

Issued November 7, 1908.

U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF SOILS—MILTON WHITNEY, Chief.

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# SOIL SURVEY OF PRENTISS COUNTY, MISSISSIPPI.

BY

W. J. GEIB AND C. W. MANN.

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[Advance Sheets—Field Operations of the Bureau of Soils, 1907.]



WASHINGTON:  
GOVERNMENT PRINTING OFFICE.

1908.

[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.]

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## LETTER OF TRANSMITTAL

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U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF SOILS,  
*Washington, D. C., July 17, 1908.*

SIR: In the extension of the soil survey in the State of Mississippi work was undertaken in Prentiss County, the selection being made because of urgent requests of citizens of the county, duly indorsed by Hon. E. S. Candler, Representative for the First Congressional district of Mississippi.

The accompanying report and map cover this survey, and are submitted for publication as advance sheets of Field Operations of the Bureau of Soils for 1907, as authorized by law.

Very respectfully,

MILTON WHITNEY,  
*Chief of Bureau.*

HON. JAMES WILSON,  
*Secretary of Agriculture.*

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### MAP.

Soil map, Prentiss County sheet, Mississippi.



# SOIL SURVEY OF PRENTISS COUNTY, MISSISSIPPI.

By W. J. GEIB and C. W. MANN.

## DESCRIPTION OF THE AREA.

Prentiss County lies in the northeastern corner of Mississippi and is bounded on the north by Alcorn County, which extends to the Tennessee State line, on the east by Tishomingo County, reaching

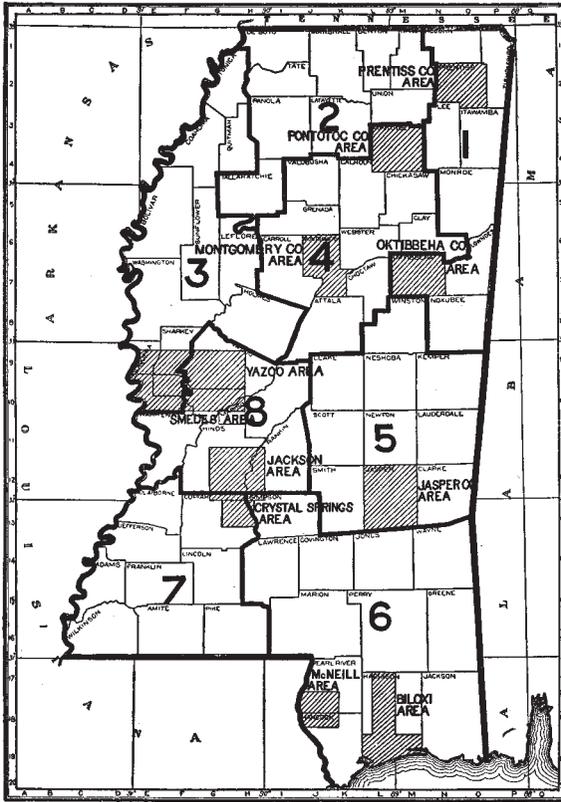


FIG. 1.—Sketch map showing location of the Prentiss County area, Mississippi.

to the Alabama State line, on the south by Itawamba and Lee counties, and on the west by Union and Tippah counties. The outlines of the county approximate a rectangle 20 miles from north to south by 23 miles from east to west. The county comprises an area of 265,792 acres, or about 415 square miles.

Early geological reports speak of this section of the State as the "Northeastern Prairie," but this term as applied to Prentiss County is very misleading, the prairie region not extending as far north as this. In topography the surface of the county varies from broken and hilly to rolling, with some gently rolling areas, and here and there a small stretch of level land. The roughest and most irregular section is found in the northeastern part of the county, where many of the slopes are too steep to be cultivated. From Tuscumbia Creek to the east county line and extending south to Mackys Creek the surface consists of a series of parallel ridges, extending from north to south or from northwest to southeast. These ridges vary in height from 20 to 50 feet. Except in the north part of this strip, the slopes can all be used for cultivated crops. The hills throughout this region are covered with a growth of shortleaf pine. Another range of hills, known as the "Tippah Hills," lies partly within the area, extending from a point 2 miles southwest of Geeville northward to where Dry Creek enters the county. Many of the slopes in this range are also too steep to be farmed. In the vicinity of Thrasher, Booneville, Wheeler, and Baldwyn there are small areas which are gently rolling. The remainder of the county varies from rolling to gently rolling, with occasional terraces and broad, level bottoms along the creeks. The highest point in Prentiss County is said to be at Booneville, where an elevation of 554 feet is attained. This is also the highest point on the Mobile and Ohio Railroad between Mobile, Ala., and Cairo, Ill.

A very distinct, though somewhat irregular, drainage divide crosses the county from east to west. It enters the area  $2\frac{1}{2}$  miles northwest of Blackland and extends northeast to the road which runs from Booneville to Dry Run, whence it turns southeast and continues in this direction to 1 mile southeast of Booneville. At this point it makes a sharp bend to the northeast and extends to the north county line, where it again turns southeast, leaving the county about 4 miles south of the northeast corner. The drainage of the extreme northeast corner is through Yellow Creek directly into the Tennessee River. The remainder of the county north of the divide drains its waters through Pollys, Boones, and Tuscumbia creeks into the Tuscumbia River. Dry Creek, in the extreme northwest corner, flows into Hatchie River, which joins with Tuscumbia River, emptying into the Mississippi. South of the divide the streams all flow in a southerly direction. Mackys Creek crosses the southeast corner of the area. Big Brown Creek rises  $1\frac{1}{2}$  miles from the north county line, about 4 miles from the northeast corner, flows almost due south, and leaves the county about 5 miles southeast of Marietta. It receives the waters of Hurricane and Little Brown creeks and after crossing the south line unites with Mackys Creek. Twenty-mile Creek crosses the

southwest corner of the survey from  $2\frac{1}{2}$  miles northwest of Geeville to Baldwyn and receives the waters of Wolf and Osborne creeks. After leaving the county Twenty-mile Creek flows into Mantachie Creek, which joins Mackys Creek to form the Tombigbee River, a stream flowing into the Gulf of Mexico through Mobile Bay. The current in none of these streams is sufficiently swift to be of use as a source of power.

