

U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE STATE OF MISSISSIPPI, THEODORE G. BILBO,
GOVERNOR; E. N. LOWE, DIRECTOR, STATE GEOLOGICAL SURVEY.

SOIL SURVEY OF HINDS COUNTY,
MISSISSIPPI.

BY

A. E. KOCHER, IN CHARGE, AND A. L. GOODMAN.

HUGH H. BENNETT, INSPECTOR, SOUTHERN DIVISION.

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



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WASHINGTON, D. C.

MISSISSIPPI

LETTER OF TRANSMITTAL

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

Washington, D. C., June 4, 1917.

SIR: Field operations of the Bureau of Soils for 1916 included a soil survey of Hinds County, Miss., undertaken in cooperation with the Mississippi State Geological Survey. The selection of Hinds County was made after conference with State officials.

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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MAP.

Soil map, Hinds County sheet, Mississippi.

SOIL SURVEY OF HINDS COUNTY, MISSISSIPPI.

By A. E. KOCHER, In Charge, and A. L. GOODMAN.—Area Inspected by HUGH H. BENNETT.

DESCRIPTION OF THE AREA.

Hinds County, Miss., is situated just southwest of the center of the State, about 70 miles from the southwestern corner. It is bounded on the north by Warren, Yazoo, and Madison Counties, on the east by Madison and Rankin Counties, on the south by Copiah County, and on the west by Claiborne and Warren Counties. It is separated from Rankin County by the Pearl River and from Warren County by the Big Black River. The county is somewhat irregular in outline. It has a total area of 872 square miles, or 558,080 acres.

Physiographically, Hinds County is a plain dissected by a large number of streams. These have formed distinct flood plains and terraces, resulting in considerable diversity in surface configuration in various parts of the county. The uplands present three forms of topography, viz, smooth or gently rolling areas, rolling to hilly areas, and steep hillsides and ridges. The areas of smooth topography occupy the greater part of the eastern third of the county. Important areas occur in the vicinity of Pochahontas, Brownsville, and Bolton, and along the Yazoo & Mississippi Valley Railroad between Oakley and Utica. There are many small areas of comparatively level land, the most important being in the vicinity of Terry, Oakley, and Learned. The central part of the county is rolling to hilly, with only a few of the slopes too steep for cultivation. The areas of roughest topography are in the southwestern corner of the county, where a considerable area, known as the "Scutchlow Hills," consists of maturely dissected hills and narrow ridges, with steep slopes rising 100 to 150 feet above the streams. Eroded hills also border the Big Black River bottoms in the northern part of the county and in small



FIG. 1. Sketch map showing location of the Hinds County area, Mississippi.

areas in the vicinity of Greene Crossing, Elton, Coopers Wells, and Champion Hill.

The elevation of Hinds County ranges from a little over 100 feet above sea level at the western boundary where the Big Black River leaves the county, to about 450 feet above near the southwestern corner. The general elevation of the uplands is between 225 and 325 feet. The elevation at Smith is 136 feet, at Edwards 223 feet, at Clinton 324 feet, and at Jackson 294 feet.

The watershed separating the drainage of the county is a low, narrow ridge, moderately dissected by erosion. It extends southwestward from the vicinity of Cynthia and Dixon to Coopers Wells, where it turns southward to the county line. About two-thirds of the county drains to the west into the Big Black River, which flows in a southwesterly direction for a distance of about 25 miles along the western boundary. This stream has a flood plain one-half mile to 2 miles wide and lies about 100 feet below the adjoining uplands. The country around Raymond, Bolton, and Champion Hill is well drained by Bakers Creek and its tributaries, and the section around Tinnin and Pocahontas by Bogue Chitto Creek. These streams occupy deep channels, with flood plains one-fourth to 1 mile wide, and have a sluggish flow, though they are slowly deepening their channels. Pearl River, with its small, sluggish tributaries, which reach back a distance of 5 to 8 miles, drains the eastern part of the county. Its flood plain is one-fourth to one-half mile wide from the northeast corner of the county to Elton and about 1 mile to 2½ miles wide from Elton southward. The southern part of the county is thoroughly drained by Whiteoak and Tallahalla Creeks and their tributaries, which enter the Mississippi through Bayou Pierre.

A large number of streams and branches of intermittent flow reach all parts of the county and afford a complete and ample drainage system for every section. The larger streams are of only moderately swift current and apparently are less actively cutting down their beds than the smaller headwater streams.

Practically all the streams have first bottoms, which are annually overflowed. In addition to the present flood plains, many of the streams are bordered by extensive former flood plains or terraces. Most of these are old and have not been flooded for many years, but some of the lower ones are subject to occasional inundation.

Hinds County was formed in 1821,¹ and as first organized included a vast territory along the Mississippi River. In the next few years Yazoo, Rankin, and Copiah Counties were formed from its territory, and in 1829 its present boundaries were established and the county seat was located at Raymond. In 1821 the site was selected

¹ Data furnished by Dr. Dunbar Rowland, Director, Miss. Dept. of Archives and History.

for Jackson, the capital of the State. Among the first settlements were Hamburg, 1826; Amsterdam and Antbank, 1836; and Auburn, all of which are now extinct. The first two were located on the Big Black River just west of the present site of Edwards. For a number of years before railroads reached the county Amsterdam was an important cotton-shipping point and port of entry.

The early settlers were of English descent and came largely from Virginia, Kentucky, Tennessee, and North and South Carolina. The census of 1910 gives the population of Hinds County as 63,726, of which 45,407, or over 70 per cent, are colored. In 1900 the total population was reported as 52,577, of which about 75 per cent was colored. About 67 per cent of the total population is classed as rural. The population is well distributed throughout the county, the least thickly settled portion being the hilly section in the western part of the county, particularly in the southwestern corner, and the most densely populated in the vicinity of Jackson and near the small towns along the railroads. The lowlands along the Big Black River and most of the larger streams in the western part of the county are also thickly populated. The density of the rural population is reported in the 1910 census as 49.5 persons per square mile.

Jackson, the capital of the State, is the only large city in the county. Its population is given in the 1910 census as 21,262.¹ Raymond, with a population of 579, is the county seat, but for a number of years the county business has been divided between Raymond and Jackson. Clinton has a reported population of 767; Bolton, 632; Edwards, 589; Utica, 572; Terry, 473; Pocahontas, 250; Byram, 225; Oakley, 175; and Learned, 134. All these towns are important as shipping points for cotton, and other towns of local importance are distributed throughout the county.

Transportation facilities are good throughout the eastern and central parts of the county. The Illinois Central Railroad from Chicago to New Orleans traverses the eastern part, and a line of this system extends northwestward from Jackson through Cynthia and Pocahontas. The New Orleans Great Northern Railroad, entering the county from the south, and the Gulf & Ship Island entering from the southeast, terminate at Jackson and afford additional facilities for shipping to the Gulf. The Yazoo & Mississippi Valley Railroad crosses the county in a southwesterly direction from Jackson and connects with Natchez. The Alabama & Vicksburg Railroad crosses the central part of the county from east to west and is one of the through lines of travel. The transportation facilities in the northwestern, southwestern, and south-central parts of the county are inadequate.

¹ Rand-McNally reports the estimated population of Jackson in 1914 as 26,990.

Good public roads lead out of Jackson for several miles in every direction, and most of the towns have good roads leading a few miles out. A number of the main roads are being graveled and made to connect with improved highways outside the county. The dirt roads are kept in good repair, and in the hilly sections considerable attention has been given to establishing moderate grades.

All sections are reached by rural mail service, but telephones are found as a rule only in the homes of the larger landowners. Churches and schools are conveniently located in all sections, and facilities for higher education are furnished by denominational colleges at Jackson and Clinton.

Jackson is the principal local market for vegetables, poultry, and dairy products, while cotton is sold at all the small towns. The principal markets for cattle and hogs are Jackson, Natchez, East St. Louis, and New Orleans. Most of the tomatoes are shipped to Pittsburgh, although Philadelphia, New York, and other eastern points are also markets for this crop.

CLIMATE.

The climate of Hinds County is typical of southern Mississippi. The summers are long and warm, with an average temperature of 79.5° F., according to the records of the Weather Bureau station at Vicksburg. The highest temperature ever recorded at this station is 101° F. The winters are short and mild, though the weather is very changeable and freezing temperatures may be expected at intervals from December to February, inclusive. The winter temperature has fallen as low as -1° F., but extremely cold periods are of short duration and of rare occurrence. The mean annual temperature is about 65° F.

According to the records of the Weather Bureau station at Jackson, the mean annual precipitation is about 51 inches. As a rule, this is well distributed throughout the year, the rainfall being lightest in September, October, and November, when most of the harvesting is done. The precipitation in the summer is local and frequently torrential in character. Sometimes a rainfall of 6 or 8 inches occurs within as many hours, causing considerable damage by gullying the easily eroded uplands and by flooding the lands along the streams. The floods most often occur in late spring or early summer and sometimes necessitate the replanting of cotton and corn in the lowlands. The average annual snowfall at Jackson is a little less than 2 inches. Hail and sleet rarely occur.

Killing frost has occurred at Vicksburg as early in the fall as October 19 and as late in the spring as April 3. The average date of the last killing frost in the spring is reported as March 6 and that

of the earliest in the fall as November 13. This gives a normal growing season for tender vegetation of more than 8 months, while such crops as oats and many forage plants thrive throughout the greater part of the year.

The following table is compiled from the records of the Weather Bureau stations at Jackson and Vicksburg:

Normal monthly, seasonal, and annual temperature at Vicksburg, and precipitation at Jackson.

Month.	Temperature, Vicksburg.			Precipitation, Jackson.		
	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.....	49.4	79	12	4.53	6.77	6.06
January.....	47.0	82	3	4.46	6.13	5.64
February.....	50.9	83	- 1	5.53	1.84	6.88
Winter.....	49.1	83	- 1	14.52	14.74	18.58
March.....	58.2	88	24	6.52	5.04	10.16
April.....	65.2	92	31	4.58	1.34	4.10
May.....	72.9	95	44	3.85	2.90	1.02
Spring.....	65.4	95	24	14.95	9.28	15.28
June.....	78.5	101	52	3.92	5.33	5.72
July.....	80.4	100	62	4.41	3.10	2.14
August.....	79.6	100	54	4.28	3.03	7.00
Summer.....	79.5	101	52	12.61	11.46	14.86
September.....	74.8	98	42	2.90	.72	8.54
October.....	65.3	94	34	2.08	1.91	1.74
November.....	55.9	86	22	3.51	2.05	6.60
Fall.....	65.3	98	22	8.49	4.68	16.88
Year.....	64.8	101	- 1	50.57	40.16	65.60

AGRICULTURE.

Since the earliest settlement of Hinds County agriculture has been the dominant industry. Cotton soon became and has remained the chief money crop. Prior to the completion of the present Alakama & Vicksburg Railroad from Vicksburg to Clinton, in 1840, the cotton was hauled to points on the Big Black River, from which it was shipped by boat. During the early years, in addition to cotton, the farmers produced some corn, wheat, and vegetables and enough beef and pork to supply home needs. Before the Civil War agriculture was in a prosperous condition. There were many well-improved

plantations in the uplands, and the bottoms along the small streams were largely under cultivation. A number of prosperous cotton plantations were located on the bottom lands and terraces of the Big Black River, and much of the land here that has been planted to cotton more or less continuously for nearly 70 years without fertilization is still producing profitable yields. Only the strongest soils, however, have shown this durability. Under the exhausting one-crop system yields on the uplands declined and the fields were abandoned and allowed to wash, their place being taken by fields newly cleared. Cattle and hogs were kept on every plantation, and in many places beef cattle of good quality were raised. These were allowed to range in the woods and in most cases received no other food the year round.

During the war farm buildings, implements, and live stock of all kinds were destroyed, and at its close little was left but the land. From this devastation the county has not yet fully recovered. Labor was hard to obtain and there was little capital with which to hire help. Conditions were such that it was necessary for the farmers to grow some crop that could be readily disposed of in the fall for cash. Cotton brought high prices and met this requirement, and supplies were sold on credit to the farmers who would grow cotton and give a mortgage on the crop. Although conditions have greatly improved, the one-crop credit system still prevails. The recent invasion of the boll weevil, however, has resulted in a greater diversification of crops.

