to work, and for this reason the plowing has generally been shallow and the seed-bed preparation inadequate. The soil is very sticky and tenacious when wet, and if plowed when in this condition it is apt to bake into hard clods on drying. Owing to its calcareous nature and large content of organic matter it assumes a granular structure if plowed and cultivated at the proper

moisture content. Fertilizers are seldom used for the crops grown at the present time.

Farm land on the Houston clay is held at $10 to $50 an acre, depending on the location with reference to shipping points and local markets.

Improved labor-saving machinery can be used on this type, and heavier implements should be employed in plowing and preparing the seed bed. To insure a good tilth the fields should be thoroughly harrowed soon after being plowed. Deep fall plowing is advisable. Areas which show a tendency to wash should be used as pasture or hay land, or if cultivated should be seeded to a winter cover crop. The crops grown should be arranged in a systematic rotation, including leguminous crops for forage and green manuring. The Houston clay in general has a good organic content, but the incorporation of fresh vegetable matter will greatly increase the productiveness of areas which have been under constant cultivation for a long time. Some of the less perfectly drained areas will be benefited by tiling.

This soil offers splendid opportunities in stock raising and dairying. It is the best corn and grass soil of the upland, and where well drained is especially suited to alfalfa. This crop is extensively grown on the Houston clay in other parts of the Black Prairie Belt of Alabama and Mississippi. Heavy crops of oats and wheat are grown on this soil in adjoining counties, but these crops lodge badly and are rather susceptible to "rust." Forage crops, such as cowpeas, velvet beans, sorghum, and millet, do well. This soil is not well suited to fruit and vegetables.

SUMTER CLAY.

The surface soil of the typical Sumter Clay consists of 5 to 8 inches of clay, ranging in color from dull yellowish brown or greenish gray to light grayish brown faintly mottled with pale yellow and white. The surface soil is sticky and plastic when wet, but assumes a crumbly structure on drying. It grades rather abruptly into a subsoil of mottled yellow, gray, and white, heavy, waxy, impermeable clay. The white mottlings, which are due to nodules or fragments of limestone, increase with depth, until the subsoil merges into the underlying parent stratum of Selma chalk at varying depths between 2 and 4 feet. Both soil and subsoil are calcareous, and the lower subsoil is strongly so. Shells and shell fragments are common on the surface and throughout the subsoil.

Several variations are necessarily included with the Sumter clay. On most slopes and knolls the surface soil is shallower than typical, and on many of the more pronounced slopes it has been entirely removed by erosion, the mottled yellow, gray, and white subsoil being

exposed. The type includes many small areas of Oktibbeha clay, or a shallow phase of that type, which occurs without apparent relation to the topography. The surface soil in these patches is a red or brownish-red clay. Where they are so numerous as to occupy 50 per cent or more of any area it is shown on the soil map as Oktibbeha clay, mixed phase. In slightly depressed or flattish situations the surface soil of the Sumter clay is often darker and deeper than typical, resembling the Houston clay.[1]

The Sumter clay occurs extensively in the central and northeastern parts of the county. It occupies undulating to gently rolling uplands. The valleys are generally shallow and open, and the stream courses are approached by comparatively long, gentle slopes. Abrupt slopes occur in only a few places. The surface is sufficiently sloping to induce good surface drainage, but the internal drainage is slow, owing to the impervious nature of the subsoil. This causes a relatively heavy run-off, and injurious erosion takes place on the more pronounced slopes unless protective measures are employed.

The Sumter clay is one of the most important soils of the county. Fully 60 per cent of it is devoted to crop production, and most of the remainder is used as pasture or hay land. This soil is locally known as "gray prairie." Clumps of crabapple, plum thickets, and an occasional locust or cedar constitute the only tree growth on the typical soil. A few scattered trees of shortleaf pine, post oak, red oak, sweet gum, and hickory grow on the patches of Oktibbeha clay associated with this type. The Sumter clay is a natural grass soil. Wild prairie grasses are native to it, and parts of the type are well seeded to Bermuda grass, lespedeza, Johnson grass, and melilotus.

Corn is the principal crop on the Sumter clay. Prior to the advent of the boll weevil cotton was extensively grown. It is still an important crop, but there has been a considerable reduction in the acreage in recent years. This has been met by an increase in the area devoted to corn, hay and pasture grasses, oats, cowpeas, velvet beans, millet, and sorghum.

Cotton is the principal money crop. Corn and other crops are largely used to feed the work stock on the farm. A small proportion of these crops is sold, and they are used to some extent to feed beef cattle, dairy cows, and hogs. On some of the farms operated by owners part of the corn crop is made into ensilage for feeding beef cattle. Considerable forage is obtained by stripping the blades from corn and curing them in bundles. The hay produced is largely used on the farm, but some of the larger landowners have a surplus for

[1] The Sumter clay occurs closely associated with the Houston clay, and was included with that type in several early surveys in Alabama.

sale. More attention is being given to live-stock farming on this type than formerly.

Corn yields range from 15 to 40 bushels per acre, depending upon the seasonal variations and cultural methods. Before the advent of the boll weevil cotton yielded one-third to three-fourths bale per acre, but under present conditions the yield is considerably lower and very uncertain. Johnson grass yields 1½ to 2½ tons of hay per acre, in three cuttings. Alfalfa has been grown in a small way on several farms, and the results have, in almost every case, been encouraging. Oats are usually cut for hay, but where thrashed yield 20 to 40 bushels per acre.

The same farming methods are used on the Sumter clay as on all the other upland soils. The equipment on the average tenant farm is too light for deep plowing and efficient preparation of the seed bed. Plowing is done mainly in February and March. Owing to the heavy texture of the soil and an unwillingness to turn up the partially weathered subsoil, the plowing seldom exceeds 4 or 5 inches in depth. Corn, cotton, sorghum, millet, cowpeas, and velvet beans are grown on ridges and intertilled. Considerable care is taken to make the rows conform to the contour, and the more pronounced slopes are usually terraced. The cultivation given these crops is done with light turning plows, sweeps, and shovels, and, while not conservative of soil moisture, it is remarkably clean. On many of the farms operated by owners, heavier equipment is used, such as walking and riding plows turning a 10½ to 12-inch furrow, disk harrows, section harrows, seeders, grain binders, and cultivators.

Systematic crop rotations are not generally practiced. The limited range of crops grown on the average tenant farm precludes the practice of any rotation beyond the growing of cowpeas or velvet beans in conjunction with part of the corn. On these farms the fields are usually left bare throughout the winter. On the farms operated by owners a greater variety of crops is grown. These are not generally arranged in a systematic rotation, but they are alternated more frequently and cowpeas and velvet beans are more extensively grown with corn.

Oats are sown in the fall, and after serving as a winter cover crop and affording some grazing they are cut for hay or harvested for grain between May 15 and June 15. Oats are followed by velvet beans and late corn, by cowpeas and corn, or by cowpeas sown broadcast alone. In some cases where cowpeas are grown alone after oats, they are grazed to some extent, mowed, disked thoroughly, and turned under in the early winter. The succeeding crops of corn or cotton are said to be markedly benefited by this incorporation of vegetable matter.

Until recently fertilizers were quite generally used for cotton, and to a lesser extent for corn. The fertilizers were generally mixed on the farm, and the proportions of the various ingredients and the acreage application varied with the character of the soil and the preceding season's yields. Cottonseed meal, kainit, and acid phosphate were principally used for cotton. A ground-bone and blood mixture was used to some extent. The applications for cotton ranged from 250 to 600 pounds per acre. A larger proportion of acid phosphate was used in places where the surface soil was thin or lacking. More kainit was used in slight depressions and poorly drained areas, where cotton was subject to rust and wilt. For corn an acreage application of 200 to 300 pounds of cottonseed meal and acid phosphate, with a side dressing of about 50 pounds of sodium nitrate at the last cultivation, was generally made.

At the present time fertilizers are not used to any appreciable extent for cotton, because of the uncertain yield under boll-weevil conditions. Acid phosphate and nitrate of soda are used to some extent on oats. The phosphate is applied with a fertilizer distributer attached to the seed drill, and the nitrate of soda is applied in the spring as a top-dressing. Velvet beans are being more extensively grown for soil improvement.

Land of the Sumter clay is valued at $15 to $35 an acre, depending on the location.

The Sumter clay varies widely in yields from place to place, but it can be built up to a uniformly high state of productiveness. The foremost need of the type is an increase in the organic-matter content. Steps should be taken to prevent the soil wastage caused by washing and erosion, and the soil should be plowed deeper and more thoroughly prepared before planting. A systematic rotation should be adopted, to include summer legumes for green manuring and cover crops to occupy the fields during the winter. Cowpeas, velvet beans, soy beans, sweet clover, and lespedeza are well suited for green manuring. Oats, rye, crimson clover, bur clover, and hairy vetch are good winter cover crops which incidentally furnish green manure. Leguminous crops are preferable to grains because of their action in storing nitrogen in the soil. The liberal incorporation of vegetable matter and deeper plowing will greatly increase the ability of the soil to absorb and retain moisture.

In order to plow the Sumter clay deeply and to prepare a good seed bed, the light equipment commonly used should be replaced by larger plows, disk and section harrows, and other heavier implements, requiring a 3 or 4 mule hitch. The type is well suited to the use of labor-saving machinery, and such implements as weeders and cultivators can probably be used to advantage in cultivation.

The Sumter clay is primarily suited to general farming. It is adapted to the crops commonly grown, such as corn, cotton, Johnson grass, millet, sorghum, oats, cowpeas, and velvet beans. Vetch, bur clover, crimson clover, and lespedeza also succeed. In Pickens County alfalfa is extensively grown on this soil, and the yields compare very favorably with those obtained on the Houston clay, the premier alfalfa soil of the Black Belt. Good yields of wheat and rye are obtained, but for climatic or other reasons the milling and baking qualities of the grain are somewhat inferior. The Sumter clay, because of its adaptaton to pasture, hay, and forage crops, offers excellent opportunities for dairying and the raising of beef cattle, hogs, horses, and mules.

Sumter clay, eroded phase.—Severely gullied and eroded areas of Sumter clay in which little or no soil has accumulated are mapped as an eroded phase. In the surface few inches the soil varies from bare, partially weathered white chalk to light-gray or gray chalky loam. This is underlain by white, partially weathered chalk or mottled gray, yellow, and white, calcareous clay, which passes into a bluish or bluish-gray, soft but compact limestone at a depth of about 3 or 4 feet. This bluish limestone is frequently exposed at the surface in places where erosion has been most active. Shells and limestone fragments are scattered over the surface and embedded in both soil and subsoil. The type includes a few patches of typical Sumter clay and of Oktibbeha clay or a shallow phase of that type.

The Sumter clay, eroded phase, occurs in comparatively small areas on the crests of high, narrow divides and on steep slopes. The surface is generally rough and broken. The run-off is excessive, and erosion is very active over the entire area of the phase. Most of the land is so gullied as to be unfit for cultivation in its present condition. It would be classed as nonagricultural but for the readiness with which melilotus and lespedeza spread over the land when once started.

This soil is little used for crop production. Most of the phase lies idle or is included with the adjoining types in pasture. It is practically devoid of vegetation except for patches of melilotus.

While some of this land can be reclaimed for the production of general farm crops, the phase as a whole is better suited to use as permanent pasture or hay land. The gullies should be filled with brush and the slopes seeded to sweet clover, bur clover, lespedeza, or Bermuda grass, to check erosion. When this has been controlled Johnson grass and alfalfa can be grown.

OKTIBBEHA CLAY.

The surface soil of the Oktibbeha clay is a red or brownish-red clay, 6 to 10 inches in depth. The supply of organic matter is gen-

erally low, but in forested areas the soil is usually dark gray or black in the surficial 1 or 2 inches, owing to an accumulation of leaf mold. The subsoil is a plastic, impervious clay, mottled red, yellow, and gray. The red mottling decreases with depth and is usually lacking below a depth of 24 to 30 inches. In the lower part of the 3-foot section the gray and yellow mottlings usually blend into a peculiar greenish-yellow color, which continues until the underlying stratum of soft grayish limestone (Selma chalk) is encountered. This is usually reached at a depth of slightly more than 3 feet. In some places it occurs within the 3-foot section, and occasionally, where erosion has been active, it outcrops at the surface over small areas. It seldom lies at greater depths than 6 or 8 feet.

There is some variation in the surface soil from place to place. A surface covering of 2 to 5 inches of gray to brownish fine sand frequently occurs in virgin areas. In many places this material is sufficient to impart a somewhat loamy texture to the surface soil on cultivation. In the higher lying areas of the type the subsoil is frequently somewhat friable and mealy, owing to a noticeable content of finely divided mica flakes.

The Oktibbeha clay is rather widely distributed throughout the uplands. The most extensive areas occur in the south-central and east-central parts of the county, but many small, widely scattered areas are mapped in the western and northeastern parts.

The surface varies from gently rolling to rolling, and the slopes for the most part are long and gentle. The streams flow in rather shallow, open valleys. The internal drainage of the type is very slow, owing to the impervious character of both the soil and subsoil. This imperviousness prevents the ready absorption of rainwater and causes a heavy run-off, so that fields are frequently badly washed and gullied even on rather moderate slopes.