Prentiss County was established from a part of Tishomingo County in 1870. The original surveys were made about 1834, and the first settlements took place between 1830 and 1840. At the time of organization the county had a population of 9,344, of which 1,754 were colored. In 1900 the population was 15,788. The early settlers came chiefly from the Carolinas, Georgia, Alabama, and Tennessee. Owing to the more favorable topography and better soil conditions, the west part of the county was settled first, and it is at present the most thickly settled section.

Booneville, with a population of 1,600, is the county seat and the chief business and distributing center between Corinth and Tupelo. It is situated near the center of the county and draws considerable trade from adjoining counties. Baldwyn, located 12 miles southwest of Booneville, on the south county line, has a population of 1,200 and is a prosperous town. Wheeler, Thrasher, Geeville, and Marietta are villages of less importance.

The Mobile and Ohio Railroad crosses the area from north to south and affords adequate transportation facilities for the business now conducted. It is a direct line from St. Louis to Mobile and New Orleans. The distance from Booneville to St. Louis is 335 miles, and from Booneville to Mobile is 308 miles.

The wagon roads throughout the county are usually in good condition during the summer and fall months, but during winter and spring it is almost impossible to travel over some of the roads traversing the clay areas. There is no road material in the area surveyed, but a very good grade in the form of chert can be obtained at Iuka, Miss., and shipped in at a moderate cost. The roads should be graded and crowned with gravel and chert.

Booneville is the chief market in the county for cotton and other farm produce. Baldwyn is a market of less importance. Some vegetables and a small quantity of fruit are shipped to points north and south, but the supply is very limited.

#### CLIMATE.

The climatic conditions prevailing in Prentiss County are those of a warm temperate zone. The average annual temperature is  $61.6^{\circ}$  F. The coldest months are December, January, and February.

with an average temperature of 43.6° F. Freezes and light snows occur frequently, though they are of short duration. The mean temperature during July and August is 80° F. The annual precipitation is 49.7 inches, which is fairly well distributed throughout the year, but January and February are generally considered the rainy months.

The following tables give the normal monthly and annual temperature and precipitation and the dates of the last and first killing frosts as reported by the Weather Bureau station at Booneville. The average date of the first killing frost in the fall is November 3, and of the last in the spring, April 1. This gives a growing season of two hundred and sixteen days for the tenderest vegetation. The mild climate, coupled with excellent drainage and a good supply of water, insures healthfulness. A few crops could be grown with profit during the winter months. A long grazing period for cattle is afforded, and much work in the way of clearing land, making compost manure, and plowing can be done even during the coldest months of the year.

*Normal monthly and annual temperature and precipitation.*

Month.	Booneville.		Month.	Booneville.	
	Temperature.	Precipitation.		Temperature.	Precipitation.
	°F.	In.		°F.	In.
January.....	41.7	4.75	August.....	79.5	2.93
February.....	43.8	5.57	September.....	73.8	2.80
March.....	51.8	6.96	October.....	63.2	2.15
April.....	60.0	4.38	November.....	52.0	4.15
May.....	70.0	2.91	December.....	45.5	4.02
June.....	77.8	4.22	Year.....	61.6	49.70
July.....	80.5	4.86			

*Dates of first and last killing frosts.*

Year.	Booneville.		Year.	Booneville.	
	Last in spring.	First in fall.		Last in spring.	First in fall.
1898.....	Apr. 6	Oct. 26	1903.....	Mar. 25	Oct. 25
1899.....	Apr. 9	Dec. 3	1904.....	Mar. 28	Oct. 23
1900.....	Mar. 31	Nov. 9	Average.....	Apr. 1	Nov. 3
1902.....		Oct. 29			

#### AGRICULTURE.

A careful study of the development of agriculture in Prentiss County reveals the fact that, while two crops, cotton and corn, have been grown almost exclusively, and while in general the old methods have been rigidly adhered to, slight changes in the crops grown and

in the methods practiced have been slowly making way, until at the present time the farmers are coming to realize the importance of diversified farming and of improved methods of culture. Prior to 1835 a few white settlers had taken up lands in the county, but not until after 1845 did active permanent settlement begin. The greater part of the county was covered with forests of shortleaf pine, oak, chestnut, and hickory. On the bottom lands were sweet gum, oak, and beech. By 1855 some large plantations were operated with slave labor, brought from eastern States. Cotton, corn, wheat, oats, rye, and barley were grown before the war. Live stock, including horses, mules, cattle, and sheep, was kept and sheep raising in particular was a profitable industry. In these early days cotton was hauled to Memphis, a week or more being required to make this trip of 100 miles.

The completion of the Mobile and Ohio Railroad in 1861 greatly facilitated the marketing of cotton and assisted in the development of this and other industries. With the exception of corn, very little grain has been produced since 1865.

According to the Twelfth Census, 29 per cent of the land in Prentiss County is improved, and in this is included the cleared land which is not under cultivation at the present time. Within the last decade considerable progress has been made in the agricultural methods practiced. In general, as stated, farm operations are directed to producing two crops—cotton and corn. The acreage of cotton probably exceeds that of corn, and with the majority of farmers cotton is the only money crop. No definite system of crop rotation is in use even among the most progressive farmers. By the liberal use of commercial fertilizers fair crops of cotton and corn are obtained on the same fields year after year. On the bottom soils fertilizer is seldom used because of the high natural productiveness of the land.