According to the 1880 census there were 80,013 acres in cotton in 1879, producing 36,684 bales; 47,510 acres in corn, with a production of 532,636 bushels; 1,388 acres in sweet potatoes, with a production of 132,920 bushels; and 1,962 acres in oats, with a production of 26,380 bushels. There were 160 acres in sugar cane, from which 12,899 gallons of sirup were produced. In addition, 17,137 gallons of sorghum sirup were produced. About 500 acres were reported in hay.

By 1889 the area in cotton had increased to 97,841 acres, with a production of 37,393 bales, and corn was grown on 53,384 acres, producing 767,319 bushels. The acreage of sweet potatoes remained about the same, while that of oats was somewhat reduced. The production of sugar-cane sirup was 33,851 gallons, from 2,100 acres, and of sorghum sirup, 25,368 gallons. Hay occupied 2,361 acres, with a production of 3,033 tons. There were 53,126 peach trees in the county and 6,418 apple trees.

The census of 1900 showed a material increase in the acreage of all the important crops. Cotton is reported on 103,353 acres, producing 41,283 bales, and corn on 70,967 acres, with a production of 986,600 bushels. There was little change in the acreage and production of hay and sweet potatoes or in the production of sugar cane and

sorghum sirups. The number of peach trees had increased to 60,254, but apple trees had decreased in number. The value of all orchard products in 1899 was \$4,606, and of forest products \$57,691. Animals sold or slaughtered amounted in value to \$159,687, dairy products to \$184,782, and poultry products to \$68,282.

At the present time the agriculture of Hinds County consists chiefly of growing cotton for sale and corn for feeding work stock, together with hog raising and the feeding of some beef cattle.

Cotton occupies the largest acreage and is the principal money crop. The census reports 103,165 acres in cotton in 1909, with a production of 30,553 bales. The production in 1910 was 31,265 bales. Since that year the annual production has ranged from 17,503 bales to 21,356 bales. The highest production ever reached was 52,188 bales in 1907.

Corn is the second crop in importance, and in recent years it has been grown on nearly every farm. The census of 1910 reports 61,606 acres in corn, producing 679,666 bushels. The greater part of the crop is used on the farm for feeding work stock, and the remainder in pork and beef production. Practically none is sold outside the county.

Hay is the third crop in importance. According to the census, a total of 6,210 acres was devoted to hay and forage crops in 1909, producing 8,069 tons. Of this, 1,757 acres was in tame or cultivated grasses and 3,036 acres in native grasses; grains were cut green from 1,134 acres, and 283 acres was in coarse fodder. All the hay is used on the farms for feeding work stock, beef cattle, and dairy cattle.

The 1910 census reports 1,106 acres in oats, with a production of 20,128 bushels. During the last few years the acreage of oats has increased considerably, and there are now several thousand acres devoted to this crop. The oats are fed to work stock on the farms. The fields are used during the winter months for grazing cattle and hogs.

There were 2,197 acres of sweet potatoes in 1909, producing 178,772 bushels; 1,166 acres in sugar cane; and 1,205 acres in cowpeas, with a production of 5,621 bushels. These crops are all used on the farms where grown or are disposed of at Jackson and the small towns within the county.

Tomatoes are becoming an important money crop in the vicinity of Terry, Utica, and Raymond. According to information furnished by the Illinois Central Railroad, 85 carloads were shipped from Terry in 1915 and 26 from Utica. Most of the crop is consigned to Pittsburgh. Tomatoes are ready for shipment about June 1. In the same season there were shipped four carloads of cabbage and four of mixed vegetables.

A total of 52,676 peach and nectarine trees is reported by the census of 1910, and 4,420 apple trees. There were in 1909, 3,101 pecan trees, with a production of 24,247 pounds of nuts.

The total value of all farm products in Hinds County in 1909, including live-stock products, was \$4,326,109.

In addition to the principal crops, Irish potatoes, peanuts, berries, and vegetables are grown on many farms in a small way. In many cases the production is insufficient to supply the needs of the home.

Nearly every farmer in the county keeps one or more cows to supply dairy products for home use, and commercial dairying is carried on in a small way in the vicinity of Jackson. A few farmers also sell small quantities of butter in the local towns, and small shipments are made by parcel post to special customers. The census gives the total value of the dairy products in the county in 1909, excluding home use, as \$177,221, and of poultry and eggs, \$162,177. The cows are mainly Jerseys, or Jersey grades, and are maintained largely on pasture.

In the last few years the raising of beef cattle has received considerable attention. Most of the cattle are grades from the native stock, although there are several herds of the Hereford and Angus breeds. One herd in the vicinity of Jackson contains some very fine Herefords and includes among other prize winners the grand champion at the International Live Stock Exposition at St. Louis in 1913. (See Pls. I and II.) This stock is sold for breeding purposes throughout the United States and in Canada. At a recent sale of 45 head from this herd the average price received was more than \$500. Animals from this herd are numerous in Hinds County and are having a marked influence in improving the native stock. Most of the beef cattle in the county are carried through the greater part of the year on pasture grasses which grow voluntarily in abandoned fields, supplemented in the winter by a luxuriant growth of wild cane in the stream bottoms. Some of the mature stock is fattened on corn ensilage or corn and oat ensilage, together with cottonseed meal or some other concentrate. The census reports the value of animals sold or slaughtered in 1909 as \$238,019. According to figures obtained from the Illinois Central Railroad, there were shipped in 1915 from Utica 55 cars of cattle and from Terry 56 cars. Of these, 57 cars were shipped to East St. Louis, 30 to New Orleans, and 22 to Natchez.

Nearly every farmer keeps a few hogs, while on a number of farms there are herds of 20 to 50. The hogs are raised chiefly to supply the home with pork, but most of the small towns ship a few carloads of hogs out of the county each year. In 1915 Utica shipped 16 carloads, of which 9 went to Natchez and the others to New Orleans, East St. Louis, and Jackson.

The farmers of Hinds County recognize that with early planting and thorough cultivation the alluvial and terrace soils are best adapted to cotton, but that otherwise the damage caused by the boll weevil on these soils frequently makes the crop unprofitable. Unless all the conditions are favorable for maturing the crop early and thus avoiding in part the damage by the weevil, the farmers recognize that these lowland types are better adapted to corn. They have also learned that the Calhoun silt loam will produce fairly good yields of corn in favorable seasons, but that in years of excessive or deficient rainfall it is poorly adapted to corn and gives somewhat better results with cotton. Owing to the greater damage done by the boll weevil in the lowlands than on the uplands, many farmers prefer to plant cotton on the Memphis and Grenada silt loams. In growing special crops the Olivier, Memphis, and Grenada silt loams are recognized as being suited to tomatoes, cabbage, berries, and fruits, while the Ruston sandy loam and Lexington silt loam are considered best for peanuts, potatoes, and early truck crops. The lowland soils are universally recognized as being the best soils for sugar cane and sorghum. The lowlands in general are considered well suited for pastures.

In the growing of all crops except oats, which are sown in the fall, the land is plowed in the spring to a depth of about 3 to 5 inches. Cotton is invariably planted on beds, but on the terraces and in the uplands corn is frequently planted in the water furrow. Oats sown in the fall are pastured during the winter months and harvested about the middle of May. Very little of the crop is thrashed, the greater part being fed to stock in the bundle. After oats are harvested the land is broken and planted to corn or cowpeas. The latter crop is frequently planted in corn fields following the last cultivation. Corn is harvested by snapping the unhusked ears from the standing stalks, and the fields are used for pasturing cattle and hogs from late fall until about March 1, when the land is again plowed for cotton or corn.

The farm buildings throughout Hinds County, including the dwellings, are usually small. There are a number of fine old residences formerly occupied by owners but now tenanted by negroes; most of these are fast approaching a state of ruin. There are many farms without stables of any kind, little provision being made for housing stock. Although there are few fences, most of them are in good repair. The work stock consists of small horses and mules, and the implements are light and generally drawn by one animal. A few gasoline plows are used in the southern part of the county, but aside from these there are very few riding implements of any kind in the county. According to the census of 1910, the average

value of all property per farm is \$1,473, of which the land constitutes 57.8 per cent, buildings 20 per cent, domestic animals 18.4 per cent, and implements 3.8 per cent.

No definite system of crop rotation is practiced in Hinds County. Cotton commonly is grown year after year on the same land or alternated occasionally with corn. Corn or cowpeas usually follow oats, the land being grazed in the fall and winter and cotton planted the succeeding year.

The value of the commercial fertilizer used in the county in 1909 is reported by the census as \$40,644, an average of \$46.93 per farm for the 866 farms reporting its use. A large part of the fertilizer is used in the eastern part of the county, chiefly on cotton and corn. In the past a fertilizer containing about 8 per cent phosphoric acid, 2 per cent nitrogen, and 2 per cent potash was used on these crops, but during the present season (1916) no potash has been obtainable. During the last two years heavy applications of commercial fertilizer have been made on land used for tomatoes. Barnyard manure is applied to both cotton and corn.

A large part of the farm labor is performed by negroes, and practically all the hired help is drawn from this race. The supply is fairly adequate. Day laborers usually are harder to obtain than tenants. The price paid for day labor ranges from 50 to 75 cents. About 50 cents per 100 pounds is paid for picking cotton. On the 1,608 farms reporting in the 1910 census the total expense for labor was \$151,478, or an average of \$94.20 per farm.

The 1910 census reports a total of 7,305 farms in Hinds County, and about 71 per cent of the area of the county in farms. The average size of the farms is given as 53.2 acres.¹ Of all farm land 72.3 per cent, or an average of 38.5 acres per farm, is reported improved. There are many holdings of 1,000 acres or more, and some of 10,000 to 15,000 acres. Most of the white farmers own 100 to several hundred acres. The farms owned by negroes usually are small, consisting of 5 to 40 acres. Few of the negroes own the farms they occupy.

There has been a steady decrease in the number of farms operated by owners and a proportionate increase in the number of tenanted farms. The 1910 census reports 19 per cent of the farms operated by owners, and practically all the remainder by tenants. The farms are rented for a period of one year, and usually for a part of the crop. Where the owner furnishes everything but the labor, he receives one-half the crop, but where the tenant furnishes work stock, seed, and implements the owner receives either a cash rental of 75

¹The census classes each tenancy as a farm.

cents to \$2 an acre or a stipulated quantity of lint cotton, ranging from about 20 to 25 pounds per acre.

The price of land varies with the character of the soil, topography, improvements, and location with respect to towns. Well-improved farms in the vicinity of Jackson or Pocahontas and on some of the terraces in the western part of the county sell for \$25 to \$50 an acre. Improved terrace lands and stream-valley lands throughout the county can be bought for \$15 to \$30 an acre, while the greater part of the upland sells for \$10 to \$25 an acre. The average value of farm land in the county is reported as \$16 an acre in the census of 1910.

SOILS.

The upland soils of Hinds County, comprising about five-eighths of its area, are derived from loessial material,¹ with the exception of three types of small extent derived from Coastal Plain material² and from the Vicksburg limestone. The surface soils are predominantly high in silt content, while the texture of the subsoil ranges from silty clay loam or silty clay in the upper part to silt or silty clay loam in the lower part. Some sandy material occurs in the 3-foot section in the eastern part of the county, where the depth to Coastal Plain material is least.

The basal material, or that underlying the loess, consists of sedimentary beds of sandy clay, heavy clay, and gravel and some limestone. These beds are Coastal Plain deposits, formed of material washed from old-land areas and laid down when the waters of the Gulf occupied this general region. The loessial deposit apparently was deposited over this Coastal Plain material by wind action. It is thickest in the western part of the county, where a depth of 30 feet or more is attained and thins out gradually toward the east, the depth along the eastern boundary being 3 feet or less.

The Coastal Plain deposits have given rise to soils of almost negligible extent occurring in a few areas where erosion has removed the loessial covering. The same is true of the soils derived from limestone, which have decayed in exposures to form a dark-colored calcareous clay and to some extent a yellowish sticky clay in which little calcium carbonate has been left.

The alluvial soils are derived from material washed from the drainage basins of the streams and deposited over their flood plains. Most of this material consists of wash from the loessial soils of the region. That on the terraces was deposited when the overflows reached higher levels than at present; that is, before the streams had lowered their channels to the present levels. Some of the lower

¹The "Brown loam" of the Mississippi Geological Survey.