The Oktibbeha clay is locally known as "red prairie." Practically the entire area of the type has been cultivated at one time or other, but at present much of it supports a sparse growth of tall, slender shortleaf pine, mixed with oak, hickory, and sweet gum. Probably 40 per cent of the type is now cultivated, and about one-half the remainder is in permanent pasture. Good grazing is afforded, even in the timbered areas, by a mixture of native grasses and legumes, among which are Johnson grass, crab grass, broom sedge, and beggarweed.

Cotton and corn are the most important crops on this soil. Cotton is the money crop. The type is considered an early cotton soil, but it is inclined to be droughty for late corn. A large part of the corn produced is used to feed work stock. Some is ground into meal and the remainder is sold. Oats are grown to some extent. This crop is

largely fed in the sheaf to work stock. Peanuts, sweet potatoes, cowpeas, soy beans, and velvet beans are grown in numerous small fields on the sandier areas of the type, the sweet potatoes being produced for home use, and the other crops for forage. The runner variety of peanuts is most commonly grown on this soil. Cowpeas, peanuts, and soy beans are seeded in rows, either alone or alternating with rows of corn. Velvet beans are nearly always seeded with corn, the cornstalks serving as a trellis to keep the heavy vines off the ground. Work stock and cattle are allowed to graze off the vines of the various leguminous crops during the late fall and winter, and hogs are allowed to root up the peanuts.

Before the advent of the boll weevil, cotton yields averaged about one-third bale per acre, without fertilization, and ranged from one-half to two-thirds bale where fertilizer was used. From 6 to 8 acres were required, on an average, to produce 1 bale of cotton, without fertilization, in 1916, under boll-weevil conditions. Corn yields range from 10 to 25 bushels per acre. Sweet potatoes average 40 to 80 bushels per acre, but considerably larger yields are reported in some cases. Cowpeas, soy beans, velvet beans, and peanuts do fairly well. Two to three acres of cleared land of this type is considered ample to provide grazing for 1 head of stock. From 3 to 5 acres are needed on timbered areas.

Owing to the heavy, tenacious character of the soil, this type is seldom plowed to a depth of more than 4 or 5 inches. Plowing is often delayed in the spring because of the tendency of the soil to bake into clods if plowed when wet. As a result of the unbalanced farming system and the small number of stock kept on the average tenant farm, the acreage in the minor crops is too small to permit a systematic rotation of crops. Cotton and corn are often grown for a number of years in succession or alternation. Oats are usually fall sown, and after being lightly grazed through the winter are either harvested for hay before thoroughly ripe or cut for grain at maturity. Oats are ready to cut between May 15 and June 15. In many cases this crop is followed by cowpeas or velvet beans seeded with corn, after which cotton is grown for one or more years. Fertilizers are not used to any important extent at present, but before the advent of the boll weevil commercial fertilizers were quite generally used for cotton, except on new fields. From 300 to 500 pounds of mixed cottonseed meal and acid phosphate were applied per acre. A lighter application was made for corn, followed by about 50 pounds of sodium nitrate per acre, distributed at tasseling time.

Land of the Oktibbeha clay is valued at $5 to $15 an acre. Improved areas close to town are often valued at $40 to $50 an acre.

The methods of improvement suggested for the Sumter clay can be followed with equally good results on the Oktibbeha clay. Unlike

the Sumter clay, however, this soil is decidedly acid[1] above the underlying limestone, and applications of air-slaked lime or ground limestone are necessary for best results with most leguminous crops.

The typical Oktibbeha clay is adapted to cotton, under boll-weevil conditions, and grains, grasses for hay and pasturage, and forage crops. It is better adapted to general farming and stock raising than to special crops.

Oktibbeha clay, eroded phase.—The eroded phase of the Oktibbeha clay is separated from the typical soil principally upon the basis of a difference in topography. Like the typical Oktibbeha clay, the eroded phase has a surface soil of red to brownish-red clay, underlain at 6 to 10 inches by a subsoil of mottled red, yellow, and gray clay, which changes to a peculiar greenish-yellow color before the underlying soft, bluish-gray limestone is encountered. This limestone generally occurs at a depth of slightly more than 3 feet, but owing to the severe erosion to which this phase has been subjected the depth of the soil material is more variable than in the typical Oktibbeha clay, and outcroppings of limestone are more numerous. A few small patches have a surface covering of 1 to 3 inches of brownish sand or fine sand. The subsoil in the higher lying areas is often friable or mealy, owing to a noticeable content of finely divided mica.

The principal areas of the Oktibbeha clay, eroded phase, occur in the southeastern part of the county, in the vicinity of Fort Deposit, Calhoun, and Sandy Ridge. A number of smaller areas are mapped in the southwestern part of the county. The phase is confined mainly to sharp narrow divides and the broken slopes around the heads of drainage ways. The surface ranges from hilly to rough and broken. The areas have been deeply dissected by a ramifying system of drainage ways. The slopes are prevailingly steep or abrupt, and irregular in direction. Erosion is everywhere active.

The eroded phase is moderately extensive, but because of its rough surface it is not agriculturally important. Corn and cotton are grown in places on the more moderate slopes. Probably one-third of the total area of the phase is used as permanent pasture. A sparse and patchy growth of shortleaf pine, sweet gum, hickory, and oak occupies the unused areas. The land is valued at $3 to $8 an acre.

Oktibbeha clay, mixed phase.—The mixed phase of the Oktibbeha clay consists of areas of Sumter and Oktibbeha clay, or a shallow phase of the latter type, so intricately associated and of such small

[1] Analysis of a typical sample of the surface soil of the Oktibbeha clay showed the lime requirement to be 0.3 per cent of CaO or about 3 tons of burnt lime or 6 tons of ground limestone to the acre 6 inches. Analysis of the calcareous material (Selma chalk) underlying this soil showed it to contain 57.5 per cent of calcium carbonate. It is possible that this material could be used to correct the acid condition of the surface soil.

individual extent as to make their separation on the soil map impossible. The included areas occur without regularity or apparent topographic relation. They are about equally divided between Oktibbeha clay and Sumter clay. The areas of Oktibbeha soil are frequently underlain by limestone at some depth within the 3-foot section. The areas of Sumter clay are typical of that soil.

The Oktibbeha clay, mixed phase, occurs most extensively in the southern and east-central parts of the county. A number of smaller, scattered areas are mapped in the west-central and northeastern parts.

Surface drainage is well established. Over much of the phase it is excessive, and erosion occurs in places. Owing to the impervious structure of the subsoil, the internal drainage is imperfect and the capacity to absorb and retain water is low. This aids erosion and causes crops to suffer during droughts.

Probably 40 per cent of this phase is devoted to the production of cultivated crops and hay. Most of the remainder is utilized for pasture. The areas of Sumter clay support a natural growth of Johnson grass and melilotus, while Johnson grass, crab grass, broom sedge, beggarweed, and other native grasses and legumes are common on the included Oktibbeha clay. The uncleared areas of Oktibbeha clay support a growth of shortleaf pine, mixed with oak, hickory, and sweet gum, while the areas of Sumter clay are prairie. The phase is locally known as "mixed prairie" or "red and gray prairie."

In general, the crops grown on this phase, the yields, and the methods of farming and fertilization are similar to those prevailing over the typical Sumter clay and Oktibbeha clay. Wheat is grown to some extent, and the results obtained indicate that the included Oktibbeha clay, and probably the entire phase, is suited to its production. The areas of Sumter clay are adapted to alfalfa. The included Oktibbeha clay is not so well suited to this crop. Where it is to be used for alfalfa the soil should be thoroughly inoculated and heavily limed wherever the underlying calcareous clay is not turned up by deep plowing. Land of the Oktibbeha clay, mixed phase, is valued at $10 to $25 an acre.

Oktibbeha clay, eroded-mixed phase.—The Oktibbeha clay, eroded-mixed phase, is similar to the Oktibbeha clay, mixed phase, in composition, consisting of small, intricately associated areas of Oktibbeha clay and Sumter clay. It differs from the mixed phase in having a hilly and broken topography, owing to deep dissection by a ramifying system of water courses and tributary gullies. The slopes are prevailingly steep or abrupt, and irregular in direction. Erosion is active over the entire phase.

The eroded-mixed phase is developed only in the southern half of the county. It occupies a narrow, irregular belt extending in an east and west direction, and broken and interrupted by areas of other upland soils. Rather extensive developments occur about 1½ miles south of Braggs and about 2½ miles northeast of Fort Deposit. A number of smaller areas are mapped in the south-central and southwestern parts of the county.

This phase is confined mainly to sharp, narrow divides, and the broken slopes around the heads of drainage courses. It is too rough and broken for cultivation except in patches on the more moderate slopes. Probably less than 5 per cent of the entire area of this phase is devoted to crop production. Corn and cotton are practically the only crops grown. The greater part of the phase is prairie, but a scattering growth of shortleaf pine, oak, sweet gum, and hickory occurs on the areas having a red surface soil (Oktibbeha clay). Johnson grass, crab grass, broom sedge, beggarweed, and other grasses afford considerable grazing on these areas, and Johnson grass and melilotus are native to the prairie areas. In its natural condition from 3 to 5 acres of this land are required for each head of stock, but by thinning out the timber and seeding to good permanent pasture grasses the stock-carrying capacity of this soil can be considerably increased. If Bermuda grass, lespedeza, bur clover, and white clover are seeded in addition to the native grasses, the pastures will produce grazing nearly the entire year.

NORFOLK SAND.

The surface soil of the Norfolk sand is a dull-gray or brownish-gray, medium to coarse sand, from 4 to 6 inches deep. The subsoil is a yellowish-gray or pale-yellow, medium to coarse sand. The surface soil and upper subsoil are loose and incoherent, but the subsoil below 24 to 30 inches is frequently somewhat loamy. On the north side of Dry Cedar Creek near Mount Willing, about 2 miles east of Fort Deposit, and elsewhere in the southeastern part of the county, some small areas of Norfolk fine sand are included. This soil differs in its finer texture. Near Braggs and between Fort Deposit and the southeast corner of the county some patches of Ruston sand are included with this type. This soil differs essentially from the Norfolk sand in having a reddish or brownish-yellow sand subsoil, grading at about 3 feet into reddish-yellow sandy loam. Two small areas of Norfolk gravelly sand situated, respectively, in the northeastern part of the county about 1¾ miles southeast of Manack, and in the west-central part on the Dallas County line just south of Honor Branch, are included with the type.

The Norfolk sand occurs in a number of comparatively small, scattered areas in the southern part of the county. It occupies knolls, ridge crests, and divides, occasionally extending down the slopes to the valley bottoms. The surface varies from gently rolling to rolling. Surface drainage and internal drainage are both thorough, and the type is rather droughty for crops which do not mature early.

Probably 65 per cent of the Norfolk sand is cultivated. The remainder is timbered with shortleaf pine, scrub oak, and hickory. Cotton and corn are the principal crops. A small acreage is devoted to peanuts, sweet potatoes, and melons. Before the boll weevil reached this region yields of cotton ranged from one-fifth to one-third bale per acre. Corn yields 8 to 15 bushels and sweet potatoes 50 to 125 bushels per acre.

Land of this type ranges in selling value from $4 to 12 an acre, depending on the location and the value of the adjacent types.

Yields of general farm crops on this type can be materially increased by following a well-balanced rotation. This should include the legumes. Winter cover crops should be grown and organic matter incorporated in the soil by means of green-manure crops. This soil is extensively used for the production of early truck in the Atlantic and Gulf seaboard States.

NORFOLK FINE SANDY LOAM.

The Norfolk fine sandy loam consists of a gray, loamy fine sand, underlain at 5 to 8 inches by a yellowish-gray or pale-yellow fine sandy loam. The surface soil grades at 16 to 20 inches into a subsoil of yellow, friable fine sandy clay. In some areas of this type, principally in the southeastern part of the county, the subsoil occurs at a depth of about 30 inches. These areas of deeper surface soil are locally known as "flatwoods." They include a number of small depressions or swales, in which the surface 4 to 6 inches is dark gray in color. The agricultural value of these deeper areas is about the same as that of the typical soil.

The Norfolk fine sandy loam occurs in a number of small, widely scattered areas. It occupies flat to undulating situations on divides or gently sloping areas on valley foot-slopes. In general the surface drainage and internal drainage are fairly good, but in the flatter areas and on some foot-slopes which receive seepage water from above the soil is rather poorly drained.

A large part of the Norfolk fine sandy loam is under cultivation. Cotton and corn are the principal crops. Oats, cowpeas, velvet beans, peanuts, sweet potatoes, and sorghum are grown to some extent.

Corn yields 10 to 25 bushels per acre. Before the advent of the boll weevil, cotton yielded one-fourth to one-third bale per acre, without fertilization, and about one-half bale where fertilized. The yield of sweet potatoes ranges from 75 to 300 bushels per acre, with an average of about 150 bushels. Oats yield 1½ to 2½ tons of hay per acre. Peanuts, cowpeas, and velvet beans give good yields.

Formerly the Norfolk fine sandy loam was usually fertilized with cottonseed meal, kainit, and acid phosphate, in applications ranging from 200 to 500 pounds per acre. At the present time little commercial fertilizer is used.

The selling value of land of this type ranges from $5 to $20 an acre.

The foremost need of this type is the incorporation of organic matter. All the available barnyard manure should be applied. Where the supply of this is small, winter cover crops of oats, rye, vetch or summer legumes, such as cowpeas, soy beans, and velvet beans, should be used for green manuring. Tile drains should be installed in the imperfectly drained areas.