Plowing for cotton is commenced about April 1 and continues until the middle of May. After plowing to a depth of 3 to 5 inches with a small turning plow a spike-tooth harrow is used to level and reduce the surface. The land is then thrown into ridges with a double-moldboard plow, commonly called the middle breaker. The first operation of plowing may be entirely omitted, as is often the case. Fertilizer when used is dropped in the furrow made by the ridging or bedding process and is then covered by rebedding, which is done by running the middle breaker through the center of the old ridges. Before planting the ridges are smoothed with a top harrow or log. The one-horse cotton planter is used and is adjustable for different rates of seeding. From one-half bushel to 2 bushels of seed is planted to the acre; the best practice requires about one-half bushel. The crop receives from three to five cultivations, and farmers who are

most successful with the crop recommend even more frequent cultivation. The shovel plow is generally used for cultivating, though the two-horse cultivator has recently been introduced. Only the short-staple cotton is grown. A few attempts have been made to grow the long staple, but because of the smaller yields obtained it has not been found profitable, and, moreover, little distinction is made in the price in the local market. In the spring the old cotton stalks in the fields are mowed off with a revolving stalk breaker drawn by two horses and the stalks are plowed under. When the breaker is not used the stalks are sometimes burned.

Corn is planted on all the soils of the area. Plowing is usually begun from two to three weeks earlier than for cotton. A white dent strain and Tennessee Red Cob are the only varieties grown extensively. The entire crop is used for local consumption. The average yield is about 18 bushels per acre. In the fall, while still green, the leaves are gathered from the stalks and the ears are left to mature. Small bundles of the leaves are made and allowed to cure in the field, and after one or two days these are bound together into larger bundles and preserved as fodder. It is thought that the practice is somewhat injurious to the grain, especially when the leaves are stripped before the grain has fully ripened. As a rule no care is taken to select improved seed. The yields are frequently low, but if attention is directed to improving the soil by rotation of crops and to more thorough cultivation the yields may be increased considerably.

In general, plowing should be deeper than practiced at present, especially with the heavier soils. To accomplish this the land should be plowed a little deeper each year until a depth of 7 or 8 inches is reached. Organic matter may be supplied by adding stable manure or by turning under green crops. The following three-year rotation is advocated by Director W. L. Hutchinson, of the Mississippi Experiment Station: First year, cotton; second year, corn, with cowpeas planted between the rows at the last cultivation; third year, oats or wheat, and cowpeas after the grain has been removed, followed with cotton again the fourth year. Ridged cultivation is practiced to advantage only where the land is poorly drained and subject to overflow or on the steeper slopes to prevent erosion.

No wheat is grown. Oats are grown to some extent, and are either pastured or cut and cured for hay. The crop is seldom thrashed for the grain. Cowpea vines and sorghum are also grown for hay. It is not uncommon for farmers to buy baled hay in Booneville or Baldwin for winter feed.

On some of the hillsides erosion has damaged the land to a considerable extent. Erosion could be held in check by contour cultivation and terracing. The washed places could be reclaimed by filling the deepest parts with brush, covering, and sowing a fast-growing

crop. On the lime lands melilotus grows very well, while on all of the soils lespedeza will thrive. If the soil is kept mellow enough to take up a large amount of water and if a good root system is developed there will be little danger from erosion.

Enough swine and poultry are kept in the county to supply the home demand. In the aggregate a considerable amount of stock is kept, consisting of horses, mules, cattle, hogs, sheep, and goats. There are no dairy farms in the area, and the milch cows are ordinary grades. Formerly a few Devons were kept as oxen, but in late years the work animals have been drawn from the cattle of mixed blood. The butter and milk produced, though not of high quality, supply the local demand. For the greater part of the year stock does well on the natural vegetation to be had on the range, and as a rule the cattle are allowed to find their own living during the winter. The development of the cattle industry in Prentiss County requires the introduction of some thoroughbred stock to raise gradually the standard of the native cattle. Permanent improvement would also depend on the care and attention given to providing pasture and winter feed. It is believed that more extensive stock raising would be practicable and profitable. Bermuda grass, lespedeza, vetch, and other forage plants are available for pasture. There is no doubt that alfalfa can be grown on the Houston clay, and it will probably prove profitable on the Oktibbeha clay and Guin fine sandy loam.

The growing of early vegetables commercially is engaged in around Booneville. The first strawberries are on the market by the 1st of April and English peas are marketed the last of April, while tomatoes are ready for shipment early in June. This is only about three weeks later than the early vegetables shipped from the Gulf counties of this State. The St. Louis market is reached in twelve hours by express, and other markets within easy reach are Louisville, Cincinnati, and Memphis. Some shipping is also done to New Orleans.

Fruit has never been an important crop in Prentiss County. The Guin fine sandy loam is recognized as being well adapted to the production of peaches. The relatively high altitude of the region, the climatic conditions, and the presence of large bodies of soil adapted to the crop are favorable to an extension of the peach industry. Grapes have been grown to a limited extent. The Concord, Niagara, Hartford, and other varieties yield well and are profitable for shipment. Pears are also successfully grown and yield well.

Day labor of all kinds is scarce. When labor is hired by the day the average wage is 75 cents for ten hours' work. Ordinary farm labor is usually employed to work through the season or, in the local phraseology, "to make the crop." Under these conditions \$20 per month is usually paid, with board in addition. Owing to the greater

need for help at cotton-picking time the demand for labor is especially active at that season. The wage paid for picking varies from 50 cents to \$1 a hundred pounds.

According to the report of the Twelfth Census, about 57 per cent of the farms of the county are operated by tenants. It is usual to rent on shares rather than to pay a stated money rental. Two systems of share renting are practiced. If the owner of the land furnishes the necessary tools and work animals and one-half the fertilizer, he receives one-half of the crop, both cotton and corn. The more general practice, however, is to follow the "rent system," in which the tenant provides his own tools and stock and pays the landowner one-third of the corn and one-fourth of the cotton.