²Grand Gulf formation—Mississippi Geological Survey.

terraces are overflowed at times of exceptionally high water. Fresh material is constantly being added to the soils of the first bottoms by overflows.

There are no important differences in soil material associated with physiography aside from the difference between the upland and the stream-bottom soils, and even here there are not so great differences as in areas where there is greater variety in the surface soils of the drainage basins contributing material to the alluvial bottoms. There are some important variations in material that have resulted from diverse drainage conditions. In both the upland and the alluvial soils there are areas where the surface soil and subsoil are brownish or light brownish to grayish or mottled, owing apparently to imperfect oxidation. This has resulted from imperfect drainage, caused either by an impervious layer in the deep subsoil or substratum or by the level surface. In these poorly drained areas small, dark-colored concretions and concretionary material of a ferruginous nature are of common occurrence.

The upland soils derived from loessial material are classed in the Memphis, Grenada, and Lexington series; those from Coastal Plain deposits in the Ruston and Susquehanna series; and the residual soil from limestone in the Houston series. The alluvial soils of the first bottoms are classed in the Vicksburg, Waverly, and Collins series, and those of the second bottoms or terraces in the Lintonia, Olivier, and Calhoun series.

The Memphis series is characterized by the brown color of the surface material and by the reddish-yellow to brownish-red or buff color of the subsoil, which consists mainly of silty clay loam or silty clay. This either continues throughout the 3-foot section without much change or becomes somewhat lighter colored and a little more silty below. Occasionally there is some grayish mottling in the lower subsoil. The material consists principally of loess. Generally below depths of about 28 to 40 inches a brownish, friable silt loam occurs, and beneath this Coastal Plain material is encountered. The Memphis soils are in general well drained. The series is represented in Hinds County by the silt loam type.

The Grenada soils, which are also of loessial origin, are similar to the Memphis in the surface soil and upper subsoil, being light brown in the surface section and reddish yellow to buff below, but at depths of 20 to 30 inches there is encountered a compact stratum of silty clay loam, mottled yellowish, bluish gray, and rusty brown, and containing brown and black concretions and concretionary material. This compact layer appears to be rather impervious, but conditions of poor drainage do not result. The topography is rolling to undulating. Only one member of the Grenada series is mapped in this county, the silt loam.

The Lexington soils differ from the Memphis chiefly in that sandy Coastal Plain material is reached within the 3-foot section. The series is characterized by light-brown to brown surface soils overlying lighter colored material which passes into reddish, sandy material. These soils occur on knolls, ridges, and slopes. The drainage is well established. In this survey the silt loam is mapped.

The Ruston soils are grayish at the immediate surface and yellowish below; the subsoil is a reddish-yellow to yellowish-red friable sandy clay. These soils occur on ridges and slopes and the drainage is good. Only one member of the Ruston series is recognized in this county, the sandy loam.

The Susquehanna soils are brownish in the surface portion and mottled gray and yellow in the subsoil. Both soil and subsoil are very sticky and plastic when wet. The Susquehanna series in this county is represented by the clay type. This soil occurs in small areas on slopes where the loessial material has been removed. In places it is closely associated with the Houston clay. Drainage is well established.

The Houston series is represented in this county by the clay member. This consists of a dark-gray to black clay which passes downward into yellowish clay containing whitish, calcareous material. The soil is residual from the Vicksburg limestone. It occurs on slopes and has good drainage, but is very sticky when wet.

The soils of the Vicksburg series consist of brown, mellow material which shows but little change within the 3-foot section, except that the subsoil is somewhat heavier than the surface soil. These soils consist of alluvium principally from the loessial uplands. They occur in the first bottoms of streams and are subject to overflow. Between overflows the drainage is good. Three members of this series are mapped, the Vicksburg fine sandy loam, silt loam, and silty clay loam.

Of the Waverly series only one type, the silt loam, is mapped. This series includes types with grayish surface soils and a gray to bluish-gray subsoil, somewhat mottled with yellow and usually compact in the lower part. The origin of the material is the same as that of the Vicksburg series, and the land likewise is subject to overflow. The poor drainage accounts for the grayish color.

The Collins soils differ from the Waverly in that the surface soils are brown. Two types are recognized in this county, the silt loam and silty clay loam.

The Lintonia series includes types with light-brown to brown, silty surface soils, light-brown, buff, or yellowish-red silty clay loam upper subsoil, and light-brown silt loam lower subsoil. In typical developments the series occupies level or nearly level stream terraces

lying above overflow. The material represents old stream alluvium, but in places, especially near the line of contact with the uplands, some colluvial material, washed down over the original terrace from the loessial uplands, may be present. The material of these soils is originally derived largely from loessial upland soils. The drainage is well established, and the soils are easy to cultivate. One type of this series, the silt loam, is mapped in Hinds County.

In the Olivier series are included types with brown surface soils and bluish-gray subsoils. Iron concretions are usually present in soil and subsoil and are especially abundant in a compact stratum occurring in the lower subsoil. The series occupies level terraces. The drainage conditions are poor, internal movement of water being obstructed by the somewhat impervious lower subsoil. This series is the second-bottom equivalent of the Collins series, which is developed in overflowed bottoms. Only the silt loam occurs in Hinds County.

The soils of the Calhoun series are characterized by the gray to brown color of the surface soil and by the gray or drab color and tenacious, waxy structure of the heavy clay subsoils. Iron concretions are very common, and in places there is a substratum of sandy material. These soils occupy flat, poorly drained, stream terraces. They are not overflowed. The material is of alluvial origin and has been derived principally from silty soils. The silt loam type is mapped in Hinds County.

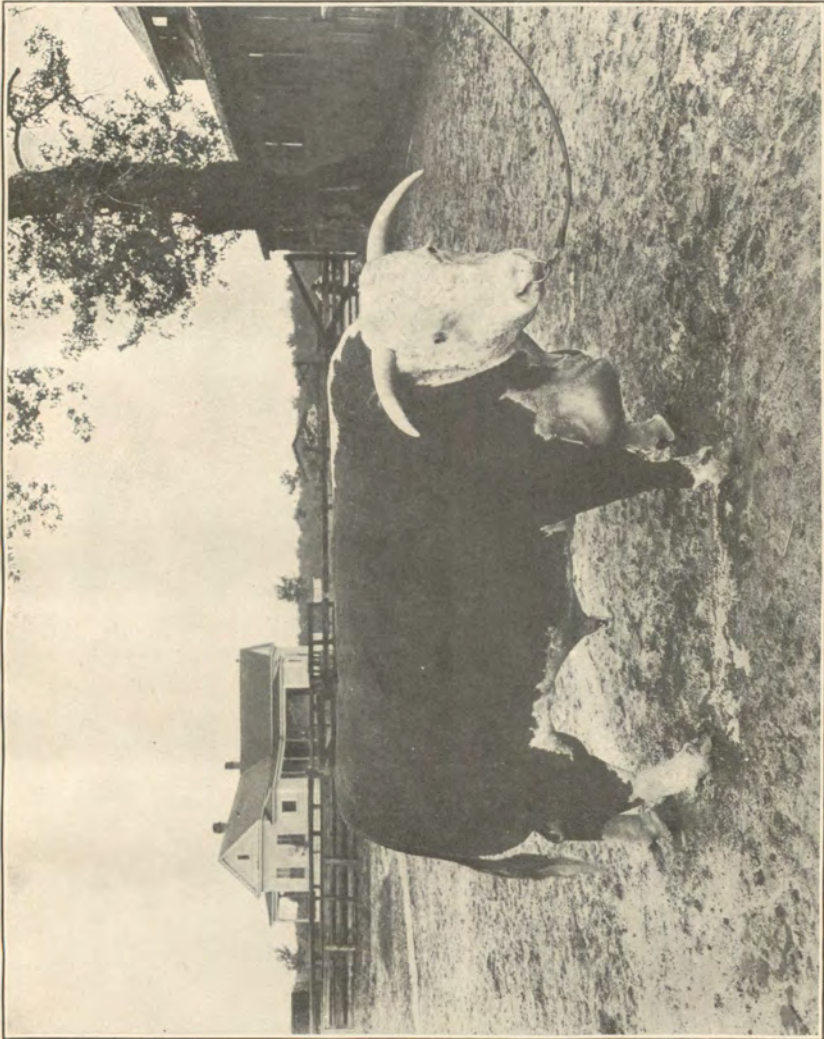
The following table shows the actual and relative extent of each of the several soils mapped in Hinds County:

Areas of different soils.

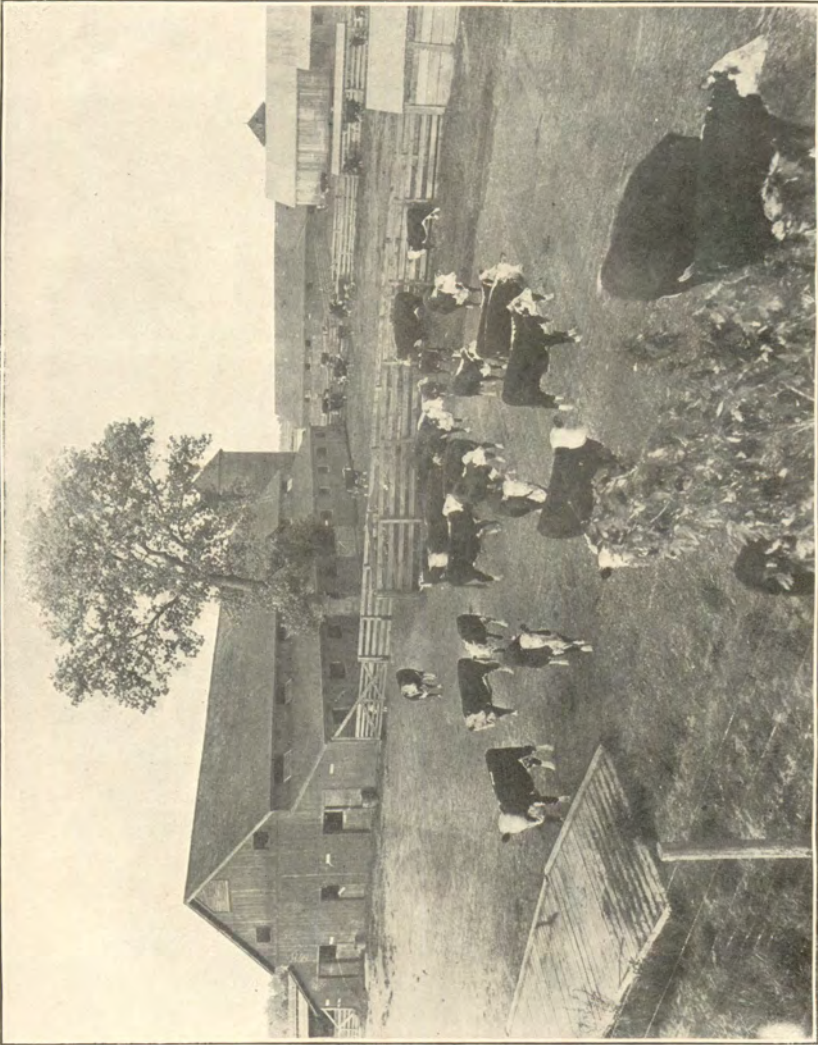
Soil.	Ac res.	Per cent.	Soil.	Acres.	Per cent.
Grenada silt loam.....	255,872	45.8	Vicksburg silty clay loam.....	1,664	0.3
Memphis silt loam.....	72,896	15.5	Collins silty clay loam.....	1,408	.3
Smooth phase.....	13,696		Ruston sandy loam.....	1,408	.3
Olivier silt loam.....	78,720	14.1	Waverly silt loam.....	1,088	.2
Collins silt loam.....	75,840	13.6	Susquehanna clay.....	1,024	.2
Vicksburg silt loam.....	32,512	5.8	Vicksburg fine sandy loam....	832	.1
Lintonia silt loam.....	14,336	2.6	Houston clay.....	512	.1
Calhoun silt loam.....	4,416	.8			
Lexington silt loam.....	1,856	.3	Total.....	558,080	

MEMPHIS SILT LOAM.

The typical Memphis silt loam consists of a brown, mellow silt loam, underlain abruptly at depths ranging from 6 to 14 inches by a brownish-red to reddish-yellow or buff-colored silty clay loam to silty clay, which is moderately friable when dry and slightly plastic when wet. Over much of the type this heavy subsoil shows little change within the 3-foot section, but there are many places where the



PRIZE BULL FROM STOCK FARM NEAR JACKSON.
Photograph by Illinois Central Railroad.