The Norfolk fine sandy loam is easy to till, and deeper plowing and more thorough tillage can be done with little additional effort. The soil is adapted to a variety of crops, such as cotton, under boll-weevil conditions, and corn, oats, peanuts, velvet beans, soy beans, cowpeas, sorghum, melons, and late truck. Sugar cane and strawberries are suited to the moister areas. A good grade of wrapper tobacco is produced in Florida and southern Alabama on this soil.

RUSTON GRAVELLY SANDY LOAM.

The surface soil of the Ruston gravelly sandy loam consists of 8 to 12 inches of brownish-gray to brown, gravelly sandy loam. The transition from soil to subsoil is usually marked by several inches of yellowish or yellowish-brown, heavy sandy loam. The subsoil begins as a reddish-yellow or yellowish-red, friable sandy clay. This may extend to a depth of more than 36 inches, but it frequently becomes heavier in texture and mottled with red and yellow in the lower part of the 3-foot section. Rounded quartz and chert pebbles, one-fourth to 2 inches in diameter, with a few small iron concretions or accretions, are very abundant on the surface and through the surface soil, and occur in smaller proportion in the subsoil. The type includes a number of small areas of Ruston sandy loam.

In some places the surface soil is a fine sandy loam in texture rather than a sandy loam. The principal included areas of the Ruston gravelly fine sandy loam occur in the northwestern part of the county in the vicinity of Petronia, and to the west of Collirene. Less im-

portant areas, consisting of narrow strips following the margin of the uplands, extend from a point about 2½ miles east of Trickem to a point about 1½ miles southeast of Benton. Another small area, occupying the same position, occurs just west of Benton. The slopes of Crazy Hill, a remnant of the uplands near the Alabama River about 2 miles northeast of White Hall, are also occupied by the gravelly fine sandy loam.

The Ruston gravelly sandy loam is confined almost entirely to the northwestern and northern parts of the county. Rather important areas are mapped along the Dallas County line, at points 2 to 4 miles northwest of Collirene, in the vicinity of Lowndesboro station, and east and north of Lowndesboro. The type occurs mainly on slopes from the uplands to the stream terraces. In places it occupies divides and narrow ridges as well. The surface ranges from gently rolling or sloping to broken and hilly. Both surface drainage and internal drainage are good.

Probably not more than one-fourth of this type is cultivated, the remainder supporting a light growth of pine and mixed hardwoods. The uncultivated land is largely included in permanent pastures. The crops grown and the methods of farming and fertilizing are practically the same as on the Ruston sandy loam. The yields are reported to be slightly higher. This is probably due to the fact that this soil has been brought under cultivation more recently than the Ruston sandy loam. The type is somewhat less susceptible to drought and erosion than the sandy loam in similar positions.

The methods of improvement suggested for the Ruston fine sandy loam can be applied to this soil equally well. The more moderately sloping areas of the Ruston gravelly sandy loam are fairly well suited to general farm crops and to cotton under boll-weevil conditions. The cultivated area can be extended with terracing and the use of other means to prevent erosion. The soil is well suited to peaches, plums, Scuppernong grapes, tomatoes, cucumbers, squash, and other crops. The roughest areas are probably suitable for use only as pasture and timber land.

RUSTON SANDY LOAM.

The surface soil of the Ruston sandy loam consists of 6 to 8 inches of gray or brownish-gray sand or loamy sand, underlain by brownish-gray or buff sandy loam. The surface soil is open and porous, and low in organic matter. The subsoil occurs at a depth of 14 to 16 inches. It begins as a rather compact, reddish-yellow to yellowish-red sandy clay, and changes to a mottled yellow and reddish-brown, friable, mealy sandy clay in the lower part of the 3-foot section. The surface soil is usually deeper on the foot slopes,

where it may extend to 24 inches, while in many places on abrupt slopes the subsoil lies near the surface as a result of erosion.

In the southeastern part of the county the surface soil, and occasionally the subsoil, has a noticeable content of small quartz gravel, fragments of ironstone, and iron concretions or accretions.

The principal area of Ruston sandy loam occurs on the south side of Dry Cedar Creek, in the southwestern part of the county. Other fairly important bodies occur about 3½ miles north of Fort Deposit and east of the same place. The type is largely confined to valley sides, but a few areas occupy the crests of divides as well. The surface ranges from gently rolling to abruptly sloping and hilly. The roughest topography occurs along the abrupt slopes or bluffs on the south side of Dry Cedar Creek. The larger areas are often dissected by a ramifying system of rather deep valleys and tributary gullies. The steeper slopes tend to erode seriously under the prevailing methods of cultivation. The surface relief and the rather open character of the subsoil insure good surface and internal drainage.

The Ruston sandy loam is a moderately extensive soil. The type is locally important. Probably one-half of it is under cultivation, the remainder consisting of abandoned fields now timbered with field pine and areas which still support the original growth of shortleaf pine, red oak, black oak, sweet gum, and hickory.

Cotton and corn are the principal crops on this soil. A small total area is devoted to velvet beans, soy beans, cowpeas, peanuts, and sweet potatoes. Prior to the advent of the boll weevil, cotton yielded one-fourth to one-third bale per acre without fertilization, and from one-third to one-half bale where fertilizer was used. Corn yields 10 to 25 bushels per acre, and sweet potatoes 50 to 150 bushels. Velvet beans, soy beans, cowpeas, and peanuts give satisfactory yields, but the returns average somewhat lighter than on the Ruston fine sandy loam. The type of farming on this soil and the cultural methods employed are similar to those commonly practiced on the Ruston fine sandy loam.

The greater part of the Ruston sandy loam is unfavorably located with reference to shipping points. The type ranges in value from $5 to $15 an acre.

The methods of improvement suggested for the Ruston fine sandy loam can be applied to the sandy loam as well. The soil is adapted to the production of general farm crops, and to cotton under boll-weevil conditions. Forage crops such as cowpeas, velvet beans, soy beans, and peanuts do well. It is probable that peaches, plums, Irish potatoes, sweet potatoes, and medium to late truck crops could be profitably grown on this soil.

RUSTON FINE SANDY LOAM.

The surface soil of the Ruston fine sandy loam consists of 6 to 8 inches of gray, loamy fine sand, underlain by a brownish-gray or buff fine sandy loam. The surface soil grades into a subsoil of yellowish-red or reddish-yellow, friable fine sandy clay at depths ranging from 12 to 20 inches. The lower subsoil is generally mottled with reddish brown and yellow. Owing to a larger content of organic matter, forested and newly cleared areas have a slightly darker surface soil than fields which have been cultivated for some time. Generally after a few years of clean cultivation the surface material bleaches into a characteristic light-gray color. On the gently sloping approaches to stream bottoms the subsoil is frequently a mottled gray, pale-yellow, and light-brown fine sandy clay in the upper part, and rather compact and mottled yellow and reddish brown in the lower part.

In a number of high-lying well-drained areas near Mount Willing the subsoil begins abruptly as a yellowish-red, compact fine sandy clay, and passes below into a friable or mealy fine sandy clay mottled conspicuously with yellow and reddish brown. Over part of the areas on the north side of Dry Cedar Creek about 2 miles north of Crossroads Church, in the vicinity of Fort Deposit, and about 5 miles due east of Fort Deposit, the underlying fine sandy clay subsoil occurs at a depth of 24 to 30 inches. The type as mapped just northwest of Lowndesboro Station consists in part of this deeper soil and a few small, intricately associated areas of Norfolk fine sandy loam. The boundaries between the Orangeburg and Susquehanna fine sandy loams and this type are in few places sharply defined, but the Ruston fine sandy loam is fairly uniform throughout its extent.

The Ruston fine sandy loam is a moderately extensive type, widely distributed over the county. The principal areas of typical soil occur east of Lowndesboro, northwest of Benton on the Dallas County line, and in the vicinity of Mount Willing. The type occurs largely in a number of relatively small areas separated by other upland soils. It occupies divides and moderately sloping valley sides. The surface varies from undulating to gently rolling. Practically the entire type is suited to cultivation. Both surface drainage and internal drainage are well developed. The soil is easy to till and can be cultivated under a wide range of moisture conditions. The friable fine sandy clay subsoil absorbs and retains moisture well, and this soil ranks high in drought resistance where properly cultivated.

The Ruston fine sandy loam is highly prized for general farm crops, and fully 75 per cent of the type is cultivated. Most of the remainder is in timber. Some of the forested land is used for

grazing. The timber growth includes shortleaf pine, red oak, white oak, sweet gum, hickory, and walnut. Corn and cotton are the principal crops, supplemented by oats, cowpeas, velvet beans, soy beans, peanuts, sweet potatoes, and vegetables. Bermuda grass and lespedeza afford good pasturage. Near Fort Deposit a number of small pecan groves are situated in part on this type. The yield of corn ranges from 15 to 40 bushels per acre. Cotton formerly yielded one-third to two-thirds bale per acre, but under boll-weevil conditions the yields are rather uncertain and average considerably lower. Vegetables give good yields. Sweet potatoes yield 100 to 300 bushels per acre. The yield of oats is moderately heavy. Oats are seldom thrashed. They are either fed in the sheaf or cut green for hay. Corn is grown principally for feeding work stock on the farm, but some of the farmers who have reduced their cotton acreage considerably turn part of their corn into cash.

The methods of farming on the Ruston fine sandy loam are similar to those which prevail over the sandy upland soils in general. The usual light plows, sweeps, and shovels of 1-horse draft are used. The plowing done is comparatively shallow. Most of the plowing is done in the spring. Corn, cotton, soy beans, velvet beans, and cowpeas are grown on ridges and intertilled. Contour cultivation is universally practiced, and on some of the more pronounced slopes the fields are terraced. No definite system of crop rotation is practiced, as a rule. Where velvet beans, cowpeas, or peanuts are grown, they are seeded in alternate rows with corn, and grazed by stock after the corn crop is gathered. Soy beans, cowpeas, and peanuts are sometimes grown alone for hay, forage, or hog pasturage. Oats are fall sown and pastured more or less throughout the winter. They are followed by corn and velvet beans, by corn and cowpeas, or by soy beans, cowpeas, or peanuts alone. Aside from oats, cover crops are not generally grown.

Cotton was extensively fertilized before the advent of the boll weevil, but at present this crop is grown practically without fertilization. A cottonseed-meal and acid-phosphate mixture was principally used, at the rate of 300 to 500 pounds per acre. This was supplemented by 25 to 50 pounds of kainit per acre in places where the crop was subject to rust or wilt. About 300 pounds per acre of a ready-mixed fertilizer analyzing 10–2–4[1] was used to some extent. At present, the cultivated legumes are largely depended upon to maintain yields. Cottonseed meal and acid phosphate are used to some extent for corn and oats. In some cases oats are given a light top-dressing of sodium nitrate in the spring, and on some farms corn

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

receives a side dressing of cottonseed meal or sodium nitrate before the last cultivation.

The selling value of land of the Ruston fine sandy loam is determined largely by the adjoining types. Farm land with average improvements is valued at $10 to $25 an acre. Areas very favorably located are valued at as much as $50 an acre.

This soil is easily improved. One of its greatest needs is the addition of organic matter in the form of stable or green manures. Cowpeas, velvet beans, soy beans, and crimson clover are excellent green-manure crops. Winter cover crops should be more generally grown, to protect the fields from erosion. Oats, rye, crimson clover, bur clover, lespedeza, and vetch are good winter cover crops. They furnish more or less winter grazing, and add considerable organic matter if plowed under in the spring. The staple crops grown should be arranged in a systematic rotation, with winter cover crops and summer legumes used for green manuring and soil improving. Deeper plowing would be beneficial, especially with the turning under of green-manure crops. Air-slaked lime should be used in moderately heavy applications where large quantities of vegetable matter are plowed under, in order to hasten its decomposition.

The Ruston fine sandy loam is adapted to a wide variety of staple and special crops. It is sufficiently early to be suited to cotton under boll-weevil conditions. In addition to the crops commonly grown it is adapted to rye, crimson clover, bur clover, lespedeza, and vetch. It is well suited to nearly all vegetables, including especially Irish potatoes for home use and a medium early market. Strawberries and bush fruits do well. The soil is well suited to the growing of peaches and pecans.

ORANGEBURG FINE SANDY LOAM.

The surface soil of the Orangeburg fine sandy loam consists of a gray to light-brown loamy fine sand, passing at 4 to 6 inches into a yellowish or reddish-yellow, light fine sandy loam, which extends to a depth of 10 to 15 inches. The subsoil is a moderately friable to slightly plastic, light-red or bright-red fine sandy clay. The type is closely associated with the Ruston fine sandy loam and includes some areas of that type too small to be isolated on the soil map. In a number of places erosion has removed most of the surface soil and given rise to small areas of Greenville soil. Where these are of sufficient size they are mapped as the Greenville clay loam.

In the southeastern part of the county there are included a few small, scattered areas of the Orangeburg sandy loam. This soil is slightly coarser and more open and porous than the fine sandy loam. Fragments of ironstone and ferruginous pebbles or concretions occur on the surface in many places.

The Orangeburg fine sandy loam is a rather inextensive soil. The principal areas occur in the north-central part of the county, near Lowndesboro, and within a radius of 1 to 3 miles from Lowndesboro Station and White Hall. Small areas are mapped near Trickem and west of Collirene and at widely scattered points in the southeastern part of the county. The type occupies the crests of ridges and plateaulike areas on the high, broad divides. The surface varies from slightly undulating to gently rolling. This soil has good surface and internal drainage. It retains moisture well and can be worked under a wide range of moisture conditions.