The average size of farms in Prentiss County is given by the Twelfth Census as 85.8 acres. The figures are somewhat misleading, as each tenancy was classed as a farm. The actual size of landholdings varies from 40 to 1,000 acres or more, with a probable average of 160 acres. Some large tracts of land are held as timber reserves.

The value of farm lands has increased rapidly during the last few years. At present uncleared land, which is desirable for farming purposes, is valued at \$5 to \$30 an acre. Some of the roughest land can be bought for \$2 an acre. The highest priced lands are found along the streams in the western and southern parts of the county. Large areas of this land are still uncleared, but have a high prospective value. The bottom lands are valued at \$15 to \$75 an acre. The value of land in some parts of the area is influenced by the fact that artesian water can be obtained. It is reached at about 300 feet in the vicinity of Wheeler and somewhat deeper farther south. The surface wells furnish a permanent supply of fairly good water.

During the last six years the farmers of this county have experienced a period of unusual prosperity. Improved conditions are evidenced by the number of substantial houses which are gradually taking the place of the former log houses. The farm buildings in general, however, are inexpensive. Improved farm implements are steadily coming into more general use. A stock law is in force over a part of the county, so that many of the farms are fenced. The fences are constructed of barbed wire or of rails.

From \$30,000 to \$40,000 is expended annually for commercial fertilizers. The growing of clover, cowpeas, and alfalfa, as well as other forage crops, to improve the soil and to provide additional feed for stock is strongly recommended. Among the chief sources of improvement in the agriculture of the area would be the practice of deeper plowing and, in general, level cultivation for cotton and corn, the growing of more forage crops, and the gradual improvement of the live stock. The opportunity for the development of a valuable peach and grape growing industry seems to exist, and truck

farming may also be encouraged, as this will undoubtedly be very successful and add materially to the income of the county.

#### SOILS.

Within the area surveyed there are several geological formations from each of which soils having distinct characteristics have been derived. The area lies just within the northern limits of the Gulf Coastal Plain, which is an extension of the Atlantic Coastal Plain. The surface of this entire region was at one time completely covered with sedimentary material of the Lafayette formation, which consists of beds of sand, gravel, and clay. Throughout the eastern and northern parts of the county this mantle reaches to considerable depth and the erosion, although extensive in some places, has not cut through to the underlying formation. In the western part of the county, however, where this mantle was thin, it has been entirely eroded away in places, leaving exposed the underlying material. Early geological reports speak of this region as lying within the "Northeastern Prairie," and refer to the formation as Selma chalk. While the entire region is doubtless underlain by the Selma chalk, it outcrops only in a few places, the entire area exposed being 14 square miles.

The Lafayette formation gives rise to three soil series which, although closely related, have peculiar characteristics distinguishing them. The Guin and Oktibbeha series, which cover by far the greater proportion of the present survey, have distinctly brownish-red subsoils and are represented by the Guin fine sandy loam and the Oktibbeha clay. The Norfolk series, characterized by a yellow subsoil, is represented by the Norfolk loam. These three series are found closely associated throughout the Atlantic and Gulf coastal plains.

The formation underlying the Lafayette is the Selma chalk and consists of beds of marl, rotten limestone, and chalky material. This material is of Cretaceous age and was laid down as a marine deposit at an earlier time than the Lafayette. It is filled with numerous shells of various sizes and shapes. This formation, which is exposed only in the western part of the county, gives rise to the Houston series of soils and is represented by the Houston clay. The soils of this series have a characteristic black color and occupy the "black prairies" of Alabama, Mississippi, and Texas.

Another group of soils found within the area consists of material which has been derived from various geological formations reworked and redeposited as bottom lands along the streams. They have been included in the Ocklocknee series. This series consists of yellow-brown to gray surface soils with brownish-gray or yellowish subsoils.

Along the smaller streams the soil is lighter both in texture and color and has been classed as the Ocklocknee loam. In the western half of the county the soil has been influenced more or less by the Selma chalk formation. Where there has been much wash from the chalk the soil has turned darker and the amount of humus has increased, giving to local areas some of the characteristics of the Wabash series. The bottom soils in this part of the county have been mapped as the Ocklocknee clay loam.

The following table gives the names and areas of the several soil types shown in the accompanying map:

*Areas of different soils.*

Soil.	Acres.	Percent.	Soil.	Acres.	Percent.
Guin fine sandy loam.....	176,192	66.3	Ocklocknee clay loam .....	13,632	5.1
Ocklocknee loam.....	38,144	14.4	Houston clay.....	5,632	2.1
Oktibbeha clay .....	17,344	6.5	Total .....	265,792	.....
Norfolk loam .....	14,848	5.6			

GUIN FINE SANDY LOAM.

The surface soil of the Guin fine sandy loam, locally called "gray land," consists of a gray or light-brown fine to very fine sandy loam containing a high percentage of silt and extending to an average depth of 10 inches, though it may vary in different localities from 6 to 14 inches in depth. The subsoil consists of a brownish-red clay loam which contains a varying quantity of fine sand. In local areas the color may range from a yellowish red to a deep red. The predominating color, however, is a brownish red. The subsoil of this type has a smaller quantity of sand present than is usually found in the Guin soils. The areas containing the largest percentage of sand in the subsoil are confined to the rough, hilly sections, while the rolling areas have a comparatively stiff subsoil. Iron concretions are sometimes found upon the surface over the roughest parts of this soil, though their occurrence is limited. While variations occur over areas of limited extent, the soil as a whole may be considered very uniform. Owing to the sandy nature of the soil and the heavy character of the subsoil, the type is easy to cultivate and at the same time retentive of moisture.

The Guin fine sandy loam is by far the most extensive soil, occupying about 66 per cent of the county. With the exception of the bottom lands along the streams and a few terraces of Norfolk loam, it occupies practically all of the survey east of the Mobile and Ohio Railroad. There is also a large area in the northwest corner of the county and a narrow strip extending along the west end.