TYPE OF CATTLE BEING INTRODUCED IN HINDS COUNTY.

Photograph by Illinois Central Railroad.

material is more yellowish in color in the lower subsoil and frequently more silty at a depth of about 30 inches. There are also many places, especially in the more nearly level areas, where the lower subsoil has some grayish mottling and is slightly compact. Such areas represent an approach toward the characteristics of the Grenada silt loam, and as mapped the type actually includes patches of the Grenada silt loam. A number of washed spots of Memphis silty clay loam, locally known as "red-clay land," are likewise included, the areas being so small that they can not be satisfactorily separated on the soil map. Another variation consists of patches having a light-grayish or mottled brownish and grayish surface soil and a brownish, compact subsoil mottled with gray and containing concretions and concretionary material, like the subsoil of the Grenada. Where the loess deposit is deep a friable, brownish silt loam occurs beneath the clayey stratum at depths ranging from 30 inches to about 4 feet.

Next to the Grenada silt loam the Memphis silt loam is the most extensive soil in the county. It is confined chiefly to the western section, only small areas being found east of Bolton, Raymond, and Utica. West of these towns the type occupies a large part of the rough hill lands which extend 8 or 10 miles back from the Big Black River. Its most typical development occurs near the bluffs of this stream, especially near the Askew Bridge, at Chichester, and in the vicinity of Newman. Toward the east the type merges very gradually into the Grenada silt loam, and in places it is difficult to establish definite boundaries between these two soils.

The surface is characteristically rolling, with many gullies and comparatively steep sided, narrow stream valleys. There are many long, narrow ridges, or divides, flanked by fingerlike minor ridges extending out between the streams heading near the divides. These subordinate ridges slope rather rapidly away from the main ridge crest. In some places the surface is so dissected by erosion that only a small part of the land is cultivable. On the whole, however, the type averages smoother than in the vicinity of Vicksburg and Natchez.

Both the surface and internal drainage are good. The areas in which the material is compact and mottled with gray approach the poor drainage conditions of the Grenada series, but elsewhere moisture and air apparently circulate freely through the soil section. The soil is so retentive of moisture that crops rarely suffer from drought. The surface run-off is rapid in many places, and the loose silt loam soil layer has been washed from many small areas on the steeper slopes.

Probably 20 per cent of the Memphis silt loam is under cultivation. At one time probably 50 per cent of the type was tilled. In places

cultivation has been discontinued because of erosion, but in the last five years probably more fields have been abandoned because of decreased yields of cotton caused by the boll weevil. Cotton, however, remains the principal crop. Corn is the next most important crop, and its acreage is being increased. The oat crop also has increased in recent years to a place of some importance. The raising of beef cattle recently has come to be an industry of considerable importance. A part of the stock consists of feeders, while a part is raised and finished on the farm. Most of the stock is maintained on pasturage, but a part is fed, mainly on cottonseed meal, during the winter. Bermuda grass, lespedeza, white clover, and other plants of the abandoned fields constitute the principal summer pasturage, and the wild cane of the stream bottoms the principal winter feed. The uncultivated area is gradually being brought into use as pasture. There is no important commercial dairying on the type. Most farmers keep a few hogs—sufficient for their meat supply—and on some farms a few are sold.

According to field observations and the statements of farmers cotton yields about one-fifth to one-half bale per acre. As much as 1 bale per acre frequently was obtained before the boll weevil appeared. The ordinary yield of corn ranges from about 15 to 25 bushels per acre, although larger yields are obtained with special treatment. The yield of oats ranges from 25 to 35 bushels per acre, with higher yields when particular care is exercised in cultivation.

With the exception of the fall-sown grain, the land for all crops is prepared in the spring. The field is plowed to a depth of 3 to 5 inches with rather light turning plows drawn by one mule. Both cotton and corn are grown on beds, and the preliminary cultivation is rather deep; corn is sometimes planted in the water furrow. Both crops are cultivated with light implements drawn by a single mule. Cotton usually is barred off with a turning plow which throws the soil away from the beds, and subsequent cultivation is done with shallow-running sweeps and harrows. Corn is treated in about the same way, though generally less cultivation is given this crop than cotton.

Few farmers rotate crops with any regularity. Ready-mixed commercial fertilizers of rather low grades, analyzing about 8-2-2,¹ frequently are used for cotton at the rate of about 200 to 300 pounds per acre, and for corn at the rate of about 200 pounds per acre. This year (1916) potash was not used, owing to its scarcity. Some farmers use 15 to 30 bushels of whole cotton seed, and others use a mixture of cottonseed meal and acid phosphate. A surface dressing of sodium nitrate is sometimes given to oats. Barnyard manure is generally preserved and used.

¹ Respective percentages of phosphoric acid, nitrogen, and potash.

The present price of land of this type ranges from about \$5 to \$20 an acre, depending on the location, topography, and farm improvements.

Under present economic conditions, influenced by the presence of the boll weevil, the best use of the Memphis silt loam in Hinds County seems to be for raising beef cattle and hogs, perhaps with dairying to some extent. The good marketing and transportation facilities, the abundance of natural pasturage, and the ease with which a large number of forage crops, such as lespedeza, white clover, bur clover, soy beans, velvet beans, cowpeas, vetch, and Bermuda grass, can be grown combine to make this soil exceptionally favorable for such industries. Both hogs and cattle can be pastured throughout the year on summer pasturage and winter cover crops. Hogs can be fattened rapidly on peanuts grown as a field forage crop. Little shelter is necessary for stock in this climate.

The yields of all crops can be increased, according to results obtained by some farmers on this soil, by practicing deeper plowing in the fall and by introducing the leguminous crops, which have proved successful, into rotations with the clean-cultivated crops. The soil is decidedly acid, according to litmus-paper tests, and is in need of lime. Applications of ground limestone, at the rate of 1 ton to 3 tons per acre, have been made with good results, especially with grain and corn, on land of similar characteristics in other States, and in a small way in this area.

The tendency is to run the cotton and corn rows with the contours of the slopes, and this practice has considerable effect in checking erosion, but the frequent occurrence of eroded patches in sloping areas strongly indicates a general need for terracing the cultivated fields, as is done in the Piedmont section of Georgia, Alabama, and the Carolinas. Such terraces covered with Bermuda grass or lespedeza constitute an effective obstacle to erosion.

Memphis silt loam, smooth phase.—The Memphis silt loam, smooth phase, differs from the typical Memphis silt loam mainly in topography. The surface ranges from gently rolling or sloping to slightly undulating. In places the texture is slightly heavier and the stratum of silty clay loam somewhat nearer the surface than in the typical Memphis silt loam. In a few localities this phase resembles the Grenada silt loam, in that it contains some gray mottling in the lower subsoil. Such areas occur in the gradational zone in the central part of the county, where the gray characteristic of the subsoil of the Grenada is faintly observable in the Memphis material.

The Memphis silt loam, smooth phase, is most extensively developed in the vicinity of Utica, Adams Station, Auburn School, Ballard School, and Hubbard, in the southwestern part of the county. Other areas are mapped in the vicinity of Brownsville and

Mount Zion Church, about 3 miles north of Champion Hill. The soil is well drained, and owing to its smooth topography little damage is done by erosion. Improved farm machinery can be used in all places.

Although comparatively inextensive, this phase is an important soil. Probably 75 per cent of it is used in the production of cotton and corn. Yields are slightly higher than on the Grenada silt loam or the typical Memphis silt loam. The land can be bought for \$10 to \$25 an acre, the price depending on improvements and location.

Owing to its smooth surface, this phase is more easily tilled than the typical Memphis silt loam. In general, deeper plowing and more thorough cultivation would be beneficial. Corn should be planted without bedding, and at the last cultivation it is a good plan to sow cowpeas between the rows. By grazing these off or turning them under, organic matter may be added to the soil and the fields made more productive. As yet the phase is not seriously eroded, but the experience of farmers on this soil in other areas indicates that especial care should be given to the prevention of erosion on the slopes. This can be done by deeper plowing and by following a system of rotation which will increase the organic matter in the soil.

GRENADA SILT LOAM.

The soil of the Grenada silt loam, to a depth of 6 to 8 inches, consists of yellowish-brown, brown, or buff-colored silt loam. This passes abruptly into brown or brownish-red silty clay loam or silty clay of moderately compact structure. At depths varying from 20 to 30 inches the subsoil passes gradually into a gray or mottled bluish-gray and rusty-brown silty clay loam or silty clay of plastic, compact structure, carrying black concretions and profusely marked with brownish iron stains. When wet this compact stratum is sticky and tenacious, and on drying it becomes hard and compact. It is very impervious to water and air movement, as is indicated by the dry condition of the material immediately beneath it. The mottling rarely continues to depths of more than 5 or 6 feet.

The layer in which the gray color occurs ranges from 2 to 3 feet in thickness, and below it the material consists of uniformly brown or reddish-brown silt loam in the central part of the county and of Coastal Plain material in the eastern part. In a few localities where the deposit of loess, from which this soil is derived, thins out there are some small included patches of the Lexington silt loam. There are also a number of places, especially in the western part of the county, where the type includes considerable Memphis silt loam, the two types merging so gradually into each other that definite separation is impracticable. In general, the gray mottling which charac-

terizes the subsoil of the Grenada type grows gradually less prominent toward the west, though it is so persistently developed even here that much of the Memphis silt loam is marked to a slight degree by this Grenada characteristic. The type as mapped includes many small areas where the drainage is inferior to that of the typical soil. Such areas consist of 6 to 8 inches of gray to grayish-brown silt loam overlying yellowish-brown silty clay loam that grades at about 2 feet into mottled gray and brown silty clay. Both the soil and subsoil of these areas contain large quantities of iron concretions.

The Grenada silt loam is the most extensive type in Hinds County. It occupies nearly all the upland in the eastern half of the county as well as a considerable proportion of that in the western half.

The surface ranges from almost level or gently sloping in the eastern part of the county to rolling and hilly farther west. The western areas may be said to constitute a hilly phase of the type, although some rough topography occurs in all the sections where the type is found. The smoother topography is especially well developed in the vicinity of Jackson, Terry, and Pocahontas. Many areas have the appearance of flats. In such situations both surface and internal drainage are poor, and the land remains wet for several days following heavy rains. The plastic and impervious structure of the subsoil retards the downward movement of water and air, with the result that the underdrainage of the type is usually inadequate. The soil is easily washed, and the rougher areas are marked by steep-sided ridges and gullies that extend with each heavy rain. The type, however, averages considerably smoother than the Memphis silt loam.

Probably 30 per cent of this type is now in cultivation, although fully 75 per cent of it has been farmed at some time. Cotton is the chief money crop, although since the invasion of the boll weevil the acreage has been somewhat reduced and other crops substituted. Cotton yields from one-fifth to one-half bale per acre, depending on the season, the cultivation given, and the amount of injury done by the boll weevil. Before the weevil's appearance as much as one bale per acre frequently was obtained with good management. Corn is the second crop in importance, and the acreage is increasing. The yield of corn varies from 10 or 15 bushels per acre on the shallow-plowed fields of tenants to 40 or 50 bushels on well-cultivated fields. The average is probably about 25 bushels per acre. A part of the acreage abandoned for cotton has been used in the production of oats, which crop is now of considerable importance on the type. Oats give an average of about 30 bushels an acre, and, in addition, furnish four to six weeks of winter grazing.

Many fields formerly cultivated are devoted to lespedeza, white clover, and other pasture plants. The extension and improvement

of the pastures have been accompanied by a marked increase in the number of beef cattle. This industry has grown rapidly in the last few years, with the result that much of the type in the eastern part of the county is well stocked. Several large herds are kept in the vicinity of Jackson, Terry, and Pocahontas. Most of the cattle are small, slow of growth, and of poor quality for beef. A number of especially fine Herefords, however, are being raised near Jackson, and their sale for breeding stock throughout the surrounding country is having a marked effect on improving the native herds (see Pls. I and II). In most cases the cattle are grazed throughout the year. During the summer and early fall Bermuda grass and lespedeza are the principal pasturage plants. After the cotton and corn fields have been grazed down, the stock is turned on wild cane or pastures of bur clover and white clover, which carries it over the late winter and early spring. Corn and oats ensilage is fed in some cases, but cattle usually are fattened on cottonseed meal or some other form of concentrate. On most of the farms on this type at least one cow is kept to supply the home with milk, and near Jackson there is a little commercial dairying. In the last few years the number of hogs has increased, and at the present time most farmers produce the greater part of their meat supply. In addition to this, many raise hogs for the local market.