The Orangeburg fine sandy loam is considered a desirable soil, and fully 75 per cent of it is under cultivation. Part of the remainder is in timber, consisting mainly of shortleaf pine and oak. Corn and cotton are the crops most extensively grown. Cowpeas, velvet beans, oats, sorghum, and sugar cane are crops of less importance. Sweet potatoes, vegetables, and fruit are grown for home use.

Prior to the advent of the boll weevil the yield of cotton ranged from one-third to three-fourths bale per acre. Under boll-weevil conditions this crop has been grown with more success on this soil than on the heavier upland and bottom-land types. Corn yields 20 to 50 bushels per acre and sweet potatoes 100 to 200 bushels. Sugar cane yields 150 to 200 gallons of sirup per acre. The fertilizer practices and methods of farming are similar to those on the Ruston fine sandy loam, except that fertilizers were formerly more generally used on this soil.

Farm land on the Orangeburg fine sandy loam is valued at $15 to $40 an acre, depending on the location.

This soil has been highly prized for cotton, because of the uniformly good yields obtained under varying conditions of rainfall, and until recently it has been devoted almost exclusively to crops requiring clean cultivation. The organic content of the soil has become depleted, and the first step in building up the Orangeburg fine sandy loam should be the incorporation of organic matter in the form of stable or green manure. Cowpeas, velvet beans, and soy beans are good green-manure crops suited to this soil. Winter cover crops such as oats, rye, crimson clover, bur clover, lespedeza, and vetch should be more generally grown to protect the fields from soil washing. The summer legumes, winter cover crops, and staple crops should be arranged in a systematic rotation. Deeper plowing would be beneficial. Lime should be applied when large quantities of green vegetable matter are turned under.

In addition to the crops grown this soil is well adapted to grains, grasses, forage crops, Cuban filler tobacco, peaches, pecans, bush fruits, and vegetables, including Irish potatoes, tomatoes, cucumbers, and squash. It is one of the best soils in the county for cotton under boll-weevil conditions. The type offers opportunities in dairying, stock raising, general farming, and the production of fruit and truck.

GREENVILLE FINE SANDY LOAM.

The Greenville fine sandy loam consists of 6 to 12 inches of brown to reddish-brown fine sandy loam, grading slowly into the underlying subsoil of deep-red, friable fine sandy clay. The subsoil usually passes into a rather heavy, compact fine sandy clay at 24 to 30 inches. This type is closely associated with the Orangeburg and Ruston fine sandy loams and Greenville clay loam, and includes areas of these soils too small to separate on the soil map.

In some areas, which are indicated on the soil map by gravel symbols, the type carries a large proportion of rounded, brownish quartzite gravel on the surface and through the soil.

In an area of about 160 acres, located about 1½ miles northeast of Lowndesboro, and in a somewhat smaller area on the Dallas County line about 1 mile north of Mush Creek, the surface soil is a sandy loam in texture rather than a fine sandy loam. In some places this soil is gravelly.

The Greenville fine sandy loam is confined to the northern and northwestern parts of the county. The principal areas are mapped a short distance south of Manack and within a few miles of Trickem. The included gravelly soil occurs mainly in a number of small areas between the Dallas County line and Collirene.

The Greenville fine sandy loam occupies undulating to very gently rolling uplands, and plateaulike areas on divides. South of Manack and east of Trickem it occupies some rather broad, nearly level areas which include many small, shallow depressions without established drainage outlets. These depressions, where not occupied by Grady silt loam, have a soil which is deeper, darker, and heavier than the typical Greenville fine sandy loam. Elsewhere the relief is in most places sufficient to induce good surface drainage without erosion. The structure of the soil and subsoil permits adequate internal drainage. The type absorbs and retains moisture well, and is one of the last of the upland soils to show the effects of drought.

Fully 90 per cent of the typical Greenville fine sandy loam and probably 50 per cent of the included gravelly soil are devoted to crop production. The uncultivated land is largely in timber, consisting of mixed hardwoods and some pine.

Cotton and corn are the principal crops. The acreage of cowpeas, velvet beans, oats, wheat, and rye is increasing yearly. Sweet potatoes, vegetables, and fruit are grown for home use. Cotton formerly yielded one-half to 1 bale per acre, but under boll-weevil conditions the average return is about 150 pounds of lint per acre. Corn yields 15 to 45 bushels per acre, averaging about 35 bushels. Acreage yields of 20 to 35 bushels of oats, 10 to 20 bushels of wheat, and 8 to 10 bushels of rye are obtained with the application of stable manure. Sweet potatoes yield 75 to 150 bushels per acre. Peaches are the principal tree fruit grown. The leading varieties are the Mayflower, Greensboro, Carman, Belle of Georgia, and Elberta. There are no large commercial orchards, but in the vicinity of Lowndesboro some peaches are marketed in favorable years. Strawberries are grown to some extent for home use and for sale on the local markets. Such varieties as the Lady Thompson and Heflin yield well.

The Greenville fine sandy loam, which is locally known as "red sandy land," is recognized as one of the most productive upland soils for general farm crops. It is easy to till and can be worked under a wide range of moisture conditions. Prior to the advent of the boll weevil this soil was highly esteemed on account of its uniformly high yields of cotton under a rather wide range in rainfall. Crop diversification is probably more advanced on this soil than on any other. It has been largely attended by better farming methods, such as deeper plowing, thorough preparation of the seed bed, and the growing of winter cover crops such as oats, wheat, and rye, and of summer legumes such as cowpeas and velvet beans. Stock raising and dairying are making a promising growth on this type and associated soils of the Greenville and Ruston series in the northern part of the county. Several silos have been built. The ensilage corn is grown largely on the Greenville fine sandy loam.

Under boll-weevil conditions the use of commercial fertilizer has fallen off considerably. Formerly cotton was invariably fertilized, with acreage applications of 100 to 300 pounds of a 10–2–2 preparation or of a mixture composed of 200 pounds of acid phosphate, 800 pounds of cottonseed meal, and 200 pounds of kainit. The other crops also were fertilized to some extent. At present, stable manure is used wherever available for corn and grain crops. From 50 to 75 pounds of sodium nitrate per acre is occasionally used as a side dressing for corn in midseason or as a top dressing for grain crops in the spring.

Land of the Greenville fine sandy loam is valued at $15 to $40 an acre, depending on the location. Well improved areas in the vicinity of Lowndesboro are held for somewhat higher prices.

The methods suggested for the improvement of the Ruston fine sandy loam should also be followed on this type.

This is one of the best general-farming soils in the county. It is adapted to a wide variety of staple and special crops, such as corn, oats, wheat, cowpeas, velvet beans, soy beans, peanuts, crimson clover, and bur clover. It has been recognized as the best upland cotton soil of the county, and it is well adapted to the production of cotton under boll-weevil conditions. By applying lime and inoculating the soil, alfalfa can probably be successfully grown. The type is well suited to medium or late truck crops, such as sweet potatoes, Irish potatoes, tomatoes, onions, cucumbers, squash, cauliflower, lettuce, radishes, and asparagus. It is one of the best peach and pecan soils of the county. In some other parts of the State it is used for the production of Cuban leaf tobacco.

GREENVILLE CLAY LOAM.

The surface soil of the Greenville clay loam consists of 4 to 6 inches of reddish-brown to red sandy clay loam or clay loam. The subsoil begins as a deep-red clay loam. It gradually becomes heavier with depth, and passes below into a compact or slightly plastic sandy clay. In places the surface 1 to 4 inches consists of brown to reddish-brown sandy loam. Deep plowing works up a mellow, friable clay loam soil in these areas. On slopes the surface material is deeper red in color and a heavy clay loam in texture, owing to the removal of the original lighter textured surface soil through sheet erosion. In several small areas there is a large content of rounded quartz gravel, small iron concretions or accretions, and iron-stone fragments in the surface soil, and to a less extent in the subsoil.

The Greenville clay loam is an inextensive type. It is developed mainly in the north-central and south-central parts of the county. The largest area of gravelly soil occurs about 1 mile southeast of Lowndesboro Station. In the south-central part of the county, between Fort Deposit and County Line Hill, the type occurs in small, widely scattered areas which consist in part of the typical soil and in part of the gravelly variation.

The Greenville clay loam occupies elevated positions on divides and rounded hills. The surface features are quite variable. The largest areas usually occur on the broader divides or high tablelands, and vary from undulating to gently rolling. They frequently extend down the adjacent slopes for some distance, and are more or less furrowed and gullied. The smaller areas are usually more rolling or rather steeply sloping. The entire type is well drained. Under proper management it absorbs and retains moisture well, and is quite drought resistant.

Between one-third and one-half of the type is cultivated. The remainder consists mainly of pasture land. A small proportion of

the type is in timber, consisting chiefly of oak, with some pine and hickory. Corn and cotton are the leading crops. Oats, wheat, and rye are produced to some extent, and vegetables and tree fruits are grown for home use. The yields of cotton formerly ranged from one-half to two-thirds bale per acre. Corn yields 20 to 50 bushels per acre, rye 8 to 15 bushels, and oats 15 to 35 bushels. Winter wheat seems to give good returns.

Until recently the Greenville clay loam was devoted almost exclusively to cotton and corn. As a result of the incessant clean cultivation the soil is low in organic matter. On account of its heavy texture, it can not be worked as early in the spring or under so wide a range of moisture conditions as the Greenville fine sandy loam. It has generally been plowed to only a shallow depth, and inadequately prepared for planting. The farming methods are similar to those prevailing throughout the uplands on the fine sandy loams. Fertilizers are still quite generally used for corn and cotton in the northern part of the county. Considerable stable manure is used in the vicinity of Lowndesboro.

Land of the Greenville clay loam ranges in price from $7.50 to $40 an acre. The gravelly areas are valued at about the same price as the typical soil.

The Greenville clay loam is easily maintained in a high state of productiveness. It needs deep plowing, more thorough preparation of the seed bed, the incorporation of organic matter, and the use of winter cover crops to prevent surface washing.

The type is admirably adapted to grains, grasses, and forage crops. While not so early as the Greenville fine sandy loam, it is fairly well suited to cotton production under boll-weevil conditions. It is well adapted to heavy truck, such as tomatoes, onions, squash, cucumbers, and cabbage, and is considered one of the best peach soils in the Gulf Coastal Plain.

SUSQUEHANNA GRAVELLY FINE SANDY LOAM.

The surface soil of the Susquehanna gravelly fine sandy loam consists of 6 to 14 inches of grayish to light-brown, gravelly fine sandy loam. This usually grades through a few inches of yellowish-brown or yellowish-red, heavy fine sandy clay into red or mottled red and yellow, heavy, brittle clay, which passes at 18 to 24 inches into heavy, plastic clay mottled red, yellow, and gray. Well-rounded quartz and sandstone pebbles, ranging from one-fourth inch to 2 inches in diameter, and small iron concretions and accretions are very plentiful on the surface and through the surface soil and frequently occur to some extent through the subsoil. In some places the transition from the surface soil to the underlying red or mottled clay is abrupt,

but in gently sloping areas the intermediate layer of fine sandy clay may extend to a depth of 24 inches or more.

The Susquehanna gravelly fine sandy loam is widely distributed over the uplands in the northwestern part of the county, within the drainage basins of Mush and Old Town Creeks. A fairly large area occurs in the north-central part, about 2 miles east of Lowndesboro. Several less important areas occupy the break from the uplands to the Alabama River terraces in the northern part of the county. The type occurs principally on valley slopes, but it frequently occupies narrow divides as well. The surface varies from gently rolling to hilly and broken. Drainage is adequate or excessive.

Probably not more than 25 per cent of the type is cultivated. Most of the remainder supports a rather light growth of mixed pine and hardwoods. The uncultivated area is used to some extent for pasturage. The crops grown and the methods of farming and fertilizing are quite similar to those prevailing on the Susquehanna fine sandy loam. Yields are slightly higher, and the type is said to be somewhat more drought resistant.

With the use of terraces and careful methods of farming the cultivated area of this soil can be extended. The surface soil is low in organic matter and would be greatly improved by green manuring. The methods of improvement suggested for the Susquehanna fine sandy loam can be applied equally well to this type. It is adapted to general farm crops and is a comparatively good cotton soil under boll-weevil conditions. In other parts of the Gulf Coastal Plain it is used successfully in the production of tomatoes for early market and canning. The rougher areas are probably best suited to pasturage and forestry.

SUSQUEHANNA FINE SANDY LOAM.

The surface soil of the Susquehanna fine sandy loam consists of a gray to brownish-gray loamy fine sand which passes at 4 to 8 inches into pale-yellow fine sandy loam. The subsoil, which is encountered at a depth of 10 to 16 inches, begins as a red or mottled red and yellow, moderately stiff clay, and becomes heavier, more plastic, and conspicuously mottled with gray in the lower part. The surface soil is low in organic matter. In many places it contains a noticeable amount of small iron concretions and fragments of iron-cemented sandstone.

There is considerable variation in the depth of the surface soil. On the abrupt slopes it is generally only 5 to 8 inches in depth, while in some places it may extend to a depth of 18 or 20 inches. The change from soil to subsoil is moderately sharp, except where the surface soil is deepest. The lower subsoil of some of the high-lying

areas in the vicinity of Fort Deposit and Mount Willing is more friable than typical, owing to the presence of pockets or seams of mealy, micaceous material. In many of the gently sloping areas bordering streams the subsoil begins as a yellowish or brownish or mottled yellow and reddish-brown, moderately friable fine sandy clay, and changes slowly to a mottled red, yellow, and gray, heavy plastic clay in the lower part of the 3-foot section.