The surface varies from rolling to broken and hilly. There are a few areas that are nearly level or gently rolling, but these are of limited

extent. The roughest part is found in the northeast corner of the county, where many of the slopes are too steep to be cultivated. Going south from this region, the surface is not so broken, but still consists of series of low hills and ridges upon which some of the slopes would be difficult to till. Proceeding westward, the surface is only rolling, with frequent gently rolling areas, and practically all of the slopes can be cultivated. Throughout the roughest sections there are small areas of nearly level land which are very productive. The narrow strip of this soil that extends along the west border of the county is also very rough and broken. This is a part of a range known as the Tippah Hills, which form a part of the Pontotoc Ridge.

On account of the sandy nature of the soil and the uneven topography the natural drainage is excellent. The steep slopes, and often the more gentle slopes, are subject to erosion, and in some places the land has been greatly damaged from this cause.

The Guin fine sandy loam is derived from the materials of the Lafayette formation, which covers the greater part of the county. Throughout the eastern half this extends to considerable depths, but in the western part the covering is thin, the underlying material outcropping along many of the streams and on hillsides. The proximity of the underlying beds of marl and Selma chalk to the surface has influenced the Lafayette material so that the soil as found here is somewhat different from similar soils in other areas.

The original timber growth consisted of oak and shortleaf pine. The hills and ridges throughout the eastern part of the survey are still covered with this timber, though the stand is thin. Where pine has been removed and the land left idle a growth of post and black-jack oak has come up. When old fields are abandoned a thick growth of pines soon appears. The growth is rapid, and some of the timber is now being cut for lumber.

Cotton and corn are the chief crops grown, and the yields vary considerably, depending upon the topography and the methods of culture. Throughout the eastern part of the county, in the rough, hilly sections the yields are low, corn ranging from 8 to 16 bushels and cotton from one-fifth to one-half bale per acre. In the western part, under more favorable conditions, corn yields from 15 to 25 bushels and cotton from one-third to three-fourths bale per acre. For the whole type corn will average about 15 bushels and cotton one-third bale per acre. Oats are grown to a small extent; but as they are not thrashed, no yields can be given.

While cotton and corn are the chief products, this soil is adapted to a wider range of crops. The only hay produced is from the wild grasses. Lespedeza or oats and peas will make good hay and should be grown extensively. One thrifty patch of alfalfa was seen, and it is probable that this legume under judicious management could be

profitably grown on this kind of soil. It would be necessary first to bring the soil to a higher state of cultivation. Oats should be grown more as a feed for stock, and a systematic crop rotation should be followed. Garden peas, tomatoes, and strawberries do very well, and on the gently rolling areas the trucking industry could be developed. Strawberries often ripen as early as the last week in March. Peaches and grapes are grown on a small scale and seem to do very well. On the higher elevations in the vicinity of Booneville and in the extreme western section of the county the conditions seem to be the most favorable for the growing of peaches, grapes, and other fruits, for in these sections the danger of erratic frosts is less than elsewhere. One small orchard at Booneville produced nine crops in eleven years. Where the conditions are the most favorable the industry could be profitably extended.

A very small quantity of tobacco is grown upon this soil for home use. In some other sections of the South this same soil produces a fine quality of wrapper leaf tobacco, and it is probable that this industry could be built up within Prentiss County. Before undertaking it on a commercial scale, however, some experiments should be conducted to be sure that the climatic conditions are favorable and that the tobacco would be of good quality.

Commercial fertilizers are used extensively on this soil, though not judiciously. The fertilizers now in use contain enough phosphoric acid and potash, but the quantity of nitrogen is not sufficient to supply the needs of the plants. Fertilizers containing a higher percentage of nitrogen should be used and green manuring should also be practiced, as much organic matter can in this way be added to the soil and its nitrogen content and physical condition greatly improved.

The methods of cultivation should also be improved. Contour cultivation and terracing should be practiced to a greater extent, to keep the land from washing in the hilly sections. Level cultivation should be followed, for by this method more moisture can be conserved than where the fields are ridged.

Land of this type ranges in value from \$2 to \$20 an acre, depending on topography and location.

Below are given the average results of mechanical analyses of typical samples of this soil:

*Mechanical analyses of Guin fine sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
16864, 16872.....	Soil .....	0.2	2.0	3.0	23.1	4.9	58.7	7.6
16865, 16871, 16873.	Subsoil.....	.1	1.2	2.0	24.4	3.7	49.5	18.8

## OKTIBBEHA CLAY.

The surface soil of the Oktibbeha clay consists of a heavy brown loam or silty loam extending to a depth of 4 to 8 inches. A covering of 1 to 3 inches of fine sandy loam is frequently encountered. The subsoil is composed usually of red or reddish-brown heavy silty clay, which frequently contains varying quantities of fine and very fine sand, and at a depth of 24 to 36 inches along the borders of the Houston clay a gray waxy clay is sometimes found. There is a smaller percentage of sand in the subsoil of this type than is usually found in the Oktibbeha subsoils. The heaviest phases are more difficult to cultivate than the other types in the county, but under careful management little trouble is experienced in preparing the fields for a crop.

The most extensive area of the Oktibbeha clay is found immediately south of Geeville, extending to the south county line. Another broken area is found about Blackland, reaching to the northeast. Other smaller detached patches occur throughout the western part of the county. The surface varies from gently rolling to rolling, and the natural drainage is good. The soil is very compact and retentive of moisture, so that in small, level or depressed areas tile drains would be beneficial. The Oktibbeha clay is derived from materials of the Lafayette formation. Throughout the west half of the county the formation is thin and often entirely lacking. Here the Oktibbeha clay has become mixed with the underlying material to a considerable extent, which is the cause of its departure from type. The subsoil is stiffer and lighter in color than it should be.