In the last two years tomatoes have become an important money crop in the vicinity of Terry, Utica, and Raymond. The plants are transplanted to the fields early in April. Shipping begins about June 1. The principal markets are Pittsburgh, Philadelphia, Cincinnati, and New York. Tomatoes yield 300 to 400 crates per acre and sell for 50 cents to \$2 a crate, the price depending on the date of maturity and the condition of the market.

With the exception of tomatoes and fall-sown oats, the land for all crops is prepared in the spring. Plowing is begun about March 1 and is done with a light one-horse turning plow. The furrows are very shallow, frequently less than 3 inches deep. Cotton is planted on beds, although the ridges are somewhat lower than on land that is subject to overflow. Corn is usually planted in the water furrow and given shallow cultivation. The land is fertilized for cotton and corn in about the same way as on the Memphis silt loam. Commercial fertilizers, however, are in much more general use on this type than on the Memphis silt loam, as many of the farmers in the eastern part of the county find them necessary under the present system of cotton growing. Tomatoes receive 1,000 to 1,200 pounds per acre of some standard grade of fertilizer. A part is applied at the time of transplanting and the remainder a few weeks later.

In the vicinity of Jackson and Pocahontas and in other sections where it is devoted to truck the Grenada silt loam sells for \$25 to

\$50 an acre. Over the greater part of the type, however, farm lands can be bought for \$10 to \$20 an acre.

The Grenada silt loam varies widely in productiveness. In the eastern part of the county, where the loessial material thins out and the compact substratum is most strongly developed, the soil usually is less productive than farther west where the loessial material is deep and the underdrainage less seriously retarded by the compact layer. The more nearly level areas would be greatly benefited by tile draining, and the entire type is in need of deeper plowing and the addition of organic matter. A more general use of barnyard manure and the growing and turning under of such crops as cow-peas, lespedeza, and clover are needed. The soil is slightly acid, and the addition of lime in connection with green manuring would prove beneficial. The type responds readily to good farming methods, and is capable of being made very productive. In the sloping areas attention should be given to the prevention of erosion. (See Pl. III.)

The type is easily cultivated and well suited to the production of tomatoes, early potatoes, berries, and general truck crops. The best varieties of tomatoes seem to be the Detroit and Acme, the former being the more popular. Under the present uncertainty in cotton growing, brought about by the presence of the boll weevil, more attention should be given to these special crops. An increased acreage could be devoted advantageously to forage plants and used for raising beef cattle.

The average results of mechanical analyses of samples of the soil, subsoil, and lower subsoil are given in the following table:

Mechanical analyses of Grenada silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
423530, 423543.....	Soil.....	0.1	0.3	0.3	1.1	4.5	82.3	11.3
423531, 423544.....	Subsoil.....	.1	.1	.1	.9	3.4	71.3	24.1
423532, 423545.....	Lower sub-soil.	.1	.2	.4	1.6	3.9	74.3	19.4

LEXINGTON SILT LOAM.

The surface soil of the typical Lexington silt loam is a yellowish-brown, mellow silt loam, 8 to 12 inches deep. The subsoil consists of a brownish or reddish-yellow, heavy sandy loam or sandy clay which becomes lighter with depth until at a depth of about 30 inches it grades into yellowish-red or red sand. As mapped in this county the soil has a wide range in texture and depth. It varies from a

smooth silt loam to fine sandy loam, and from only a few inches deep on the crests of ridges to 3 feet or more where it adjoins the Grenada silt loam. In the deeper areas it includes a small acreage of the Grenada silt loam, and in the shallow areas small patches of Ruston and Orangeburg soils. In some areas quartz and chert gravel is abundant.

The type has a small total area and is confined to the higher ridges in the southern and eastern parts of the county. The areas, which are small, lie mainly in the vicinity of Jackson, Byram, and Greene Crossing, and southwest of Utica. The slope usually is steep and the surface drainage excessive. Considerable damage is caused by erosion.

The type is unimportant agriculturally. Probably not more than 10 per cent of it is cultivated, the chief crops being cotton and corn. The greater part is forested with red oak, blackjack oak, post oak, hickory, and beech. The yields of cotton range from one-sixth to one-fourth bale per acre, and of corn from 15 to 25 bushels per acre. The type is handled and fertilized in about the same way as the Memphis silt loam. It can be bought for \$10 to \$15 an acre.

The Lexington silt loam responds readily to the application of fertilizers, especially where care is taken to increase the supply of organic matter. Owing to its steep topography and tendency to wash, great care must be exercised in handling this soil to prevent erosion. The rows should be run at right angles to the slope and the land kept in cover crops as much of the time as possible. The soil is well suited to peanuts, Irish potatoes, berries, and vegetables.

RUSTON SANDY LOAM.

The soil of the Ruston sandy loam consists of 10 to 20 inches of gray to grayish-brown loamy sand to sandy loam, with an average depth of about 12 inches. The subsoil is a yellowish-brown sandy loam, grading at 24 to 30 inches into a dull-brown to brownish-red sandy loam or sandy clay loam, which is slightly plastic and sticky. The type includes small areas which have a silty surface soil and also small bodies of Orangeburg sandy loam, the latter consisting of about 10 inches of grayish-brown sandy loam overlying red sandy clay.

There are a number of areas in which the soil and subsoil contain sufficient quartz and chert gravel to constitute a gravelly variation, and in places forms 50 per cent of the soil mass. The gravel is well rounded and ranges in size from small particles to fragments 2 or 3 inches in diameter. In the more gravelly places cultivation is difficult. These gravelly areas, if of sufficient extent to warrant separa-



CONTOUR METHOD OF CULTIVATION COMMONLY PRACTISED TO PREVENT EROSION ON GRENADA SILT LOAM.

tion, would be mapped as the Ruston gravelly sandy loam. They are indicated on the soil map by gravel symbols.

The Ruston sandy loam is inextensive. It occurs only in small bodies capping the highest hills and ridges and on the upper parts of steep slopes. The more important areas are situated near Clinton, Jackson, Elton, and McRaven and just southwest of Utica. The soil erodes rapidly, and much of the land is so badly gullied that it is unfit for cultivation. Practically all the type is excessively drained.

Owing to its small extent and steep topography, the type is unimportant in the agriculture of the county. Practically all of it is forested with hickory, pine, beech, and various kinds of oaks. It is sold only in connection with adjoining soils.

Owing to the difficulty of working the steep slopes and the tendency of the soil to wash, the greater part of this type should be left in forest. The few small patches that are comparatively smooth are well adapted to Irish potatoes, sweet potatoes, peanuts, and truck crops, but even in these places especial care should be given to the prevention of erosion.

SUSQUEHANNA CLAY.

The typical Susquehanna clay consists of a grayish-brown silt loam, underlain at a depth of 1 to 3 inches by a red, yellow, and gray heavy plastic clay. The subsoil, encountered at a depth of about 12 inches, is a mottled red and gray to drab, sticky, impervious clay, very compact, waxy, and tenacious when wet and hard and brittle when dry. The type as mapped has little uniformity. In places the sticky clay, locally known as "pipe clay," occurs at the surface. Small patches of the Grenada silt loam and Houston clay and small areas consisting of light-brown silt loam or yellowish clay overlying stiff clay mottled gray and yellow (Montrose clay) are found.

This soil is inextensive, occurring chiefly in strips on slopes in the vicinity of Jackson and between Jackson and Clinton. The soil has been formed from the weathering of calcareous lignitic clays of the Coastal Plain. The surface usually is steep and drainage is good.

The Susquehanna clay is unimportant agriculturally. Probably 95 per cent of it is forested, mainly with red oak, blackjack oak, pine, and hickory. Where cultivated it is devoted to the same crops as the adjoining soils. It is deficient in organic matter and of rather low productive capacity, requiring heavy applications of manure or commercial fertilizers to produce good yields. It is best used for growing lespedeza, bur clover, and Bermuda grass for grazing live stock.

HOUSTON CLAY.

The surface soil of the Houston clay consists of 10 to 12 inches of black heavy clay containing large quantities of organic matter. The subsoil consists of a grayish-brown to black stiff heavy clay, which becomes lighter colored with depth, grading at depths of 3 or 4 feet into yellowish-brown calcareous clay. Both the surface soil and subsoil are compact, sticky, and plastic when wet and carry small fragments of limestone.

The type is inextensive. It occurs in narrow strips from 10 to 40 acres in extent on the sides of slopes in the eastern part of the county. The most important area is on the hillside leading down to the Pearl River bottoms in the city of Jackson. Other small bodies occur in the same vicinity.

The surface has a gentle slope and is favorable to the use of improved farm machinery. Both the surface drainage and underdrainage are good, but the heavy character of the soil and subsoil makes the type retentive of moisture, and crops successfully withstand periods of rather severe drought.

Owing to its small extent, the type is unimportant agriculturally. Not more than 10 per cent of it is used for cultivated crops, consisting of cotton and corn. The greater part of the type is devoted to pasturage or to Johnson grass for hay. A small part is forested with oak and hickory, but the soil is chiefly a well-grassed prairie type.

Cotton yields from one-fourth to one-half bale per acre, with an average of about one-third bale. Corn yields 25 to 50 bushels, with an average of about 35 bushels per acre. Where Johnson grass is cut for hay, two or three cuttings usually are obtained, with an average yield of about 1 ton per acre per cutting.

The value of land of this type ranges from \$15 to \$100 an acre, depending on its location with respect to the city of Jackson.

Owing to the heavy character of the Houston clay, it is difficult to work, but it is one of the most productive soils in the county and could be profitably used for a wide range of crops. It is well supplied with lime and, judging from the success attained on this type of soil in other sections of the State in growing alfalfa, this valuable crop could perhaps be profitably introduced in this county. In other sections of the State well-cared-for Johnson grass is cut three to five times, with an average yield of about 1 ton of hay per acre per cutting. This is an easy crop to grow, and if well seeded it should do equally well on the type in this county.

The Houston clay as mapped includes a few small areas of the Bell clay. One occurs near the northeastern corner of the county, another along Hanging Moss Creek, and one in the Pearl River bottoms within the city of Jackson. The soil of the Bell clay consists

of 16 to 24 inches of black clay, containing a high percentage of organic matter. The subsoil, to a depth of 36 inches or more, consists of stiff, waxy, impervious clay of bluish-black or black color. Both the surface soil and subsoil are very sticky and plastic when wet. Near the foot of slopes where the soil in some places borders areas of the Susquehanna clay, the surface material is slightly yellowish brown. In parts of the area the subsoil is a drab or mottled yellow and gray clay, which passes into gray or bluish-gray silty clay at a depth of about 36 inches.

This is a terrace soil occurring at the foot of slopes. It lies slightly above normal overflow, though in places it is flooded at times of exceptionally high water. The surface slopes gently toward the streams, and the drainage is good. The soil is unimportant agriculturally. It is not used for cultivated crops, but supports a good growth of grasses. It is said that corn was grown at one time and produced heavy yields.

Like the Houston clay, this soil is difficult to work, but when properly cultivated it is one of the strongest soils in the county. It is well supplied with lime and should prove suited to alfalfa. The soil is adapted to both cotton and corn, but thorough cultivation with heavy implements is necessary for its successful tillage.

VICKSBURG FINE SANDY LOAM.

The surface soil of the Vicksburg fine sandy loam is a light-brown to brown fine sandy loam to loamy fine sand 12 to 15 inches deep. The subsoil is a light-brown fine sandy loam containing a relatively large percentage of very fine sand and silt and grading at a depth of about 25 inches into brown sandy clay.

Included with this type are a few small bodies of the Collins fine sandy loam, consisting of about 12 inches of brown fine sandy loam, underlain by mottled yellow and gray sandy clay.

The Vicksburg fine sandy loam has a small total area. It occurs chiefly in very narrow strips along the immediate banks of the Pearl River. The largest area is found at the mouth of Vaughn Creek, east of Terry. Other small areas lie along the Pearl River northeast of Jackson and along the Big Black River in the vicinity of Newman and Smith.