In some small areas about 2 miles southwest of Mount Willing and near Fort Deposit and Sandy Ridge the soil is a sandy loam in texture.

The Susquehanna fine sandy loam is a moderately extensive type, developed largely in a number of comparatively small, widely distributed areas. It occurs on valley slopes and to a lesser extent on ridges and divides. The surface varies from gently sloping to rolling. There are few steep slopes. The run-off is generally good, but the imperviousness of the subsoil frequently causes the smoother areas to be imperfectly drained. It is also instrumental in causing erosion of the surface soil on slopes. Much of the type is inclined to be droughty, owing to the low water-holding capacity of the heavy clay subsoil and the slow internal movement of soil moisture.

Probably 65 per cent of the Susquehanna fine sandy loam is cultivated. Some of the unused land is in timber, and part of this is used for grazing. The timber growth consists of shortleaf pine mixed with red oak, post oak, white oak, hickory, and sweet gum. The type formerly supported some longleaf pine, but this has been almost entirely removed.

Corn and cotton are the principal crops. Oats, velvet beans, cowpeas, peanuts, and sorghum are grown to provide grazing and forage for stock. Sweet potatoes and vegetables are grown for home use. Corn yields 15 to 25 bushels per acre. Prior to the advent of the boll weevil, the yield of cotton ranged from one fourth to one-half bale per acre under the usual methods of cultivation and fertilization. Sweet potatoes yield 80 to 250 bushels per acre. About the same methods of farming and fertilization are practiced on this soil as on the Ruston fine sandy loam.

Land values on the Susquehanna fine sandy loam range in general from $7.50 to $20 an acre. In the vicinity of Fort Deposit selling prices are somewhat higher.

The organic content of the Susquehanna fine sandy loam[1] should be increased and the type protected against erosion. All areas which show a tendency to erode on cultivation should be devoted to timber or permanent pasture grasses. Bermuda grass, lespedeza, bur clover,

[1] For a detailed discussion of methods of improving the Susquehanna fine sandy loam see Circular 51, Bureau of Soils, U. S. Dept. of Agriculture.

and white clover form a permanent pasture mixture well adapted to this soil. Contour cultivation is advisable even on the gently sloping areas. On the steeper slopes terraces should be left in grass at frequent intervals, in order to check and retard the run-off.

Winter cover crops should be generally grown, to retard erosion, supply pasturage, and add vegetable matter to the soil. Oats, rye, winter vetch, and crimson clover are good cover crops well suited to this soil. Because of the limited supply of stable manure, it is probable that over the greater part of the type it will be necessary to resort to green manuring. Winter cover crops can be turned under in the spring to supply green manure, and such summer legumes as cowpeas, velvet beans, or soy beans can be made to supply a large amount of vegetable matter. Moderately heavy applications of air-slaked lime will aid materially in hastening the decomposition of green material plowed under. The legumes, winter cover crops, and staple crops should be arranged in a systematic rotation. Deeper plowing is necessary for the thorough incorporation of green manure with the surface soil. Deeper plowing and the addition of organic matter in the surface soil will greatly increase the water-holding capacity of the type as a whole. The imperfectly drained areas would be materially benefited by tile drainage.

The Susquehanna fine sandy loam is primarily a general-farming soil. It is a good cotton soil under boll-weevil conditions, and is well suited to all early-maturing crops, such as oats, rye, cowpeas, velvet beans, soy beans, peanuts, and millet. The type is not an exceptionally good corn soil. The less perfectly drained areas are adapted to sugar cane. Sweet potatoes and Irish potatoes will give good results in well-drained situations. Nearly all the common fruits and vegetable crops can be grown in home gardens. In the vicinity of Fort Deposit some 12 to 15 year old pecan trees are producing well on this type.

LUFKIN FINE SANDY LOAM.

The surface soil of the Lufkin fine sandy loam is prevailingly a gray to dull-gray fine sandy loam, 8 to 12 inches deep. It grades through several inches of yellowish or mottled yellow and gray, heavy fine sandy loam into the subsoil. This begins as a mottled yellow and gray, compact fine sandy clay, and becomes heavier and more prominently mottled with gray with increase in depth, passing at 20 to 24 inches into a gray, tough, plastic silty clay mottled with yellow and brown, and in places with traces of red.

In the northern part of the county, about 3 miles north of White Hall, east of Trickem, and south of Manack the soil in several small patches consists of a gray silt loam underlain by gray, plastic silty clay, mottled with yellow or brown. This soil occupies saucerlike

depressions and has no natural drainage outlet. None of it is cultivated. It supports a growth of swamp pine, maple, water oak, sweet gum, and willow.

In an area about 2 miles north of Collirene the type occupies a depressed position on a ridge. Over part of this area there is a large amount of rounded quartz gravel and small iron concretions or accretions on the surface and through the surface soil. This material is also present to some extent in the subsoil, but it decreases in content with depth and is rarely very plentiful in the lower subsoil. This area has a hummocky surface and is better drained in places than the type as a whole.

The principal areas of Lufkin fine sandy loam occur in the east-central part of the county, near Greve Landing Church and about 2½ miles southeast of Letohatchee, and in the west-central part of the county near Collirene. Small areas are mapped near Hayneville and at widely scattered points in the southeastern part of the county. The type occurs mainly on gentle slopes to stream bottoms and about the heads of drainage ways. The surface is prevailingly undulating or gently sloping. Both the surface drainage and internal drainage are imperfect over the type in general. In most places it receives considerable seepage water from higher lying soils and is late in drying out in the spring.

The Lufkin fine sandy loam is not of much agricultural importance. About two-thirds of its entire area is cultivated. The remainder is largely used for pasture. Probably one-half of the pasture land is timbered with pine, water oak, sweet gum, and other trees. In recent years corn has been grown more extensively than cotton. Cotton formerly yielded one-fourth to one-half bale per acre. Corn yields range widely, depending on the rainfall. The best yields are obtained in dry years, 15 to 25 bushels per acre being reported. Sugar cane is grown to some extent, and yields 100 to 150 gallons of sirup per acre. This soil is farmed in about the same way as the better drained upland fine sandy loams.

For the improvement of the Lufkin fine sandy loam, better drainage, applications of lime, and an increase in the organic content are necessary. Open ditches suplemented by tile drains will provide adequate drainage. Where properly drained this is a valuable soil for general farming. It is well adapted to cotton, corn, cowpeas, velvet beans, soy beans, sugar cane, sorghum, Bermuda grass, and lespedeza, and to such special crops as strawberries and pecans.

GUIN FINE SANDY LOAM.

The Guin fine sandy loam is extremely variable in composition and surface configuration. It comprises a number of distinct soils and

gradations too intimately associated and too patchy in occurrence to be separated into types. The surface soil appears most frequently as a grayish sandy loam or fine sandy loam, interrupted by occurrences of clay and clay loam. The sandy material may extend to a depth of 3 feet or more, but over the greater part of the type a clay or sandy clay subsoil is encountered within the 3-foot section. In the western part of the county fragments of iron-cemented sandstone and ironstone, iron concretions, and small quartz gravel occur on the surface and through the surface soil in many places. The Guin fine sandy loam is made up of intermixed small areas of Ruston sand, sandy loam, and fine sandy loam, and Susquehanna sandy loam, fine sandy loam, clay loam, and clay, with several shallow and gravelly phases of these types.

The largest areas of Guin fine sandy loam occur in the vicinity of Mount Willing, about 1 mile south of Lum, and near Calhoun. The remainder of the type occurs in widely scattered areas in the southern and western parts of the county. It occupies rough to hilly and broken uplands. The type is so thoroughly dissected by deep, narrow valleys that it is almost nonagricultural. Surface drainage is excessive and erosion is very active. The type is farmed only in patches, and probably less than 5 per cent of it is cultivated. Most of it supports a growth of shortleaf pine, oak, hickory, and sweet gum. The land is valued at $3.50 to $5 an acre.

The greater part of this type should be left in timber and used for pasture. Peaches can be grown on the areas having a sandy clay subsoil. The gentler slopes and broader ridges can be used for general farm crops with careful management to prevent erosion.

LEAF FINE SANDY LOAM.

The surface soil of the Leaf fine sandy loam consists of a dull-gray, loamy, or silty fine sand, which passes at 4 to 6 inches into a light-gray or pale-yellow fine sandy loam or silty fine sandy loam. The surface soil grades at 10 to 16 inches into a subsoil of mottled yellow and gray, compact fine sandy clay to dark-yellow silty clay, which passes at 24 to 30 inches into mottled red, yellow, and gray, tough, plastic clay.

This soil has a wide distribution throughout the second bottoms of the county. Its principal development is in the vicinity of Burkville, northeast of White Hall, and about 3 miles east of Trickem. Fairly extensive areas are encountered along Pinchony, Pintalla, Big Swamp, and Dry Cedar Creeks and their main tributaries. The type occupies terraces which lie mainly from 10 to 30 feet above normal overflow. The surface ranges from flat to very slightly undulating. Where the terraces give way to the stream bottoms they

are frequently marked by distinct slopes. Near these slopes the type frequently includes small developments of Cahaba fine sandy loam and, more rarely, Cahaba clay loam.

The Leaf fine sandy loam occurs closely associated with the Leaf silt loam and the Cahaba fine sandy loam. In general it lies slightly higher than the Leaf silt loam, and is somewhat better drained, while it lies somewhat lower than the Cahaba fine sandy loam and has correspondingly poorer drainage. Owing to the prevailingly flat surface and the impervious nature of the substratum, both surface drainage and underdrainage are slow. Water frequently stands on the surface or keeps the soil saturated for several days after heavy rains.

A considerable proportion of this type has been under cultivation in the past, but probably not over one-third of its entire area is cropped at present. The growth on the forested areas includes shortleaf pine, white oak, red oak, water oak, hickory, and sweet gum. Corn and cotton are the principal crops. Velvet beans, cowpeas, and sweet potatoes are crops of less importance. Corn yields 10 to 15 bushels per acre without fertilization. Cotton formerly yielded an average of one-third bale per acre. With fertilization the yield of corn was generally increased to 25 to 35 bushels per acre, and of cotton to about one-half bale per acre. Under boll-weevil conditions the yield of cotton is generally small. Cowpeas yield 1 to 1½ tons of hay per acre, and sweet potatoes from 50 to 150 bushels. Sugar cane yields from 100 to 250 gallons of sirup per acre.

This soil is considered easy to work. The best yields are obtained in years of less than normal rainfall. Crops generally make a slow growth in the spring, and mature considerably later than on the Chattahoochee and Amite fine sandy loams. The type is somewhat earlier, however, than the Leaf silt loam. In general, the farming methods used are similar to those which prevail over the upland fine sandy loams.

Until recently, fertilizers were quite generally used on the Leaf fine sandy loam. The acreage applications for cotton consisted of 100 to 200 pounds of a mixture analyzing 10–2–2, or about 200 to 300 pounds of cottonseed meal and acid phosphate mixed 2 to 1, with 50 pounds of kainit. Corn was given somewhat lighter applications, the kainit being replaced by about 50 to 75 pounds of sodium nitrate when the corn began to tassel. Compost and stable manure are used to some extent, but the supply of this material is small.

The selling value of land of the Leaf fine sandy loam ranges from $7.50 to $20 an acre.

This type needs better drainage and an increase in organic content. Open ditches, supplemented by tile drains, will provide adequate

drainage, and cowpeas and velvet beans should be turned under to increase the organic-matter supply. Where properly drained this is a valuable soil for general farming. It is adapted to cotton, corn, cowpeas, velvet beans, soy beans, sorghum, sugar cane, Bermuda grass, and lespedeza, and to such special crops as strawberries and pecans.

LEAF SILT LOAM.

The surface soil of the Leaf silt loam consists of 6 to 10 inches of gray to light-brown or mottled gray, pale-yellow, and light-brown, compact silt loam. The subsoil begins as a yellow or mottled gray and yellow, silty clay loam, and becomes heavier and more plastic with depth. Below 20 to 24 inches it is usually a heavy, plastic, impervious, gray and yellow clay, conspicuously streaked with red.

The surface soil is friable. The upper subsoil is friable to crumbly when dry, but plastic and tenacious when wet. The immediate surface material in flat or depressed situations dries out to a white or ashy-gray color. Small iron concretions occur sparingly on the surface and throughout the soil and subsoil in places.

Aside from one small area about 1 mile north of Devenport, this soil is confined to the northern part of the county. It is the most extensive of the terrace soils. The areas are interrupted by winding strips of Ochlockonee silty clay loam, often too narrow and irregular in outline to be separated on the soil map. The Leaf silt loam occupies the lowest terraces of the Alabama River and its tributaries, but it lies 20 to 60 feet above the normal level of the river, and is overflowed only by abnormally high floods, such as occurred in 1886 and 1916. The surface varies from nearly level to slightly undulating. The slopes to the watercourses are generally gradual, but the principal streams are sometimes approached by slightly more abrupt slopes, which include small areas of Cahaba clay loam or silt loam. These soils also occupy low swells or slight ridges within the general areas of Leaf silt loam. Owing to the prevailing flat surface and the impervious nature of the subsoil, both surface drainage and internal drainage are imperfect. In the early spring or after heavy rains the surface may be covered with water for considerable periods.

