

# SOIL SURVEY OF THE JACKSON AREA, MISSISSIPPI.

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## LOCATION AND BOUNDARIES OF THE AREA.

The area covered by the present survey includes parts of Hinds, Rankin, Simpson, and Copiah counties, or the southern two-thirds of

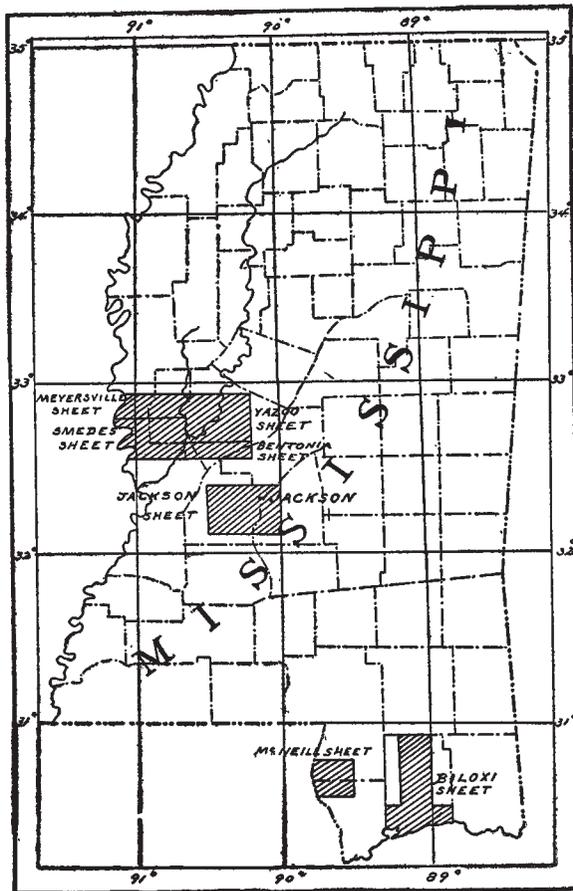


FIG. 13.—Sketch map showing location of the Jackson area, Mississippi.

the Jackson quadrangle, United States Geological Survey. The area is a parallelogram, approximately 30 miles wide from east to west and 24 miles from north to south, and comprises 737 square miles. The

Pearl River crosses the area from north to south, dividing it into two unequal parts, of which the western is the larger.

Jackson, the capital of Mississippi, lies about 3 miles from the northern boundary. It has a population of 7,816, and is the largest town in the area. The other principal towns are Raymond, Terry, Clinton, and Florence, each of which has less than 500 inhabitants.

#### HISTORY OF SETTLEMENT AND AGRICULTURAL DEVELOPMENT.

Although white settlers had lived within the Jackson area for some time prior to 1820, it was not until after that year that permanent settlement and development really began. In 1821 the site for the capital was selected, and settlers came in from the older communities along the Mississippi River, and also from Kentucky, Tennessee, and the older States to the east.

From the first cotton was the money crop of the region. Grown on large plantations, it became the principal resource of the State, and the labor knew nothing of the cultivation of any other crops except such as were grown for home consumption.

During the civil war agriculture was brought almost to a standstill. The hardships of this struggle fell with great force upon the Jackson area, for in the two attempts to reduce Vicksburg various battles were fought in this region, attended with the usual destruction of property by the troops of both sides. Out of this condition arose the present system of crop liens and mortgages, which is a great hindrance to the agricultural development of the area. Since cotton was the only money crop before the war, and its culture alone was understood, it became again practically the only crop of the area, and so remains to-day. The other crops produced are for home consumption only.

#### CLIMATE.

The climate of the region is favorable to a much wider diversification of crops than at present exists. Like those of the Gulf States in general, the winters are mild and short, while the growing seasons are long. Such mild winters, with but little freezing weather, are favorable to early preparation for crops and their cultivation. Snowfalls are light and infrequent. The long growing season makes cotton a logical crop for the region, and suggests also the advantages offered for certain truck crops.

The available data of temperature and precipitation for a series of years show a growing season lasting from about the last week in March to the first week in November; or at least seven months, during which almost any crop may be grown, and eight to nine months for crops resistant to slight frosts.