The type has a smooth surface, but it is well drained. In most places it lies 6 to 20 feet above the normal flow of the streams, but it is all subject to overflow. The type is unimportant agriculturally, though a few areas are cultivated, chiefly to cotton. The methods of farming and the yields obtained are practically the same as on the Vicksburg silt loam. The type is more easily cultivated than the heavier soils and crops on it do not suffer from drought. This land is sold only in conjunction with other lowland soils.

The methods of improvement suggested for the Vicksburg silt loam are applicable to this type.

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

Mechanical analyses of Vicksburg fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
423541.....	Soil.....	0.1	0.8	3.2	61.8	8.4	18.8	7.4
423542.....	Subsoil.....	.0	.2	1.2	52.6	12.0	21.7	12.2

VICKSBURG SILT LOAM.

The Vicksburg silt loam is a brown, mellow silt loam, which either extends without important change throughout the 3-foot section or passes at about 10 to 15 inches into brown or reddish-brown silty clay loam. The surface material when dry has a light-brownish appearance, and in places when wet a reddish cast. In some of the poorly drained areas the subsoil shows streaks of gray or faint rusty-brown mottlings, such areas approaching the characteristics of the Collins silt loam. The favorable structure of the type enables it to withstand severe periods of drought without apparent injury to crops.

The type is confined chiefly to the bottoms of the Big Black River and its larger tributaries. It is most extensive in the vicinity of Smith, where it attains a width of about 2 miles. Ordinarily the areas are from one-fourth to one-half mile in width, but a somewhat wider development occurs at the junction of Fourteenmile and Bakers Creeks. Small areas are mapped along the Pearl River in the vicinity of Jackson and northeast and south of Byram. Along many of the streams in the western part of the county this type shares the narrow valleys about equally with the Collins silt loam, small areas of which are included with the Vicksburg. There are also a few small included areas of the Vicksburg silty clay loam.

The Vicksburg silt loam has a uniformly smooth surface, broken only by the winding channels of minor streams or by small depressions which retain water from a few days to several weeks after floods. The elevation varies from only a few feet to 20 feet or more above the streams, but the entire type is subject to overflow. Except in the lower situations, as in the Big Black River bottoms at the mouths of the larger tributaries, the land remains covered with water for only a few hours at a time. A few small areas are partially protected by levees, but these usually are insufficient for protection

against backwater when the streams are exceptionally high. Occasionally considerable areas of cotton and corn are severely damaged by late spring or early summer rains, in some cases requiring the replanting of the crops. Owing to the level surface and the clayey texture of the subsoil the land is slow to dry out.

This is not an extensive type, and it is of only local importance agriculturally. About one-half of it is in cultivation, though before the appearance of the boll weevil a somewhat larger acreage was farmed. About one-third of the type is heavily forested with oak, hickory, pine, and gum, while some of the wet areas support a valuable growth of cypress. Practically all the unfarmed areas are well seeded to lespedeza, Bermuda grass, or other pasture plants.

Cotton occupies the largest acreage. The yields are low on account of the ravages of the boll weevil. The loss is especially severe on the poorly drained part of the type, as the wet condition of the soil in the spring prevents early planting, which is essential to successful cotton production in the presence of the weevil. For this reason many of the fields formerly devoted exclusively to cotton are now used for corn or have been allowed to grow up in Bermuda grass and lespedeza and are utilized as pasture. Corn has always been the second most important crop, and its acreage is increasing. There are many small patches of sugar cane, but the crop is not grown commercially. A few beef cattle are grazed in the uncultivated areas and on the wild cane in the forested areas.

According to estimates of farmers, cotton yields from about one-fifth to one-half bale per acre, though before the country became infested with the boll-weevil yields of 1 bale or more of long-staple cotton were not unusual. Corn yields from 25 to 45 bushels per acre, with as much as 75 bushels per acre under favorable conditions of moisture and with good cultivation. The average yield is probably about 35 bushels per acre. Sugar cane does especially well on this soil, yielding 200 to 400 gallons of sirup per acre.

Cotton and corn land are prepared in the spring. Plowing begins about March 1 and is done with light turning plows drawn by one mule. Both cotton and corn are planted on rather high ridges or beds, which usually are made by throwing six furrows together. In case the season is wet, the land is ridgetted before planting, as the soil has a tendency to run together and become slightly compact after being saturated for several days. This condition is frequently corrected by smoothing off the crests of the ridges with a cultivator or spike-tooth harrow immediately before the cotton is planted. The cotton planters are single-row walking implements drawn by one mule. Corn is planted by dropping the seed by hand and covering with a light turning plow. The first cultivation is sometimes done

with a spike-tooth harrow drawn by two mules, but more commonly with a small 1-horse cultivator. The last cultivation is shallow in all cases.

No commercial fertilizers are used on this soil, and no especial effort is made to maintain its naturally high productiveness. The type ranges in value from \$10 or \$12 to \$50 an acre, depending on the state of cultivation, conditions of overflow, and the location with respect to towns and transportation facilities.

The greatest needs of this soil are thorough drainage and protection from overflow. In some cases levees partially protect small areas from ordinary high water, but the greater part of the type is flooded annually. The construction of open ditches or the laying of tile drains would greatly benefit the type by hastening the removal of excess water and promoting a free circulation of air throughout the soil, permitting it to warm up earlier in the spring, so that crops may be planted earlier. This is especially important in growing long-staple cotton, which usually requires from 12 to 20 days longer to mature than the short-staple varieties. Unless the plant receives an early start, much of the crop is ruined by the boll weevil. One of the most popular varieties of cotton grown is the Allen Long Staple (Allen Hybrid), which has a staple $1\frac{3}{8}$ to $1\frac{1}{2}$ inches in length. Before the appearance of the weevil yields of this cotton on many farms averaged about 1 bale per acre, and the product brought a better price than other varieties.

The type is well adapted to corn and, owing to the ravages of the boll weevil and the rather poor conditions of drainage, an increase in the acreage of this crop and the feeding of a greater number of beef cattle would prove more profitable than the present extensive growing of cotton. Lespedeza, Bermuda grass, bur clover, and many other forage plants do especially well on this soil, making it exceptionally well suited to stock raising. In common with most of the soils of the county, the type is acid and deficient in organic matter. The application of ground limestone at the rate of 1 to 2 tons per acre is an effective means of correcting the acidity, while deeper plowing and growing and turning under such leguminous crops as crimson clover and cowpeas add organic matter and improve the physical condition of the soil and materially increase its productiveness. Where the overflow conditions are not too unfavorable, the soil is well suited to the production of oats. This crop furnishes from four to six weeks of good winter grazing in addition to the grain, and, being harvested about the middle of May, leaves the ground free to grow late corn, cowpeas, millet, Sudan grass, or other summer crops which can profitably be utilized in feeding stock.

VICKSBURG SILTY CLAY LOAM.

The surface soil of the Vicksburg silty clay loam is a brown or reddish-brown silty clay loam, having a depth of 10 to 12 inches. The subsoil to a depth of 36 inches or more is a brown to reddish-brown, plastic silty clay loam or silty clay, of rather compact structure. Included with the type are a few small patches of the Vicksburg silt loam.

This type is inextensive. It occurs in the bottoms of the Big Black River at the mouth of Fourteenmile Creek and in a few small areas along the Pearl River. It is an alluvial soil, occupying low, flat areas which occasionally are broken by former channels of streams. It frequently is overflowed and the drainage is poor.

Agriculturally the Vicksburg silty clay loam is relatively unimportant. About 50 per cent of it is cultivated to cotton and corn, and the remainder is covered with a valuable growth of pine, oak, gum, and wild cane, with considerable cypress in the brakes or swamps. This soil formerly gave large yields of long-staple cotton, but since the advent of the boll weevil the yields have been low, ranging from less than one-fifth to about one-half bale per acre. Corn produces from 25 to 45 bushels or more per acre. The type is handled in about the same way as the Vicksburg silt loam.

Well-cultivated fields of this type are held at \$30 to \$40 an acre, while forested areas sell for \$10 to \$25 an acre.

Owing to the heavy texture of this soil cultivation is more difficult than on the other valley soils. It is sticky and plastic when wet, and so slow in drying out in the spring that it can rarely be planted until late in the season. For this reason under boll-weevil conditions it is better adapted to corn than to cotton. It is well suited to lespedeza, Bermuda grass, and bur clover, which could profitably be used in the raising of cattle and hogs. Practically all the type is in need of artificial drainage.

Results of mechanical analyses of samples of the soil and subsoil follow:

Mechanical analyses of Vicksburg silty clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
423507.....	Soil.....	0.1	0.4	0.4	1.8	4.0	69.4	24.3
423508.....	Subsoil.....	.1	.2	.2	1.2	5.6	70.9	21.9

WAVERLY SILT LOAM.

The soil of the Waverly silt loam to a depth of about 10 inches is a gray silt loam streaked with yellowish-brown or rusty-colored iron stains. The subsoil consists of mottled gray and yellowish-brown, compact silty clay loam, extending to 36 inches or more. In places iron concretions are numerous in both the soil and subsoil.

Only a few small areas of this soil are encountered. These occur as narrow strips along Bakers and Bogue Chitto Creeks and in the Big Black River bottoms near Chichester and Cox Ferry. The type is level and occupies low positions along the streams. It frequently is overflowed. Both the surface drainage and underdrainage are poor.

This type is unimportant agriculturally, less than 10 per cent of it being under cultivation. The greater part is heavily forested with white oak, water oak, red oak, gum, elm, and hickory. Practically all the uncultivated areas support a dense growth of wild cane. The small acreage farmed is devoted to cotton and corn, which give somewhat lower yields than on the Vicksburg soils. The type is very deficient in organic matter and would be greatly benefited by the turning under of green leguminous crops or by heavy applications of manure. It is also in need of drainage. In its present condition the growth of wild cane furnishes winter feed for beef cattle. The soil is well suited to clovers and grasses, and its best use apparently is for the raising of live stock.

COLLINS SILT LOAM.

The surface soil of the Collins silt loam is a brown to grayish-brown, mellow silt loam, 8 to 12 inches deep. The subsoil to a depth of 36 inches or more is a gray or mottled gray and rusty-brown, plastic silt loam or silty clay loam of moderately compact structure. In many places the surface soil contains a few iron concretions and is slightly mottled. On drying, the soil has a light-grayish appearance, resembling the Waverly silt loam, typical small patches of which are included. The type also includes small areas of Vicksburg silt loam. The soil is low in organic matter.

The Collins silt loam is the most extensive lowland type in the county. It occurs in strips from one-eighth to 1 mile wide along most of the interior streams and along Big Black River in the northern corner of the county. The surface is almost level. The type lies 4 to 20 feet or more above the normal flow of the streams. The entire type is subject to overflow though in occasional years the higher areas escape inundation. The surface drainage is poor, and the gray and mottled appearance of the underlying material indicates poor aeration and drainage in the subsoil.

This is an important type agriculturally. Probably 75 per cent of it is in cultivated crops. A small acreage formerly cultivated has recently been converted into pastures. The unfarmed areas support a good growth of timber, consisting of various kinds of oaks, gum, hickory, beech, magnolia, and some pine. Wild cane is abundant, and in many places there are well-seeded areas of lespedeza, Bermuda grass, and other native pasture plants.

The principal crops are cotton and corn, the former occupying somewhat the larger acreage. Sugar cane and sorghum are grown to supply the home with sirup, but are unimportant commercially. Cotton yields one-fifth to one-half bale per acre, depending on the extent of damage by the boll weevil. Corn ordinarily yields 20 to 40 bushels per acre, but higher yields are obtained where especially good treatment is given the crop. Sugar cane and sorghum produce from 150 to as much as 400 gallons of sirup-per acre. The methods of handling this soil are the same as those followed on the Vicksburg silt loam.

Land of this type sells for \$12 to \$40 an acre, depending on the state of cultivation, the distance from towns, and the forest growth.

The greatest need of the Collins silt loam is better drainage. In many cases the construction of short levees would protect considerable areas from overflow, and the expense of digging open ditches or laying tile drains would be more than justified by the increased yields. The soil has an acid reaction and is very deficient in organic matter. The addition of ground limestone, deeper plowing, and turning under leguminous crops, such as crimson clover, cowpeas, or lespedeza, make it more easily handled and increase its productiveness. Under the present boll-weevil conditions, a reduction of the acreage of cotton and a material increase in the acreage of forage crops, in connection with the more extensive raising of beef cattle and hogs, should prove profitable.