Corn and cotton are grown exclusively. Corn yields from 10 to 25 bushels and cotton from one-third to three-fourths bale per acre. A greater variety of crops should be grown upon this soil and a systematic crop rotation, including, among other crops, oats, clover, and alfalfa, should be followed. Commercial fertilizers are in common use, but little attention is paid to their peculiar fitness for the crops or condition of the soil. Fertilizers of high nitrogen content would doubtless give better results. Green manuring crops should be introduced to supply organic matter and to improve the physical condition of the soil. Cowpeas are excellent for this purpose. Vetch and velvet beans are also good restorative crops. Deeper plowing and level and more thorough cultivation should be practiced. This will improve the physical condition of the soil and insure larger yields.

The original timber growth consists chiefly of oak and hickory, with now and then a little pine. Farms on this soil range in value from \$15 to \$25 an acre.

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

*Mechanical analyses of Oktibbeha clay.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
16866.....	Soil .....	0.1	1.9	1.2	7.9	10.2	55.1	23.8
16867.....	Subsoil.....	.0	.6	.5	1.4	10.0	50.7	36.5

## OCKLOCKNEE CLAY LOAM.

The surface soil of the Ocklocknee clay loam consists of a brown or dark-brown clay loam or silt loam extending to an average depth of 10 inches, though the depth varies from 8 to 18 inches. There is present in the surface soil a considerable percentage of organic matter, which accounts, in part at least, for the dark color and the loamy characteristics. Where the type borders the Guin fine sandy loam, as is frequently the case, the two soils are more or less intermingled, and the surface of the Ocklocknee clay loam contains a larger proportion of fine sand. Such areas, however, are not of sufficient size to be indicated on the soil map. The subsoil consists of a brownish, drab, or gray clay loam or silty clay loam, extending to a depth of 36 inches or more. Beds of sand may be encountered at 3 feet, but this is infrequent. This soil is more difficult to handle than the sandy types of the area, and trouble is often experienced in securing a good seed bed. To get the best results, after the field has been plowed it should be allowed to remain so for a short time before harrowing begins; the clods seem to pulverize better than immediately after plowing.

The Ocklocknee clay loam is confined to the west half of the county south of the divide and occurs as first bottom land along practically all of the streams in this region. The most extensive development is along Twenty-mile Creek, from a short distance above Wheeler south to the county line. The width here varies from one-half mile to 1 mile. The "heavy bottom," as it is commonly called, also extends along Wolf, Little Wolf, and Osborne creeks.

The surface is level or gently undulating, and on account of the heavy nature of the soil the natural drainage is poor. Some portions of the bottoms are flooded each year, and the crops are sometimes damaged, but near the headwaters of the creeks and along the smaller branches there is little danger from floods. About half of the type is cleared and under cultivation. Through these cleared areas large open ditches have been constructed to assist in carrying off the surface water. More of the land is being cleared each year, and by the time it is all under cultivation and large ditches established there will be much less damage from floods, as the water can then be carried off rapidly. The creeks and ditches should be kept free from débris during the entire year.

The Ocklocknee clay loam is an alluvial soil, having been carried down and deposited by the streams. The material of which it is composed comes largely from the beds of marl, rotten limestone, and chalky material which underlie the entire county and which are exposed in the western part. A portion of the material also comes from the Lafayette formation.

As on the other soils of the area, cotton and corn are the chief crops. Cotton yields from one-third bale to 1 bale and corn from 20 to 50 bushels per acre. This is without doubt the best corn soil in the area, and with improved methods much larger yields could be secured. While cotton yields fairly well, the soil is not so well adapted to this staple as to corn. It does not mature as early as on the higher land, and it is apt to grow very large stalks and to fruit sparingly. Red clover produces a rank growth, but may lodge badly before it can be cut. Alfalfa is being tried on a small scale where there is no danger of overflow, but it is not likely that this venture will meet with great success, as the water table is too close to the surface. In unusually dry seasons a fair crop might be secured. Alfalfa is better adapted to higher land.

The methods of cultivation followed fall short of meeting the needs of the soil. The "middle breaker," which is now commonly used for "bedding," leaves a series of ridges from 10 to 12 inches high. A light harrow is used to pulverize the soil after the middle breaker, and when the field is ready to plant the ridges are still very prominent. The seed is planted on the top of the ridges. It is believed that level cultivation and a more thorough preparation of the soil would increase the yields and also improve the physical condition of the soil. Commercial fertilizers are not used on this type and are not considered necessary, since the soil in itself is very rich. A greater variety of crops should be grown and a systematic rotation followed. Hay would be a profitable crop. Timothy sown with clover would doubtless make a good stand. Tile drains could be installed in many places, and there is no doubt that these would greatly increase the value of the land.

The value of this soil is constantly increasing. The best farms made up of bottom land entirely are worth from \$40 to \$75 an acre. Where the land is timbered it can be bought for \$15 to \$30 an acre, depending on the character of the timber.

The table below gives the results of mechanical analyses of this soil:

*Mechanical analyses of Ocklocknee clay loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
16876.....	Soil .....	0.2	1.3	0.9	4.3	1.9	68.2	22.8
16877.....	Subsoil.....	.1	1.5	.9	5.5	8.2	53.3	30.0

## OCKLOCKNEE LOAM.

The surface soil of the Ocklocknee loam consists of a light-brown or grayish fine sandy loam or loam extending to a depth of 8 to 16 inches. In local areas there is sufficient silt present to impart the characteristics of a silt loam. The subsoil consists of a yellowish or drab heavy loam or silty loam to a depth of 36 inches. Sometimes lenses of sand are found, and a bed of sand may be encountered at 24 to 36 inches below the surface. These variations, however, are of too limited extent to be mapped separately. This soil is easy to cultivate and a fine mellow seed bed can be secured with comparatively little labor.