The Leaf silt loam is not very important agriculturally. Probably 25 per cent of the type is under cultivation at present. A considerable area of formerly cultivated land has been abandoned, probably because of the ravages of the boll weevil during the last two seasons. These old fields now support a growth of blackberry bushes, broomsedge, crab grass, and lespedeza, and are used to some extent for pasture. The remainder of the type is still forested with oaks,

sweet gum, elm, ironwood, soft maple, birch, shortleaf pine, and persimmon.

Corn and cotton are practically the only crops grown. Corn yields from 10 to 25 bushels per acre. Cotton formerly averaged about one-third bale per acre without fertilization, and about one-half bale per acre where fertilized with 200 to 300 pounds of a 10–2–2 mixture per acre. Under boll-weevil conditions 100 to 200 pounds of seed cotton are obtained per acre.

The same methods are employed in the production of corn and cotton as on the Leaf fine sandy loam. In general the plowing is shallow and the seed-bed preparation inadequate. If plowed when wet the soil is inclined to bake into hard clods on drying. It absorbs water slowly and crops are said to suffer during protracted dry spells.

Land of the Leaf silt loam is valued at $7.50 to $15 an acre.

This type can be considerably improved by providing adequate drainage, adding organic matter, plowing deeply, and thoroughly preparing the seed bed. Where properly drained it is adapted to small grains, pasture and hay grasses, forage crops, and corn.

The results of mechanical analyses of samples of the soil, subsoil, and lower subsoil of the Leaf silt loam are shown in the following table:

Mechanical analyses of Leaf 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.*
415545	Soil	1.0	5.0	3.0	8.0	6.1	53.9	22.9
415546	Subsoil	.3	2.6	1.5	4.5	5.1	45.3	40.5
415547	Lower subsoil.	.1	.6	.6	2.4	3.7	50.3	41.9

KALMIA SAND.

The Kalmia sand consists of a dull-gray or gray sand to loamy sand, 5 to 8 inches in depth, underlain to a depth of more than 3 feet by a pale-yellow or gray sand. Both soil and subsoil are loose and incoherent.

This type occurs chiefly on the high terraces of the Alabama River. It is of very small extent. It occupies low ridges or broad swells elevated a few feet above the surrounding soils, and is well drained.

The original timber growth of shortleaf pine and oak has been largely removed. Nearly all the Kalmia sand has been under cultivation in the past, but probably less than 50 per cent of it is cropped at present. Cotton and corn are the principal crops. Cowpeas, vel-

vet beans, and soy beans are grown to some extent, and vegetables and melons are produced for home use. Cotton yielded one-fourth to one-third bale per acre before the boll weevil became prevalent. Corn yields 8 to 15 bushels per acre, and sweet potatoes from 50 to 100 bushels.

Practically the same methods of farming are followed on this type as on the upland sandy soils, especially the Norfolk sand. The Kalmia sand is easy to work and produces early maturing crops. Yields can be materially increased by adding organic matter and by adopting a rotation to include leguminous crops between corn and cotton. This soil is especially adapted to the production of truck crops, such as watermelons, cantaloupes, sweet potatoes, and Irish potatoes for early market. Most of the type is fairly well located with reference to shipping facilities.

KALMIA FINE SANDY LOAM.

The surface soil of the Kalmia fine sandy loam is a gray to slightly brownish-gray, loamy fine sand, passing at 4 to 6 inches into a pale-yellowish fine sandy loam. This grades slowly into a subsoil of yellow, friable fine sandy clay at an average depth of 15 inches. The subsoil generally becomes slightly heavier with depth and frequently shows gray or brown mottlings.

A few small areas of fine sand are included with the Kalmia fine sandy loam. They consist of dull-gray, loamy fine sand underlain at about 8 inches by a gray to yellowish-gray fine sand which extends to more than 3 feet without change. The largest of these areas is situated in Gordon Bend, about 2 miles northwest of Pleasant Green Church. It is used for pasture, and probably is subject to overflows.

The Kalmia fine sandy loam is not an extensive type, but it is widely distributed over the county. It occurs on the second bottoms of the Alabama River and other large streams, and is not subject to overflows. The surface varies from nearly level to slightly sloping and undulating. Drainage is prevailingly good, and only the slightly depressed areas and those having a heavier subsoil than typical are poorly drained.

The Kalmia fine sandy loam is a desirable soil. It withstands drought well, and is generally easy to cultivate. Fully 75 per cent of it is cropped. The remainder is partly in timber, which consists mainly of shortleaf pine and oak, with occasional magnolia, beech, and gum.

Corn and cotton are the principal crops, followed by velvet beans, cowpeas, and sugar cane. Sweet potatoes and vegetables are produced for home use. The yields of cotton formerly averaged about

one-third bale per acre. Corn yields 10 to 25 bushels per acre. An excellent grade of sirup is made from sugar cane grown on this soil, and yields range from 100 to 200 gallons per acre. The methods of farming are similar to those followed on the Cahaba fine sandy loam, which frequently occurs in association with this type.

The selling value of land of the Kalmia fine sandy loam ranges from $10 to $20 an acre.

Deep plowing, thorough tillage, an increase in the organic-matter supply, and the adoption of systematic crop rotations to include the legumes will maintain, and in many cases increase, the productiveness of the Kalmia fine sandy loam. The less perfectly drained areas would be materially improved by tile drainage.

The Kalmia fine sandy loam is a good general farming soil. In addition to the crops grown, it is adapted to oats, Bermuda grass, lespedeza, and grasses and forage crops in general. With good drainage it is well suited to truck crops, including peas, beans, cucumbers, Irish potatoes, raspberries, blackberries, and strawberries.

CAHABA FINE SANDY LOAM.

The Cahaba fine sandy loam consists of 12 to 16 inches of brownish-gray to light-brown fine sandy loam, grading into a subsoil of brown, reddish-yellow, or yellowish-red, friable fine sandy clay. The subsoil is frequently rather compact, slightly heavier, and mottled with red and yellow below 24 inches. The slopes to the lower terraces and stream courses in some places include small developments of Cahaba clay loam or silt loam, which are not separated on the soil map. The type also includes narrow strips or small depressed areas of Leaf fine sandy loam, Grady silt loam, and Ochlockonee silty clay loam, too small to map. In an area about 2 miles due west of Robinson Station and another about 4 miles northwest of Lowndesboro Station the surface soil is a sandy loam.

The Cahaba fine sandy loam occupies high terraces along the Alabama River and other large streams. Its principal development is in the northern part of the county. It has a nearly level to slightly undulating surface. In general, the type lies slightly higher than the Leaf fine sandy loam and lower than the Chattahoochee and Amite fine sandy loams. Only a small part of the type, if any, is subject to overflows. Drainage in most places is fairly good. The type has decidedly better drainage than the Leaf fine sandy loam, and is not so thoroughly drained as either the Chattahoochee or the Amite fine sandy loam. The soil absorbs and retains moisture well, and crops are not readily affected by drought.

The Cahaba fine sandy loam is one of the most extensive terrace soils of the county. Its agricultural importance has been reduced considerably by the ravages of the boll weevil. In the past it has

been farmed mainly by negro tenants, who have not grown a diversity of crops. The proportion of the type devoted to crop production has fallen from about three-fourths to about one-third. About one-fourth of the type is forested with pine, sweet gum, water oak, red oak, and elm. The timbered areas and the idle fields are used to a considerable extent for pasture. Grazing is afforded by a number of wild grasses, including broom sedge and lespedeza. Corn and cotton are still the principal crops. Cowpeas, velvet beans, and oats are grown to some extent for forage, and sugar cane for the manufacture of sirup. Sweet potatoes, vegetables, and melons are produced in sufficient quantities for home use.

Acreage yields of one-third to three-fourths bale of cotton were formerly obtained, with the use of fertilizers, but under boll-weevil conditions the yield is uncertain and usually very low. Corn yields 15 to 25 bushels per acre. Oats, which are rarely thrashed, average about 1 to 1½ tons of hay per acre. Sugar cane yields from 100 to 200 gallons of high-grade sirup per acre, and sweet potatoes from 50 to 150 bushels. The farming methods on the soil are similar to those followed on the upland Ruston fine sandy loam.

Land of the Cahaba fine sandy loam is held at prices ranging from $12.50 to $30 an acre.

The productiveness of this soil can be easily maintained by good farming methods. It needs the incorporation of organic matter, deeper plowing, more thorough preparation of the seed bed, and the rotation of crops. The permanent pastures should be seeded to a mixture of Bermuda grass, lespedeza, bur clover, and white clover.

The Cahaba fine sandy loam is an excellent general farming soil. It offers splendid opportunities for a combination of dairying, general farming, and the production of medium to late truck crops. It is adapted to corn, oats, rye, soy beans, velvet beans, cowpeas, sorghum, and sugar cane, and is a relatively good cotton soil under boll-weevil conditions. A great variety of vegetables, such as Irish potatoes, sweet potatoes, tomatoes, peppers, okra, squash, cucumbers, string beans, lima beans, radishes, and lettuce do well and could doubtless be profitably grown for markets. The soil is also well adapted to pecans, bush fruits, and strawberries. The greater part of the type is favorably located with reference to shipping facilities.

Cahaba fine sandy loam, light phase.—The Cahaba fine sandy loam, light phase, consists of 5 to 12 inches of light-brown to brown medium sand or loamy sand, grading into a subsoil of mellow, medium sand which is prevailingly lighter or brighter colored, ranging usually from dull yellow to reddish yellow. In places the lower subsoil is somewhat sticky, and yellowish brown in color.

This soil occurs in a few small areas on the higher terraces of the Alabama River and Big Swamp Creek. It is typically and most ex-

tensively developed in the vicinity of White Hall. The areas occurring about 2¼ miles northwest of Robinson and about 1 mile south of White Hall consist in part of a shallow variation of this phase, in which a reddish-yellow sandy clay occurs at about 30 inches. The phase occupies slight ridges or broad swells which rise 5 to 15 feet above the adjacent terrace soils. The internal drainage is good to excessive.

The original growth of shortleaf pine and water oak has been very largely removed from this soil. Practically the entire phase has been cultivated in the past, but at present only about 50 per cent of it is devoted to crops, principally cotton and corn. These are supplemented by velvet beans, soy beans, and cowpeas. Vegetables, sweet potatoes, and melons are grown for home use. Cotton formerly yielded about one-third bale per acre. Corn yields 10 to 15 bushels per acre.

This soil is somewhat more productive than the Kalmia sand. It is easy to till, and can be worked early in the spring. Crops mature early, but they are usually a little later than on the Kalmia sand. The methods of farming are quite similar to those prevailing over the upland sandy soils. The plowing is usually shallow, and a distinct hardpan layer has developed at about 3 inches below the surface in the area near White Hall. Light sandy soils in general do not require deep plowing, but it would be advisable to plow this phase sufficiently deep to destroy this hardpan, and thereafter to vary the depth at which plows and sweeps are run, to prevent its re-formation. This soil can be increased in productiveness by growing leguminous crops and by adding organic matter to the surface soil.

The Cahaba fine sandy loam, light phase, is especially suited to the production of early truck crops, such as melons, cantaloupes, sweet potatoes, and Irish potatoes. The greater part of the phase is very favorably located with reference to shipping facilities and markets.

CAHABA SILT LOAM.

The surface soil of the Cahaba silt loam consists of 5 to 10 inches of light-brown to brown, compact silt loam. This grades into a subsoil of reddish-yellow to yellowish-red silty clay, which passes below into heavy, stiff silty clay or clay, mottled or spotted with red, reddish-brown, and yellow. In places there is a noticeable content of small iron concretions or accretions on the surface and a smaller proportion in the soil and subsoil. As mapped, the Cahaba silt loam includes narrow strips and small areas of Leaf fine sandy loam and silt loam.

The type also includes some small areas of Cahaba clay loam, situated about three-fourths mile southwest of Burkville, near Robinson,

about 2 miles east of White Hall, and 1 mile north of Gordon Bend Church. This soil is slightly heavier in texture. In places it approaches a clay.

The Cahaba silt loam occurs on low terraces along the Alabama River and its tributaries. It lies mainly above normal overflows, but practically the entire type is inundated by abnormally high floods. It occurs closely associated with the Leaf silt loam and fine sandy loam. It lies slightly higher than the Leaf silt loam and somewhat lower than the fine sandy loam. Some of the areas are traversed by a network of narrow, swampy sloughs or sluggish, intermittent drainage ways, in which the soil is mainly the Ochlockonee silty clay loam. Where the areas of the latter soil are of sufficient extent, they are mapped separately. The surface of the typical Cahaba silt loam ranges from nearly level to undulating or sloping. The surface drainage is fairly good, averaging somewhat better than on the Leaf silt loam, but the internal drainage is imperfect.

The Cahaba silt loam is unimportant agriculturally. Probably one-third of it is under cultivation. The remainder is timbered with oak, gum, beech, elm, and pine. The soil is heavy to work, and if plowed when too moist bakes into hard clods on drying. Crops suffer from lack of moisture during dry spells, and from lack of good surface drainage in wet weather. The type is used for corn and cotton, but is not considered a good cotton soil under boll-weevil conditions. The yield of cotton formerly averaged about one-third bale per acre. Corn yields 15 to 30 bushels per acre.