COLLINS SILTY CLAY LOAM.

The typical soil of the Collins silty clay loam is a brown silty clay loam 10 to 12 inches deep, rather plastic and sticky when wet, but friable and granular when dry. The subsoil is a mottled gray and rusty-brown silty clay loam, passing into bluish-gray and brown compact silty clay. Dark-brown to black iron concretions and concretionary material are common in both the soil and subsoil.

Along the Pearl River several small areas of the Waverly silty clay loam are included with this type. The soil in these areas consists of about 10 inches of gray silty clay loam. The subsoil is bluish-gray, heavy, plastic, tenacious clay with rusty-brown mottlings.

The Collins silty clay loam is inextensive in Hinds County. The largest areas occur along Bogue Chitto and Limekiln Creeks, near the

northern county line. Smaller and less typical bodies occur as narrow strips in the Pearl River bottoms just northeast of Jackson. The type occupies low, flat areas along the streams and is one of the first soils to be overflowed in case of high water. In the Pearl River bottoms it occurs chiefly in old river channels, locally known as swamps or cypress brakes. During extremely high water these are sometimes flooded to a depth of 20 feet or more. The entire type has poor surface drainage, and the impervious structure of the subsoil retards the downward movement of both water and air, causing the soil to remain wet and cold for long periods after floods.

The type is unimportant agriculturally. It is not cultivated but supports a valuable forest growth of white oak, red oak, water oak, sycamore, gum, and some cypress. Practically all of it is also covered with a dense growth of cane, which is utilized in wintering cattle.

The Collins silty clay loam is held at \$8 to \$15 an acre, depending on location, the forest growth and conditions of overflow.

This is naturally a productive soil, and from the results obtained on the Vicksburg soil, of similar texture, it would seem that the larger areas of the type could profitably be cleared and utilized for farming. Under present boll-weevil conditions the soil probably could best be devoted to corn and such crops as can be used in raising live stock.

LINTONIA SILT LOAM.

The soil of the Lintonia silt loam is a light-brown silt loam, slightly pasty when wet, but friable and easily pulverized when dry. It is underlain, at an average depth of 8 to 10 inches, by reddish-yellow or brownish-red silty clay loam, which shows but little change within the 3-foot section. When dry, both soil and subsoil are frequently yellowish brown or buff. There are a few places, especially on the lower terraces, where the subsoil is slightly mottled with gray, such areas representing a gradation toward the Olivier silt loam. As mapped, this type includes small patches of the Olivier silt loam, as in occasional narrow, poorly drained strips bordering the minor draws. There are also a few included strips of the Vicksburg silt loam, subject to inundation, which are too narrow to be shown separately on the map. The soil is moderately well supplied with organic matter, and if plowed when dry is easily worked into a mellow tilth. Owing to its rather high content of clay the subsoil when wet is plastic and compact, though to a somewhat less degree than the subsoil of the Olivier silt loam.

The type is very similar to the smooth phase of the Memphis silt loam, both in character and color of material and in surface configuration. The latter, however, is an upland soil, while the Lintonia

silt loam is a terrace type. There are several included small areas of the Lintonia fine sandy loam along the Pearl River near Jackson, in the vicinity of Byram and Terry, and along the Big Black River near Fivemile Lake and Chichester. The areas of this type in the eastern part of the county are in general of fine sandy loam texture.

The Lintonia silt loam is most extensively developed in the western part of the county, where it occurs on terraces 20 to 60 feet above ordinary overflow. The type is confined chiefly to the second and third bottoms of the Big Black River and to the higher terraces along its larger tributary creeks. One of the largest and most typical areas is at Smith. Others occur at Mount Mariah Church on Fourteenmile Creek, in the vicinity of Champion Hill, and in the northwestern part of the county.

The surface characteristically is level or gently sloping toward the streams. The type usually occupies the better drained areas of the terraces, occurring on gentle slopes adjoining the hills, as elevated bodies within areas of the Olivier silt loam or in narrow strips on the slightly elevated banks of streams. In places the type occupies two or more well-defined terraces, the highest of which rises gradually and merges imperceptibly with the uplands. Near the foot of the hills the surface is slightly undulating, but in no place is the land steep enough to cause erosion or to prevent the use of farm machinery.

Both the surface drainage and underdrainage are good. There are a few flat areas, however, where the soil and subsoil remain water-logged for some time following heavy rains. In case of drought, crops suffer first in these areas.

The Lintonia silt loam is one of the most productive and important types in the county. Probably 95 per cent of it is under cultivation. Cotton and corn are the principal crops, the former occupying perhaps 75 per cent of the cultivated area. In the last few years oats have been grown in a small way, and a number of fields formerly devoted to cotton have been seeded to lespedeza, Bermuda grass, bur clover, or crimson clover. In some cases these crops have been cut for hay, but more commonly they are used only for pasturage. A few beef cattle of good grade are raised and a number of native cattle are fattened for market on lespedeza pasturage and corn and oat ensilage, together with some form of cottonseed concentrate.

The yields on this type and the methods of handling the soil are about the same as on the Vicksburg silt loam. Prior to the advent of the boll weevil this was considered one of the best cotton soils in the State. One bale or more per acre of long-staple cotton was not an unusual yield, and the product is said to have sold for as much as 30 cents a pound. The crop was very profitable and was grown almost exclusively.

Land of this type sells for \$15 to \$50 an acre, the price depending on the improvements and the distance from shipping points.

The Lintonia silt loam is only moderately well supplied with organic matter. It can be improved by deeper plowing and the growing and turning under of lespedeza, cowpeas, crimson clover, or bur clover. One of these crops should be rotated with cotton and corn and grazed off by cattle and hogs. The wet areas are in need of tile drainage.

OLIVIER SILT LOAM.

The surface soil of the Olivier silt loam is a light-brown to grayish-brown silt loam, 8 to 14 inches deep, with an average depth of about 10 inches. It has a smooth feel, and when dry is mellow and friable. When wet it is of a pasty consistency. The subsoil consists of a bluish-gray or mottled gray and brown, plastic silt loam or silty clay loam, which becomes quite compact at about 28 inches. Typically the brown silt loam passes gradually into the mottled gray and brown material, though there are many included areas in which the surface soil grades abruptly into gray silty clay loam. Such areas usually are poorly drained and represent Olivier silt loam soil overlying Calhoun material. As mapped, the type includes small patches of Calhoun silt loam and a few narrow strips of overflowed land around the heads of minor streams. Dark-brown or black iron concretions are numerous throughout the entire 3-foot section.

The Olivier silt loam is the most extensive terrace soil in the county. It is developed along practically all the larger streams, as well as around the heads of many of the smaller ones. The towns of Bolton and Oakley are situated on areas of this type.

The surface of the larger areas is mainly level. Along the smaller streams, and where the type adjoins the Grenada silt loam, the land has the appearance of a gently sloping plain. In such locations the drainage is good. A large part of the type, however, is too flat for adequate natural drainage, and both the surface soil and subsoil remain in a saturated condition for several days after heavy rains. The type occupies terraces which lie 40 to 50 feet above the streams. Except in strips near the heads of minor drainage ways, it is not overflowed by streams, though some of the flat areas occasionally are inundated for short periods by run-off from the uplands. The mottling in the subsoil indicates that internal drainage and aeration are rather poor. This is due in part to the flat topography, but mainly to the compact structure of the subsoil. The surface soil is slightly acid, and the subsoil is markedly so.

About 75 per cent of the type is under cultivation. Until the last few years at least three-fourths of the cultivated area was devoted to cotton, but since the appearance of the boll weevil the cotton acreage

has been reduced. Corn has always been second in importance, and the acreage of this crop gradually is increasing. Oats formerly were grown only in a small way, but at the present time the crop is receiving considerable attention. Following the decrease in the acreage of cotton, a number of fields were sown to lespedeza. These are used both in the production of hay and as summer pasture for cattle. Sugar-cane sirup is produced for home consumption, and a very small quantity is sold. In the last few years tomatoes for shipment to northern markets have become a relatively important crop in the vicinity of Terry, Utica, and Raymond. The live-stock industry recently has become important. The greatest increase has been in the production of the beef cattle, and much interest is taken in the improvement of the breeds. The stock is raised and fattened in the same manner as on the Memphis silt loam. Aside from the cows kept to supply the home, very little dairying is carried on. Nearly every farmer raises a few hogs, which are wintered cheaply in the oat fields and fattened in the fall on corn.

According to statements of farmers, the yield of cotton ranges from about one-fifth to one-half bale or more per acre, the low yields being due chiefly to the ravages of the boll weevil. Corn ordinarily yields from 25 to 45 bushels per acre. Oats yield 25 to 45 bushels per acre, and in addition furnish from six weeks to two months of winter grazing. When lespedeza is cut for hay the yields average about 1 ton per acre. Sugar cane yields 200 to 400 gallons of sirup, and tomatoes from 200 to 400 crates per acre.

With the exception of the oat ground, which is seeded in the fall, the type is not prepared for crops before March 1. This soil is handled in the same way as the Vicksburg silt loam. Very little commercial fertilizer is used on cotton and corn. Tomatoes are fertilized in about the same way as on the Grenada silt loam, receiving from 1,000 to 1,200 pounds per acre of commercial fertilizer of some standard grade.

The Olivier silt loam sells for \$20 to \$50 an acre in the vicinity of towns and railroads and for \$10 to \$20 an acre a few miles away.

The methods suggested for the improvement of the Lintonia silt loam are applicable to the Olivier silt loam. The soil is acid, and it is probable that applications of ground limestone at the rate of 1 to 2 tons per acre would prove beneficial.

CALHOUN SILT LOAM.

The Calhoun silt loam consists of a compact, gray silt loam, 10 to 12 inches deep, resting either on a subsoil of compact, white silty clay loam marked with rusty-brown iron stains or on a mottled bluish-gray and yellowish-brown, heavy, plastic clay. Dark-brown or

black iron concretions are thickly strewn over the surface and are more or less abundant throughout the soil and subsoil. The type, which is locally known as "crawfish land" and "buckshot land," is deficient in organic matter, and when wet is sticky and plastic, resembling a soil of heavier texture. If plowed in this condition, it forms clods, but if worked when in the proper condition of moisture a mellow seed bed is readily obtained.

A small area of Calhoun silty clay loam is included with the type in the Pearl River bottoms at Jackson. There are also two small included areas having some reddish mottling in the subsoil. One of these occurs near Byram and the other near the southeastern corner of the county. If of sufficient extent to warrant separation, the soil of these two areas would be mapped as the Leaf silt loam.

The Calhoun silt loam is confined to small areas on the terraces and is rather widely distributed throughout the county. The most important areas occur near Terry, Byram, and Jackson, in the eastern part of the county, and between Newman and Edwards, in the western part. The type usually occurs as flat areas in low situations and frequently in poorly drained strips encircling ponds. In most cases the surface drainage is poor, and the impervious subsoil prevents the ready movement of water and air and causes the soil to remain wet and cold until late in the spring.

Owing to its relatively small extent, this type is not important in the agriculture of the county. Probably 35 per cent of it is in cultivation, the remainder being forested with white oak, water oak, black gum, and hickory. Cotton and corn are the chief crops, the former occupying somewhat the larger acreage. The yield of cotton ranges from about one-sixth to one-third bale per acre, while the yield of corn is very low, frequently between 5 and 10 bushels per acre. The land is handled in much the same way as the other terrace soils, except that the bedding is sometimes higher and there is a somewhat more general use of commercial fertilizers.

Land of this type sells for \$5 to \$10 an acre.

The Calhoun silt loam is poorly drained and very deficient in organic matter. It can be cultivated only under a very narrow range of moisture conditions and is one of the first soils in the county to suffer from excessive moisture or from drought. It would be greatly benefited by deeper plowing, tile drainage, and the growing and turning under of green-manure crops, such as cowpeas, crimson clover, bur clover, and lespedeza. The soil is decidedly acid and is materially improved by the application of lime. Where barnyard manure is available, it should be used liberally and worked deeply into the soil.

In some localities there are small patches on this type, as well as on some of the other soils of the county, where vegetation fails to

grow. These areas, locally known as "bald spots" or salt spots," are rarely more than a few rods across. They may be improved by perfecting the drainage, plowing deep, and liberally applying barnyard manure. Plowing under vegetation to increase the supply of organic matter also is beneficial. In its present condition this type seems better adapted to cotton than to corn. Much of it could more profitably be devoted to crops that could be used for grazing stock.