The Ocklocknee loam is confined to the bottoms along the streams of the eastern and northern parts of the county. The bottoms vary in width from one-eighth mile to 1 mile. Along the south county line, where Big Brown and Mackys creeks cross into the adjoining county, the bottom has a width of  $4\frac{1}{2}$  miles. Broad bottoms occur along Big Brown, Mackys, Little Brown, Tuscumbia, and Pollys creeks.

The surface is level or slightly undulating. The bottoms are subject to overflow, and crops are frequently damaged from this source. There is a smaller percentage of this soil cleared than of any other in the area, and some of the timber remaining is of considerable value. The chief growth is white oak, beech, and gum. The construction of large open ditches through the cleared portions greatly assists in carrying off the surface water. As more of the land is cleared and more open ditches constructed, there will be less danger from the floods. The danger could be greatly reduced by keeping the creeks and ditches free from débris. It is not uncommon to see fallen trees lying in the streams. About these driftwood will accumulate and retard the flow, this being sufficient sometimes to change the course of the stream.

The Ocklocknee loam is an alluvial soil, derived from material washed from the Lafayette formation, which, being of a sandy nature, has given the light texture of this soil. It is commonly spoken of as "sandy bottoms" to distinguish it from the heavy bottoms in the western part of the county.

On this soil corn yields from 15 to 35 bushels and cotton from one-third to three-fourths bale per acre. No attention is given to seeding grasses for hay, but the wild grasses are sometimes cut. Grasses should be grown upon this soil on a commercial scale, for the price of hay in this region is high, and the industry would be profitable. Commercial fertilizers are not commonly used, but where they have been tried good results have been obtained.

Bottom lands composed of this type of soil range in value from \$5 to \$20 an acre.

The table below gives the average results of mechanical analyses of samples of this soil:

*Mechanical analyses of Ocklocknee loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
16880,16882 .....	Soil .....	0.2	2.1	2.6	14.3	7.4	64.6	8.3
16881,16883 .....	Subsoil.....	.2	.7	3.3	28.4	9.3	44.6	13.2

#### HOUSTON CLAY.

The surface soil of the Houston clay, where typically developed, consists of a dark-brown or black heavy loam or clay extending to a depth of 4 to 8 inches. The subsoil is a drab, gray, or whitish waxy clay, which grades at from 24 to 36 inches into beds of marl or chalky material. Large numbers of shells of various sizes and shapes are scattered through the subsoil. If cultivated under the proper moisture conditions little difficulty is experienced in preparing a seed bed, but when wet the soil becomes very sticky and troublesome to handle. In winter the roads through this type are very bad; the mud adheres to the wheels of vehicles, making progress very difficult. This region is commonly spoken of as "black land." Over a large part of it the surface soil has been eroded, leaving exposed the whitish subsoil.

The Houston clay is confined entirely to the west half of the county. The largest area begins immediately west of Booneville and extends from 5 to 6 miles in a northwest direction. Other areas of smaller extent are found throughout the western part of the survey. The surface is rolling and the natural drainage is good. The soil is very compact and very retentive of moisture, so that crops seldom suffer from drought. The Houston clay is derived from the Selma chalk, which is of Cretaceous age. The original growth consisted chiefly of red oak, white oak, and hickory.

Cotton and corn are the only crops grown, although the type is adapted to small grains, clover, and alfalfa. Only a small part of the soil is under cultivation. Some fields have been abandoned on account of erosion. Corn yields an average of 22 bushels and cotton one-half bale per acre. By careful management these yields should be greatly increased.

The possibilities of this type are not realized at the present time and therefore no effort is being made to improve the soil or reclaim the eroded places. These "galls" can be reclaimed and made productive fields. If the eroded places are deep, brush should be thrown in and covered to level the surface. Melilotus will grow readily on these "gall spots" without attention. It should be seeded, how-

ever, so as to be sure the entire surface is covered. Lespedeza will also grow readily and may be used in the process of reclamation. Either of these can be cut for hay or plowed under, when the surface should again be seeded. This will add organic matter to the soil and improve its physical condition so that in a few years other crops may be planted.

As the Houston clay is one of the strongest alfalfa soils in the South, the type found within this area should be devoted to the production of this lucrative crop. It should be seeded in the spring upon a well-prepared, fertile field, without a nurse crop. At least four cuttings can be secured in this latitude, and a yield of 4 tons per acre obtained. Hay is now selling for \$20 a ton, which would make the gross receipts from 1 acre \$80. Alfalfa can be produced with much less labor than cotton; hence it will be seen that it is far more profitable. Clover could also be grown to advantage upon this soil. Farms composed of the Houston clay range in value from \$5 to \$25 an acre. If alfalfa is once established this soil will be worth easily \$100 an acre.

The table below gives the results of mechanical analyses of typical samples of this soil:

*Mechanical analyses of Houston clay.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
16856.....	Soil.....	0.3	1.0	0.5	14.6	12.9	46.1	23.9
16857.....	Subsoil.....	.7	1.8	.7	15.5	17.9	38.5	24.9

NORFOLK LOAM.

The surface soil of the Norfolk loam consists of a brown or light-brown silty loam containing a high percentage of fine sand. Frequently the fine sand predominates, when the soil has the characteristics of a fine sandy loam. The average depth is 12 inches, though it may vary from 8 to 14 inches. The subsoil to a depth of 36 inches consists of a heavy yellow loam which frequently contains a quantity of fine sand sufficient to give a marked textural peculiarity. In a few low and depressed areas the subsoil is drab or mottled in color, due to the poor drainage condition. There are a few local areas in which the subsoil is reddish-yellow, especially where the type borders the Guin fine sandy loam or the Oktibbeha clay. On account of the relatively large proportion of fine sand in the soil this type is easy to cultivate, while the comparative heavy nature of the subsoil makes it retentive of moisture.