The Cahaba silt loam can be improved by providing better drainage, by plowing deeply and thoroughly preparing the seed bed, and by adding organic matter. The type is adapted to grains, hay and pasture grasses, and forage crops.

CHATTAHOOCHEE FINE SANDY LOAM.

The surface soil of the Chattahoochee fine sandy loam consists of 6 to 12 inches of light-brown loamy fine sand to light-textured fine sandy loam. The subsoil is a light red or brick red, moderately friable to compact fine sandy clay. Over part or all of the areas mapped about 1 mile northeast of Lowndesboro Station and about 2 miles west of Lowndesboro the surface soil is a sandy loam.

The Chattahoochee fine sandy loam is widely distributed over the terraces of the Alabama River and its tributaries in the northern part of the county between Robinson Station and Benton. It occupies the higher-lying third or fourth terraces, and is exceeded in elevation among the terrace soils only by the Amite fine sandy loam.

The entire type lies well above overflow level, and has excellent surface and internal drainage. The surface varies from nearly level

to undulating or very gently rolling. The fine sandy clay subsoil is very absorptive and retentive of moisture, and the type has a high drought-resisting capacity. The surface configuration favors the use of labor-saving farm machinery and implements. The soil is easy to till and can be worked under a wide range of moisture conditions.

At least three-fourths of the Chattahoochee fine sandy loam is cultivated. Most of the unused land is in timber, consisting of oak, hickory, and pine. A few of the least productive fields have been abandoned, owing to the ravages of the boll weevil. This soil is not considered capable of producing as heavy yields of cotton as the Amite fine sandy loam, but it has had the reputation of producing uniformly good yields more consistently, under varying conditions of rainfall, than any other terrace soil. The best yields are obtained in wet years. Corn and cotton are still the principal crops grown, but the acreage of the latter crop has been materially decreased. This reduction has been partly balanced by an increase in the acreage of corn, oats, cowpeas, peanuts, and soy beans. Velvet beans have recently become a common crop. Sweet potatoes and vegetables are grown for home use. The yield of cotton, where fertilized, formerly ranged from one-half to three-fourths bale per acre, but under boll-weevil conditions the yield is uncertain and usually small. Corn yields 15 to 25 bushels per acre, and sweet potatoes 75 to 150 bushels or more. Oats, cowpeas, velvet beans, soy beans, and peanuts give satisfactory returns. The fertilizer practices and methods of farming are similar to those followed on the upland Orangeburg fine sandy loam.

Land of the Chattahoochee fine sandy loam is valued at $15 to $35 an acre.

This soil resembles the Orangeburg fine sandy loam very closely in many respects, and the suggestions made for the improvement of that soil can be applied equally well to the Chattahoochee fine sandy loam.

The greater part of this type is favorably located with reference to shipping facilities. It offers opportunities in dairying, general farming, the production of fruit and truck, or a combination of these branches of farming. In addition to the crops grown, it is adapted to grains, grasses, forage crops, Cuban filler tobacco, peaches, pecans, bush fruits, and a variety of vegetables, including Irish potatoes, tomatoes, cucumbers, and onions.

AMITE FINE SANDY LOAM.

The surface soil of the Amite fine sandy loam consists of 5 to 10 inches of brown or reddish-brown to red, heavy fine sandy loam, which grades into a subsoil of deep-red, friable, open-structured fine sandy clay.

This type is developed in the north-central part of the county. The principal areas occur near Manack and about 1 mile southeast of White Hall. In the northern extension of the area near Manack the soil resembles the Chattahoochee fine sandy loam. The area southeast of White Hall is made up in part of Amite sandy loam.

The Amite fine sandy loam occupies the highest terraces of the Alabama River. The entire type lies well above overflows. It has a nearly level to undulating surface. In general, the surface drainage and internal drainage are good, but there are a few slight depressions which have inadequate drainage. In these the soil usually averages somewhat heavier in texture and darker in color.

This type is easily worked and can be handled under a fairly wide range of moisture conditions. Crops withstand drought well, and the best yields are obtained in years of less than normal rainfall. Probably 95 per cent of the type is cultivated. Cotton and corn are the chief crops grown. Oats, cowpeas, peanuts, sweet potatoes, and vegetables are produced to some extent.

The yield of cotton formerly ranged from one-half to 1 bale per acre, with fertilization, but under boll-weevil conditions the average return probably does not exceed one-fifth bale per acre. Corn yields 15 to 35 bushels per acre, cowpeas 1 to 1½ tons of hay, peanuts 15 to 20 bushels, and sweet potatoes from 100 to 200 bushels. The farming methods on this soil are similar to those prevailing on the upland Greenville fine sandy loam.

The Amite fine sandy loam is very favorably located with reference to shipping facilities, and the land is held at $20 to $40 an acre.

The suggestions made for the improvement of the Greenville fine sandy loam also apply to this soil. It is suited to the same types of farming and to the same crops as the Chattahoochee fine sandy loam. Pastures seeded to Bermuda grass, lespedeza, or white clover will furnish excellent grazing on this soil.

In the following table are shown the results of mechanical analyses of samples of the soil and subsoil of the Amite fine sandy loam:

Mechanical analyses of Amite 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.*
415561	Soil	0.2	12.1	20.9	28.3	7.4	20.9	11.0
415562	Subsoil	.4	4.6	10.9	25.8	8.3	22.2	27.6

CATALPA CLAY LOAM.

The surface soil of the Catalpa clay loam is a light-brown or yellowish-brown to dull-gray clay loam, with an average depth of 6 to

10 inches. The subsoil begins as a mottled brown and drab, compact to plastic clay loam or sandy clay, and passes at 18 to 24 inches into a heavy, plastic, silty clay, mottled yellow and gray or yellow, gray, and brown. The lower subsoil is lighter in color than the upper part. The surface soil is everywhere calcareous. The upper subsoil in places is not calcareous, and the lower subsoil frequently is decidedly acid.

There is some variation in this type. The surface soil in places is a loam or silt loam. Lenses of sand or fine sand, from 1 to 6 inches thick, occur at varying depths in the subsoil. The color of the surface soil ranges from pale yellow or greenish yellow to reddish brown, varying with the proportion of sediment contributed by the Sumter and Oktibbeha soils, respectively, in the formation of this type.

The Catalpa clay loam occurs in the overflowed bottoms of streams heading in, or flowing through, limestone soils. It has a nearly level surface, with a very gradual slope in the direction of stream flow. The entire type is subject to frequent short overflows.

Owing to the imperfect internal drainage, the soil often remains saturated for considerable periods after the overflows subside. Cultivation is seldom delayed more than a week, however.

The Catalpa clay loam is a fairly extensive type, of considerable agricultural importance. Probably a larger proportion of this type is devoted to crop production than of any other soil in the county. A very small part of the type is in pasture, and not more than 10 per cent of it supports a timber growth, consisting mainly of oak, gum, bay, willow, beech, and holly. Formerly cotton was extensively grown, but under boll-weevil conditions corn and Johnson-grass hay are the most important crops. A smaller acreage is devoted to sugar cane, sorghum, and oats. Yields of corn range from 15 to 50 bushels per acre, with an average of about 30 bushels. Three cuttings of Johnson grass can be depended upon, and the total yield averages 1½ to 3 tons per acre. Before the boll weevil became prevalent cotton yielded one-half to 1 bale per acre. The crop does not mature early enough for good results, under present conditions, and the yields are uncertain and generally small. Sugar cane is grown principally for manufacture into sirup on the farm. The yield ranges from 100 to 250 gallons per acre, with an average of about 125 gallons. Sorghum gives a slightly heavier yield of sirup. Oats generally give satisfactory yields when not injured by overflows.

Almost the entire area of the Catalpa clay loam has been ditched and diked, with the object of controlling, rather than preventing, overflows. The stream channels have been straightened and lateral

ditches dug where needed, to effect rapid removal of flood waters and incidentally to lower the water table.

A mellow seed bed can be obtained on this soil except where it is plowed while wet. For corn, cotton, sugar cane, and sorghum the land is plowed in the spring to a depth of 3 to 5 inches. These crops are all grown on ridges and intertilled. Early corn matures about September 1, and may be followed by oats as a fall crop. The corn land is plowed and harrowed, to level off the ridges, before the oats are sown. Oats are harvested for hay or grain in the latter part of May or early in June, and the field is allowed to come up in Johnson grass or is planted to late corn. Where it is desired to maintain Johnson-grass hay lands for a number of years they are renovated every two or three years by being plowed in the late summer and seeded down with oats. No fertilizer is used on this soil at present. In the past acreage applications of 200 to 500 pounds of kainit and cottonseed meal were made by some farmers on areas subject to cotton wilt.

Land of the Catalpa clay loam ranges in selling value from $15 to $40 an acre.

More thorough preparation of the seed bed is needed on the Catalpa clay loam. The cultivated areas should be rotated with hay and pasture grasses, to receive the benefit of sedimentation from overflow waters. Better drainage and more efficient protection from overflows could be obtained by cooperation of the landowners in constructing main ditches and levees. The Catalpa clay loam is well adapted to the crops generally grown. It is also suited to alfalfa where properly drained and protected from overflows.

In the following table are shown the results of mechanical analyses of samples of the soil and subsoil of the Catalpa clay loam:

Mechanical analyses of Catalpa 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.*
415511	Soil	0.0	0.1	0.1	15.5	37.9	28.8	17.3
415512	Subsoil	.0	.0	.1	4.1	22.8	36.0	36.8

The following sample contained more than one-half of 1 per cent calcium carbonate ($CaCO_3$): No. 415511, 2.43 per cent.

CATALPA CLAY.

The surface soil of the Catalpa clay is a brownish-gray to dark-brown, heavy clay, ranging in depth from 4 to 10 inches. It is very stiff and waxy when wet, but crumbles into small granules on drying. The subsoil begins as a mottled drab and brown, plastic clay, and becomes mottled with gray, yellow, and brown below 18 to 24 inches. The surface soil is highly calcareous, and the subsurface material is generally calcareous. but the deep subsoil frequently is decidedly acid.

In some places the soil in the first 2 or 3 inches is a brownish clay loam or silty clay. A few small areas of Trinity clay, which has a dark-gray to black surface soil, are included with the Catalpa clay. These occur principally 1½ miles east of Hayneville and 2 and 3 miles west and 4 miles southwest of Lowndesboro. Smaller areas occur about one-third mile and about 2 miles southwest of Charity Industrial School, and southwest of Benton on Valley Creek and a small branch of Old Town Creek. In many forested areas within the Catalpa clay the soil appears almost black in the surface inch or two.

The Catalpa clay occurs in bottoms along streams which head in or flow through limestone soils. The surface is predominantly flat, with abandoned stream channels, cut-offs, and swales in places. The entire type is overflowed to a considerable depth at least once each year. The surface drainage and internal drainage are imperfect, owing to the flat surface and the impervious nature of the soil and subsoil. Plowing and seeding are sometimes delayed by spring overflows, and cultivation may be retarded by heavy rains during the summer.

Probably 60 per cent of this type is cultivated. The remainder is used to some extent for pasture. It is largely forested with oak, elm, gum, sycamore, and swamp pine. Switch cane or bamboo furnishes considerable grazing in the winter months. Cotton was formerly grown extensively, but under boll-weevil conditions corn is the principal crop. A considerable acreage is devoted to Johnson grass for hay. Sugar cane and sorghum are grown to some extent, but the sirup is said to be inferior to that produced on the lighter-textured soils. Some oats are grown in the smaller bottoms, where the winter overflows are least damaging. A satisfactory stand of alfalfa has been obtained on an area about 3½ miles north of Gordonsville, on Panther Creek, where the overflows are controlled. The yield of corn ranges from 15 to 65 bushels per acre, with an average of 25 to 30 bushels. Three cuttings of Johnson grass are usually obtained, with a total yield of 1½ to 3 tons of hay per acre. Prior to the advent of the boll weevil the yield of cotton ranged from one-half to 1 bale per acre. Some cotton is still grown, but the crop matures late on this soil, and the yields are uncertain and generally small. The methods used in handling the Catalpa clay are similar to those prevailing on the Catalpa clay loam.

Selling values range from $15 to $40 an acre for improved land. The unimproved areas are valued principally for the timber growth.

The Catalpa clay can be improved by the methods that have been suggested for the Catalpa clay loam. This soil is especially adapted to corn, oats, Johnson grass, rice, sugar cane for sugar, and alfalfa. Under natural conditions good pasturage can be obtained from Bermuda grass, Johnson grass, and lespedeza.

In the following table are shown the results of mechanical analyses of samples of the soil and subsoil of the Catalpa clay:

Mechanical analyses of Catalpa 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.*
415513	Soil	0.0	0.2	0.4	13.4	7.2	38.1	40.3
415514	Subsoil	.0	.1	.4	21.4	15.1	33.9	28.3

The following sample contained more than one-half of 1 per cent calcium carbonate ($CaCO_3$): No. 415513, 2.68 per cent.

OCHLOCKONEE SILT LOAM.

The surface soil of the Ochlockonee silt loam is a brown or mottled drab and brown silt loam, 6 to 10 inches deep. This changes abruptly to a subsoil of mottled gray, yellow, and brown, sticky sand or fine sandy loam, which usually gives way at 24 to 30 inches to a mottled gray and yellow, plastic, impervious sandy clay or clay. Lenses of sand or fine sand are encountered at variable depths in the subsoil. Included with this type are some narrow strips of Ochlockonee fine sandy loam, mainly in the southeastern part of the county.