SUMMARY.

Hinds County, Miss., lies just southward of the center of the State. It has an area of 872 square miles, or 558,080 acres.

The topography varies from smooth or gently rolling to steeply sloping, the greater part of the county having a rolling surface. Excepting a narrow strip along the eastern and northern boundaries, the general slope is toward the west. Extensive level areas occur as terraces and first bottoms along the principal streams. The elevation ranges from about 100 to 450 feet above sea level, the greater part of the county lying between 225 and 325 feet above. The drainage is carried mainly by the Big Black and Pearl Rivers and their tributaries. Drainage is well established.

The population of the county in 1910 was 63,726.

The principal towns are Jackson, the capital of the State, Clinton, Bolton, Edwards, Utica, Terry, Pocahontas, Byram, Oakley, and Learned. All are important cotton-shipping points.

Six railroads center in Jackson, providing excellent transportation facilities in the eastern and central parts of the county. The public roads are good.

Jackson is the principal local market for vegetables. Cotton is sold in all the towns. Live stock is shipped to Natchez, East St. Louis, and New Orleans, and tomatoes to Pittsburgh and other northern markets.

The climate of Hinds County is mild. The mean annual temperature is about 65° F., and the mean annual precipitation about 51 inches. The rainfall is well distributed throughout the year. There is an average growing season for tender vegetation of more than eight months.

The agriculture consists principally of growing cotton for sale, corn principally for feeding work stock, the production of hogs, the feeding of some beef cattle, and in certain sections the growing of vegetables for shipment to northern markets. Stock raising is receiving increased attention. Some fine Hereford stock is kept, and the native stock is rapidly improving.

No definite system of crop rotation is practiced, but cotton is alternated occasionally with corn. The use of commercial fertilizers is

not common, though they are applied to some extent in the eastern part of the county on cotton and corn, and in liberal quantities, on tomatoes.

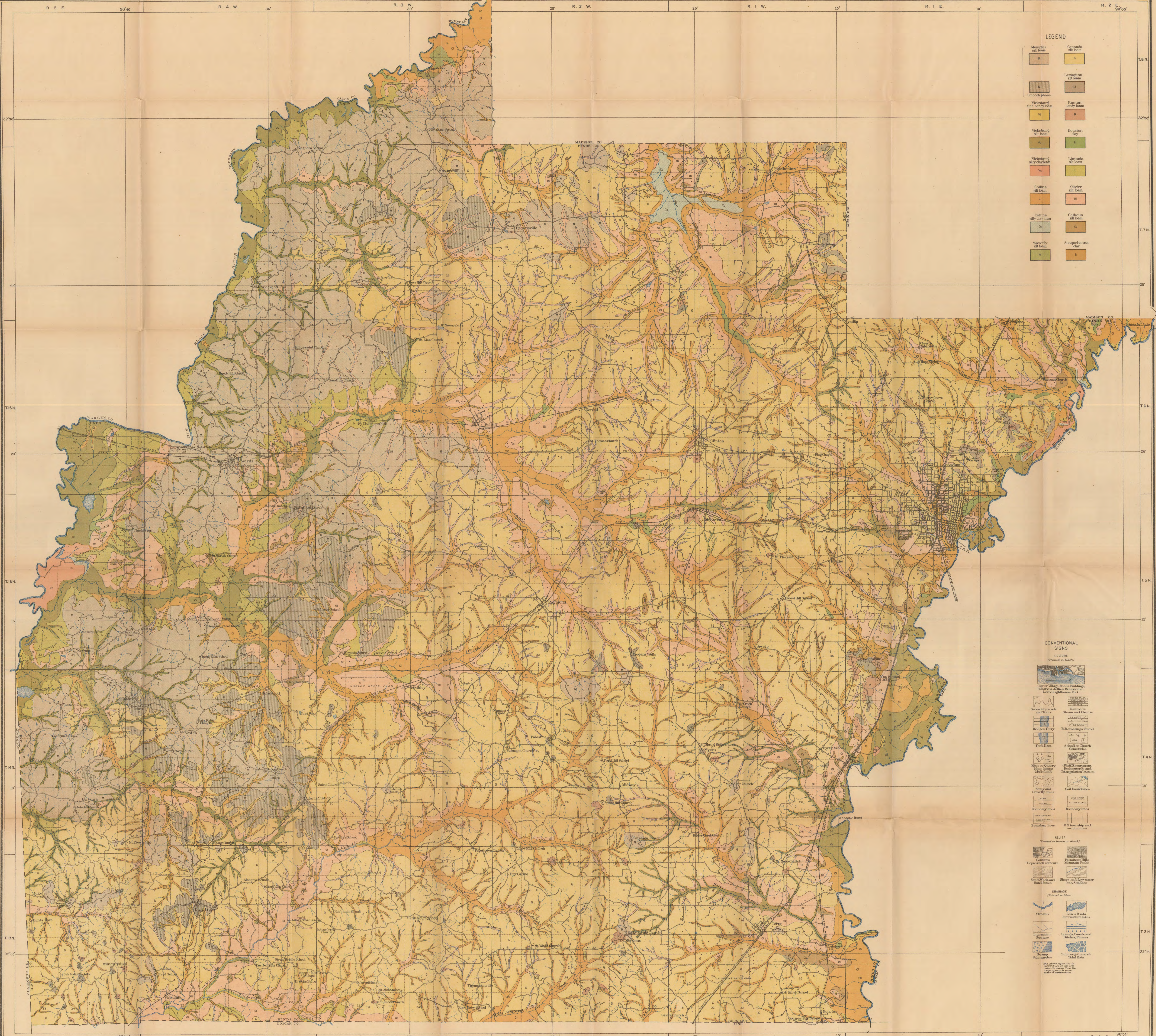
The average size of the farms is reported in the 1910 census as about 53 acres, each tenancy being classed as a farm. In some cases the land is held in tracts of 1,000 to several thousand acres.

About 71 per cent of the area of the county is in farms, and of the farm land about 72 per cent is reported improved. About 81 per cent of the farms are operated by tenants. The price of farm land ordinarily ranges from \$10 to \$50 an acre.

The soils of Hinds County are derived mainly from a deposit of loess, but exposures of Coastal Plain material occur in small areas in the eastern part of the county and give rise to the Ruston, Lexington, Susquehanna, and Houston soils.

The Grenada silt loam and the Memphis silt loam are the most extensive upland types. These soils are well suited to cotton, corn, and vegetables. The Olivier, Lintonia, and Calhoun silt loams are the most important terrace soils. They produce good crops of cotton, corn, and hay. The Vicksburg, Collins, and Waverly soils are subject to overflow, but are among the most productive soils in the county. They are well suited to corn, sugar cane, and pasturage, and when not seriously damaged by the boll weevil they produce heavy yields of cotton.





LEGEND

Memphis silt loam M	Genesee silt loam G
Smooth phase M	Lorington silt loam L
Wickburg fine sandy loam W	Huston sandy loam H
Wickburg silt loam V	Houston clay H
Wickburg silty clay loam V	Linton silt loam L
Collins silt loam C	Officer silt loam O
Collins silty clay loam C	Calhoun silt loam C
Waverly silt loam W	Susquehanna silt loam S

CONVENTIONAL SIGNS

(Printed in black)

CULTURE

(Printed in black)

Open Village, Roads, Buildings, Warehouses, Lighthouses, Piers, Lightships, Piers	Stock pens and corrals
Secondary roads and trails	Stations and electric lines
Railroad tracks	Railroad crossings
Stock pens, pens	R. R. crossings, tunnel
Fork dams	Schools or church conference
Moss or Quarry, Mine, Quarry, Mill, Dam	Blue Earth, sandstone, and conglomerate
Shed and covered ways	Soil bankhouse
Boundary lines	Boundary lines
Boundary lines	U.S. township and section lines

RELIEF

(Printed in brown or black)

Contours	Dykes, hills, mountains, peaks
Point, washed sand, dunes	Shore and low-water line, sandbar

DRAINAGE

(Printed in blue)

Streams	Lake, Bayou, intermittent streams
Intermittent streams	Spring, Canebrake and Discoloration
Salt marshes	Subsidence, tidal flats

The above signs are to be used in accordance with the manual of soil survey.

High R. Bennett, Inspector, Southern Division, Soils surveyed by A. E. Koster, in charge, and A. L. Goodwin.

[PUBLIC RESOLUTION—No. 9.]

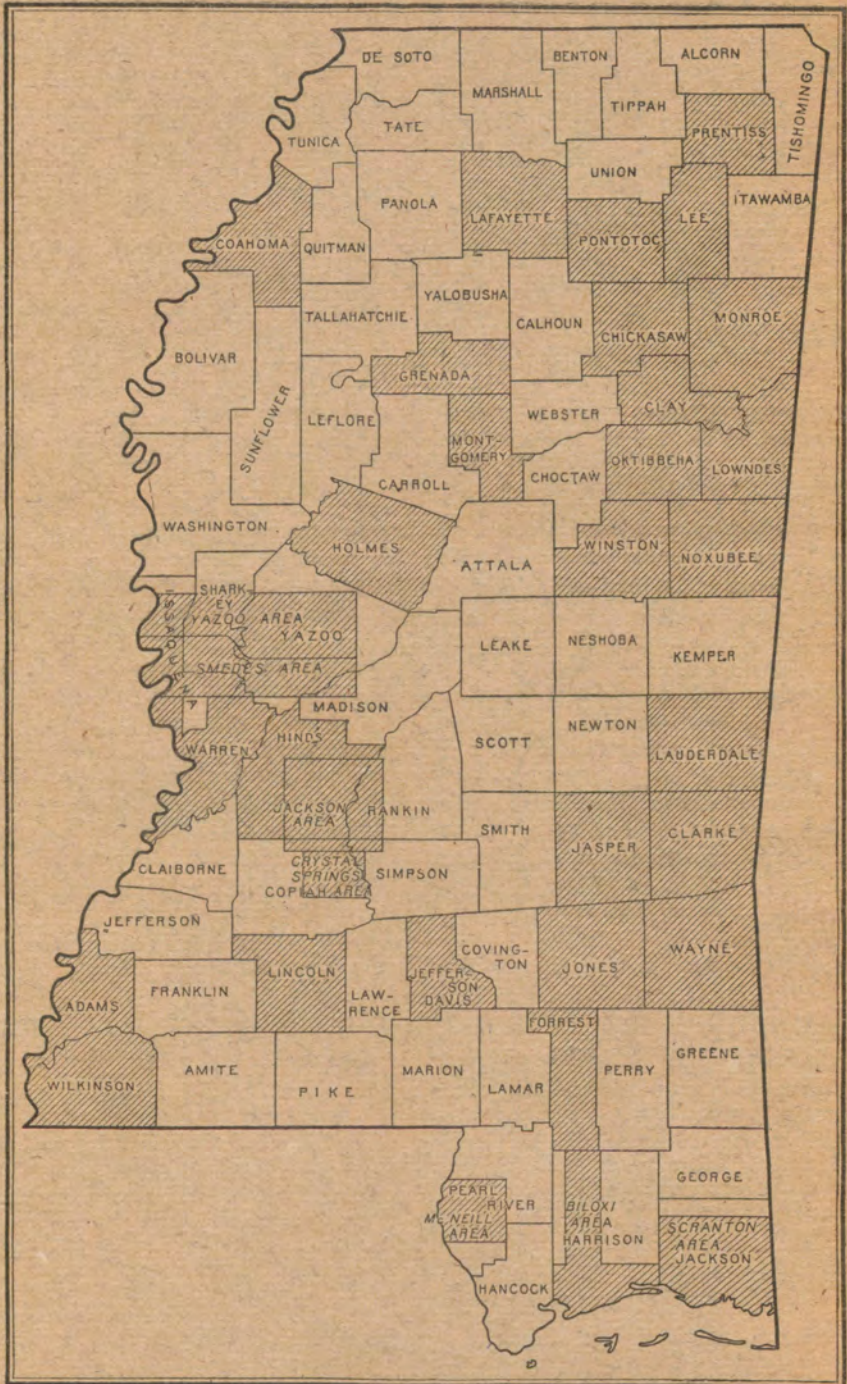
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

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 Mississippi.