The Norfolk loam occurs only as a terrace soil and is commonly spoken of as "second bottom" or "bench land." It is found along

nearly all of the streams bordering the bottom soils, though the areas are not continuous throughout the course of the streams. An area about 6 miles long by one-half mile wide occurs along the north side of Pollys Creek. Another area lies in the immediate vicinity of Thrasher and extends along Tuscumbia Creek for a considerable distance. More of the same soil is found along Big Brown, Hurricane, and Mackys creeks and also in the vicinity of Baldwyn and Wheeler.

The surface is level or gently rolling and there is frequently a gentle slope toward the stream. The natural drainage is good except in a few depressed areas where tile drains would be beneficial. The soil is derived from the Lafayette formation, portions of which have at some time doubtless been reworked and redeposited by the streams.

Cotton and corn are grown almost exclusively, although the soil is adapted to a much greater variety of crops. It is a fairly good general farming soil. Cotton yields from one-third to three-fourths bale, the average being one-half bale per acre. Corn yields from 20 to 35 bushels per acre. Oats are sometimes grown but never thrashed, so no yields can be given. Tomatoes, peas, and berries do very well. It is a good trucking soil, though not as early as soils of lighter texture. No cultivated grasses are grown at present, but they should be introduced. Red clover could be grown successfully, and on the best drained and richest places it is probable that alfalfa would also be profitable.

The greater part of this type is cleared, and there is a greater percentage of this soil under cultivation than of any other in the country. Commercial fertilizers are used. Green manuring should be practiced, and cowpeas are excellent for this purpose. Level instead of ridged cultivation should be followed, and a systematic crop rotation would be found profitable. As compared with the Guin fine sandy loam the Norfolk loam is the more desirable soil, since, with its more even topography, freedom from erosion, and its water-holding capacity, it can be more readily improved.

Farms containing this character of soil range in value from \$15 to \$30 an acre.

The table below gives the results of mechanical analyses of samples of the soil and subsoil of this type.

*Mechanical analyses of Norfolk loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
16862.....	Soil .....	0.2	2.0	5.4	26.4	7.9	49.5	7.8
16863.....	Subsoil.....	.1	1.4	3.0	17.3	5.2	52.4	19.7

## SUMMARY.

Prentiss County lies in the northeastern part of Mississippi. The surface varies from rough and hilly in the eastern part to rolling in the western part, with here and there gently rolling areas and broad level bottoms along the creeks. Booneville, the county seat, is about 90 miles southeast of Memphis, 335 miles south of St. Louis, and 308 miles north of Mobile.

Prentiss County was organized in 1870 but settlement took place between 1830 and 1840. Cotton and corn have always been the chief crops, though before the war wheat, barley, and rye were grown to some extent. Oats are grown for pasture or hay, but are seldom thrashed. The wild grasses, peavines, and sorghum are also used for hay. No definite crop rotation is followed. The "dixie" plow is still largely used, though improved farm machinery is being steadily introduced. Old methods of cultivation which heretofore have been rigidly adhered to are slowly giving way to improved methods. The large turning plow and the middle-breaker are frequently seen. Commercial fertilizers are extensively used. Considerable live stock is kept but it is of inferior grade.

A few peaches and grapes are raised and truck farming is engaged in to some extent. Both these industries give promise of profitable development.

The value of farm lands is rapidly increasing, though much of the land is still comparatively cheap, considering its agricultural value. It ranges in price from \$5 to \$75 an acre depending on location, topography, and the character of the soil.

There are five series of soils represented in the present survey, but as these are more or less intermingled the soils are not as typical as in some other localities. The Lafayette formation is by far the most extensive, giving rise to the Guin, Oktibbeha, and Norfolk series. The Selma chalk, which underlies the entire area and which is exposed in the western part, gives rise to the Houston soils. The Ocklocknee series represents two distinct classes of bottom land, both of which are developed in this area.

The Guin fine sandy loam is the most extensive soil type, occupying 66.3 per cent of the entire area. Its surface varies from rough and broken in the east to rolling farther west, with here and there gently rolling areas. Only a comparatively small percentage of the type is under cultivation. Cotton and corn are the chief crops grown at present, though it is also adapted to oats, cowpeas, clover, and probably alfalfa. It is a good trucking soil and peaches and grapes also do very well. Level cultivation, green manuring, and more thorough tillage are recommended for its improvement.

The Oktibbeha clay is a heavier soil than the same soil in other areas. It is difficult to cultivate and the yields obtained are not what they should be for this type. The judicious use of commercial fertilizers should be supplemented by green manuring. In addition to cotton and corn the soil is adapted to oats, clover, and cowpeas, and it is probable that alfalfa could be grown.

The Ocklocknee clay loam occupies the broad bottoms along the creeks in the western part of the area and is the strongest and richest soil in Prentiss County. It is dark in color and rich in organic matter. Though rather difficult to cultivate, it gives excellent results. It is a fine corn soil and produces good cotton, though it is not as early as the higher land.

The Ocklocknee loam occupies the bottoms along the streams in the eastern and northern parts of the area. It is lighter in color and less productive than the Ocklocknee clay loam. The greater part of the soil is timbered. Where cleared and ditched good crops of corn and cotton are obtained. More hay should be grown upon this soil. It is subject to overflow.

The Houston clay has been so badly eroded that there is little of the surface soil left. An effort should be made to reclaim this soil by growing melilotus or lespedeza, for when the soil is intact it is very well adapted to alfalfa. As soon as reclaimed it should be seeded to alfalfa. Red clover will also do very well.

The Norfolk loam occupies the terraces which lie adjacent to the bottoms and is commonly spoken of as "second bottom" or "bench land." It is a good general farming soil and also fairly well adapted to truck crops. Cotton and corn are the chief crops at present. Oats, cowpeas, and clover should also be grown. The surface is gently rolling or level. The soil is easy to cultivate and capable of being highly developed.

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