The Ochlockonee silt loam occurs principally in low, flat, first-bottom strips along streams tributary to Pigeon Creek, in Butler County. It is also developed north and southeast of Lowndesboro Station. The entire type is subject to overflows, but between floods the surface drainage is fairly good.

Probably 75 per cent of this type is under cultivation. The remainder is either in forest or is used for pasturage. The timber growth consists mainly of water oak, sweet gum, and elm, with some black gum, beech, ironwood, magnolia, and swamp pine, and switch cane or bamboo along the streams.

Corn is the principal crop. Yields range from 15 to 30 bushels per acre. Some cotton is grown, but owing to the ravages of the boll weevil the yields are uncertain and usually small. Johnson grass for hay and sugar cane for sirup are crops of some importance. Hay yields 1½ to 2 tons per acre. Johnson grass, Bermuda grass, carpet grass, and several types of so-called water grasses constitute the pasturage. This soil is farmed in about the same way as the Catalpa soils. Fertilizers are seldom used. The type can be improved by more thorough ditching and diking, to better the natural drainage and to prevent damaging inundations. Deeper ploughing and the use of green manures are very beneficial. Lespedeza should be encouraged in pastures and hay lands. Cultivated areas should be used as hay and pasture land at regular intervals, to allow the deposition of soil-forming material by floods. Oats can be successfully grown in the better-drained areas where protected from overflows.

OCHLOCKONEE SILTY CLAY LOAM.

The Ochlockonee silty clay loam consists of 5 to 8 inches of gray to brown or mottled gray and brown, silty clay loam, grading into a subsoil of mottled gray, yellow, and brown silty clay. This passes below 24 to 30 inches into plastic, impervious, gray or bluish clay, less conspicuously mottled than the upper subsoil. In some areas small iron concretions or accretions are scattered sparingly on the surface and through the soil section. In places an accumulation of organic matter or leaf mold gives the immediate surface material a dark-gray or nearly black color, but the greater part of the type assumes a characteristic whitish or ashy appearance when dry. In the lower bottoms of the Alabama River some narrow strips of brown silty clay loam underlain by brown silty clay are included.

The Ochlockonee silty clay loam is confined to the northern part of the county. It is developed in strips which follow the network of sluggish, imperfectly developed drainage ways of the low lying terraces of the Alabama River and its tributaries. These drainage ways, known locally as sloughs, lie only 1 to 3 feet below the general level of the adjoining soils, and seldom have any definitely defined channel. The drainage is very poor. Water frequently stands on the surface for considerable periods in the winter and spring and after heavy rains. During flood stages of the river these sloughs are often filled by backwater, which subsequently finds its way slowly to established drainage channels.

This soil is not cultivated, except in strips a few rods wide included in fields with higher lying types. It is nearly all forested with a light growth of water oak, live oak, sweet gum, swamp maple, elm, and ironwood. If adequately drained with open ditches, this type can be used as pasture land and for the production of hay and corn. Corn yields 40 to 60 bushels per acre. The soil is naturally strong and productive.

ROUGH STONY LAND.

Rough stony land includes areas which are so stony and broken as to be nonarable, and which are of economic value chiefly for their forest products or pasturage. An area of about half a township, in the southwestern part of the county, is mapped as Rough stony land. This is a high-lying area, very intricately dissected by deep, steep-sided ravines or narrow valleys, generally fringed with a strip of rock outcrop. The surface is everywhere thickly strewn with irregular, vesicular limestone rocks and slabs. This limestone is moderately hard and somewhat siliceous. The underlying material is a soft, bluish or light-gray limestone, with relatively thin layers of hard limestone similar to the surface rocks. The soil between the rocks is largely Houston material. It consists for the most part of

3 to 8 inches of gray to brownish-gray or black clay, underlain by limestone or by mottled gray and yellow clay which passes at variable, but shallow, depths into limestone.

Several areas, a few acres in extent, of Houston stony clay and Oktibbeha stony clay are included with the Rough stony land. They occur on divides. The soil of the Houston stony clay areas is somewhat deeper than that of the Rough stony land in general, ranging in places to 2 or 3 feet in depth. The Oktibbeha stony clay is somewhat shallower than the typical Oktibbeha clay as mapped separately, being underlain by limestone at about the same depth as the Houston stony clay. It has a red to reddish-brown surface soil.

The Rough stony land is largely prairie with a sparse growth of red cedar, hickory, walnut, and water oak in places. A somewhat denser growth of red oak, sweet gum, and pine occurs in the ravines. The open areas support a good growth of native prairie grasses. The land is used almost entirely for grazing and stock raising. The stock consists mainly of cattle, but includes some horses and mules. From 3 to 5 acres of this land are required for subsisting 1 cow or steer the year round. A few of the small areas of Houston stony clay have been cleared of the surface rock and are cultivated to corn. The yield ranges from 15 to 30 bushels per acre.

This class of land is valued at $2.50 to $3.50 an acre.

SUMMARY.

Lowndes County, situated in the south-central part of the State of Alabama, comprises an area of 708 square miles, or 453,120 acres. The topography varies from level to hilly and broken. The elevation ranges between 100 and 600 feet above sea level. The county is practically all in the drainage basin of the Alabama River. In general, drainage is well established.

The county has a population of 31,894, of which about 88 per cent are negroes. Hayneville, the county seat, is situated in the central part of the county. Fort Deposit, in the south-central part, with a population of 893, is the largest town.

Railway facilities are good, except in the western and southwestern parts of the county. The several towns and villages are connected by improved public highways, surfaced either with gravel or a sand-clay mixture.

Montgomery, Selma, and Mobile are the principal outside markets for staple crops and poultry products. New Orleans is the principal cattle market.

The climate is characterized by relatively short, mild winters and long, warm summers. The mean annual temperature is 65.5° F. and the mean annual precipitation 51.16 inches. The normal growing season is 243 days in length. The climate is suited to the pro-

duction of a wide range of crops and is favorable for poultry and stock raising and dairying.

Agriculture has long centered around the production of cotton and corn. The presence of the boll weevil since 1914 has caused a material decrease in the acreage of cotton. Agriculture is undergoing a transition in which a more important place is being given to forage, grain, and food crops. This transition is accompanied by a steady growth in dairying and stock farming.

The systematic rotation of crops is not general.

Fertilizers are less extensively used than heretofore. The farm labor, almost entirely colored, is plentiful. Almost 89 per cent of all the farms in the county are operated by tenants. Farm lands sells for $5 to $40 or more an acre.

Lowndes County lies within the higher part of the Coastal Plain province and on the border of the Black Prairie region of Alabama. The upland soils derived from, or influenced by, limestone are classed in the Houston, Sumter, and Oktibbeha series. They are most extensively developed in the central and northeastern parts of the county. The Coastal Plain beds of sand, sandy clay, and clay have given rise to the soils of the Norfolk, Ruston, Orangeburg, Greenville, Susquehanna, Lufkin, and Guin series. These soils occur principally in the southern, southwestern, and western parts of the county. The alluvial-terrace soils are grouped into the Leaf, Kalmia, Cahaba. Chattahoochee, and Amite series. The calcareous first-bottom soils are classed in the Catalpa series, and the noncalcareous first-bottom soils in the Ochlockonee series.

The Houston clay is well suited to stock raising and dairying. It is the best corn and grass soil of the uplands, and where well drained is especially adapted to alfalfa.

The Sumter clay is a good soil for alfalfa, pasture grasses, and hay and forage crops. It is well suited to stock raising, dairying, and general farming.

The Oktibbeha clay is a comparatively good cotton soil under boll-weevil conditions. It is well suited to grains, grasses for hay and pasturage, and forage crops. The type is better adapted to general farming and stock raising than to the production of special crops.

The Norfolk fine sandy loam ranks high as a cotton soil under boll-weevil conditions, and is adapted also to velvet beans, soy beans, cowpeas, peanuts, sorghum, melons, and late truck. Sugar cane, strawberries, and pecans can be grown in the moister areas. The Norfolk sand is well suited to early truck.

The soils of the Ruston series are moderately extensive. In general they are adapted to the same crops as the Norfolk and Orangeburg soils.

The Orangeburg fine sandy loam is well adapted to corn, grasses, grains, forage crops, Cuban filler tobacco, peaches, pecans, bush

fruits, and vegetables. It is one of the best cotton soils of the county under boll-weevil conditions.

The Greenville fine sandy loam is recognized as one of the most productive upland soils for general farm crops. It is adapted to grains and leguminous forage crops, and is a good cotton soil under boll-weevil conditions. The Greenville clay loam is well suited to general farm crops.

The Susquehanna fine sandy loam is primarily a general farming soil, well suited to cotton, legumes, millet, sweet potatoes, and Irish potatoes. The gravelly fine sandy loam is quite similar in adaptation.

The Lufkin fine sandy loam is an imperfectly drained upland soil. In its natural condition it can best be used for sugar-cane production and as pasture land.

The Guin fine sandy loam is an inextensive soil of variable composition. It is best suited to use as pasture and timberland, owing to its hilly, broken topography.

The Leaf silt loam, owing to its prevailingly poor drainage, is not very important agriculturally. The Leaf fine sandy loam, where properly drained, is a valuable soil for general farming, adapted to cotton, corn, cowpeas, velvet beans, soy beans, sorghum, sugar cane, Bermuda grass, and lespedeza, and to such special crops as strawberries and pecans.

The Kalmia fine sandy loam is a good general farming soil, similar in adaptation to the Norfolk fine sandy loam. The Kalmia sand is especially suited to the production of early truck crops.

The Cahaba fine sandy loam is one of the principal terrace soils. It is productive and well suited to a combination of dairying, general farming, and the production of medium to late truck crops.

The Chattahooche and Amite fine sandy loams occupy the highest lying terrace situations. They are good soils for dairying, general farming, and the production of fruit and truck crops. These soils are adapted to grains, grasses, forage crops, legumes, Cuban filler tobacco, peaches, pecans, bush fruits, and vegetables, and are good cotton soils under boll-weevil conditions.

The Catalpa series embraces the calcareous first-bottom soils of the county. The clay loam and clay are fairly extensive types, of considerable agricultural importance. They are well suited to corn, oats, Johnson grass, sugar cane for sugar, rice, and alfalfa.

The Ochlockonee silt loam is largely under cultivation. It is adapted to corn, oats, sugar cane, and hay, where protected from damaging overflows. The silty clay loam is of little agricultural importance.

Rough stony land includes areas which are mainly too rough for cultivation.

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[PUBLIC RESOLUTION—No. 9.]

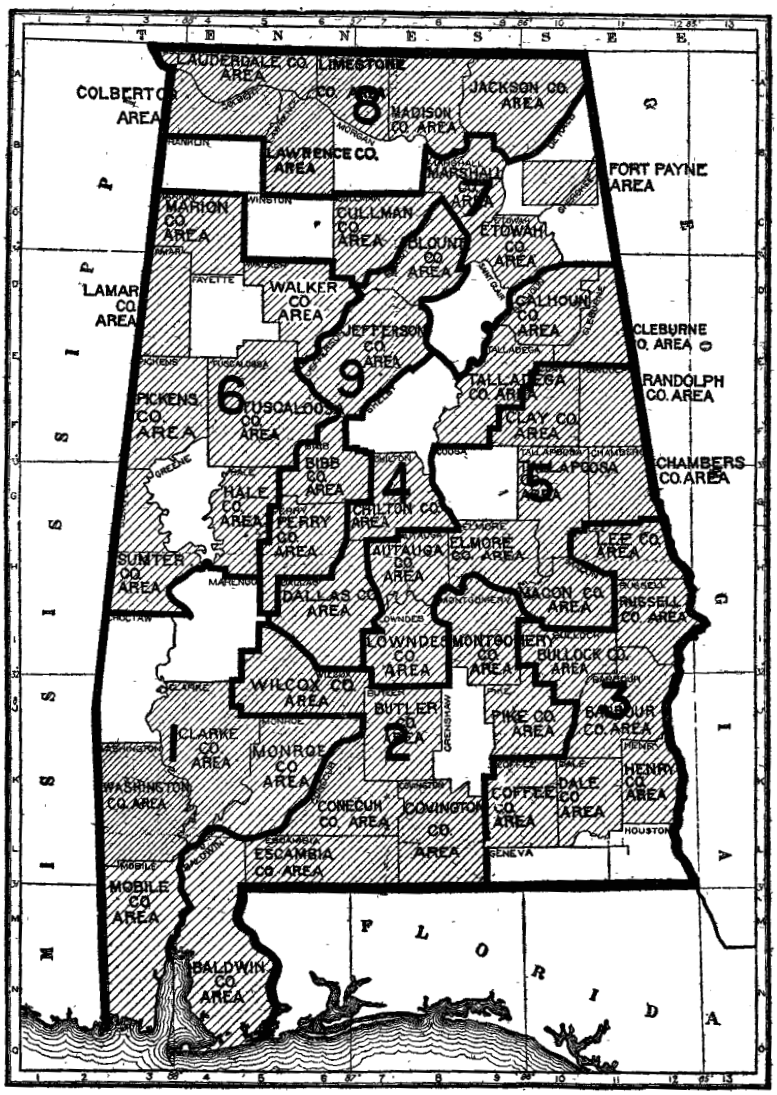
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

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 Alabama.

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