The following tables are taken from the records of the Weather

Bureau stations at Vicksburg and Crystalsprings, which are located outside the area, but sufficiently near to show the conditions therein :

*Normal monthly and annual temperature and precipitation.*

| Month.        | Vicksburg.             |                     | Crystalsprings.        |                     | Month.       | Vicksburg.             |                     | Crystalsprings.        |                     |
|---------------|------------------------|---------------------|------------------------|---------------------|--------------|------------------------|---------------------|------------------------|---------------------|
|               | Tem-<br>pera-<br>ture. | Precipi-<br>tation. | Tem-<br>pera-<br>ture. | Precipi-<br>tation. |              | Tem-<br>pera-<br>ture. | Precipi-<br>tation. | Tem-<br>pera-<br>ture. | Precipi-<br>tation. |
|               | ° F.                   | Inches.             | ° F.                   | Inches.             |              | ° F.                   | Inches.             | ° F.                   | Inches.             |
| January ..... | 47.3                   | 5.54                | 47.7                   | 5.79                | August ..... | 80.1                   | 3.52                | 80.8                   | 4.50                |
| February ...  | 52.6                   | 4.65                | 48.4                   | 5.30                | September .  | 75.3                   | 3.49                | 76.2                   | 2.42                |
| March .....   | 58.0                   | 6.45                | 58.3                   | 4.66                | October ...  | 65.3                   | 2.62                | 66.6                   | 2.49                |
| April .....   | 65.8                   | 5.86                | 65.7                   | 4.53                | November ..  | 55.4                   | 4.85                | 56.5                   | 2.98                |
| May .....     | 72.6                   | 4.94                | 73.6                   | 4.02                | December ..  | 50.6                   | 4.96                | 48.3                   | 5.96                |
| June .....    | 79.2                   | 4.31                | 79.7                   | 5.04                | Year..       | 65.3                   | 55.66               | 65.3                   | 53.96               |
| July .....    | 81.3                   | 4.47                | 81.5                   | 6.22                |              |                        |                     |                        |                     |

The following table gives the dates of occurrence of the first killing frost in fall and the last in spring for a series of years :

*Dates of first and last killing frosts.*

| Year.      | Vicksburg.         |                   | Crystalsprings.    |                   | Year.      | Vicksburg.         |                   | Crystalsprings.    |                   |
|------------|--------------------|-------------------|--------------------|-------------------|------------|--------------------|-------------------|--------------------|-------------------|
|            | Last in<br>spring. | First in<br>fall. | Last in<br>spring. | First in<br>fall. |            | Last in<br>spring. | First in<br>fall. | Last in<br>spring. | First in<br>fall. |
| 1892 ..... | Mar. 2             | Nov. 11           | .....              | Nov. 10           | 1899 ..... | Mar. 7             | Nov. 3            | Mar. 29            | Nov. 3            |
| 1893 ..... | Apr. 22            | Nov. 15           | Mar. 30            | Oct. 15           | 1900 ..... | .....              | .....             | Apr. 1             | Nov. 4            |
| 1894 ..... | Mar. 29            | Nov. 11           | .....do...         | Oct. 9            | 1901 ..... | Mar. 16            | Nov. 16           | Apr. 21            | Nov. 6            |
| 1895 ..... | Mar. 17            | .....do...        | Mar. 21            | Oct. 21           | 1902 ..... | Mar. 6             | Dec. 6            | Mar. 18            | Oct. 29           |
| 1896 ..... | Mar. 20            | Nov. 9            | Apr. 3             | Nov. 6            | 1903 ..... | Feb. 19            | Oct. 25           | Mar. 26            | Oct. 19           |
| 1897 ..... | Feb. 27            | Nov. 17           | Feb. 27            | Nov. 17           |            |                    |                   |                    |                   |

PHYSIOGRAPHY AND GEOLOGY.

The general topography of the Jackson area is rolling to hilly, with a variation in altitude of from 200 to 250 feet between the Pearl River and the highest hilltops. The lower elevations occur along the Pearl River, from which there is a rise both eastward and westward. To the west this rise ends in a ridge which crosses Hinds and Copiah counties in a general north and south direction, forming the divide between the Pearl and Black river drainage systems. It is along this ridge and in the southern part of the area, in Simpson and Copiah counties, that the hilliest sections are encountered, though around the headwaters of all the streams it is more or less hilly.

The Pearl River receives the greater part of the drainage of the area, which it crosses without much fall. It is not a navigable stream, except at high water, though in former times considerable traffic went up and down stream from Jackson in small, light-draft scows and flatboats. The drainage system of the Black River within this area is similar to that of the Pearl River.

The streams of the area are peculiar in that, while they occupy, except in their extreme headwaters, rather broad and mature valleys, they flow in trenchlike depressions in the valley bottoms, with a level overflow strip on each side. These ditchlike courses are from 4 to 15 feet in depth, and during periods of normal flow the streams occupy only the narrow bottoms of the trenches. During heavy rains, however, they rise rapidly and overflow their banks on each side.

The geology of the area is comparatively simple. The materials consist of sediments laid down in a northward extension of the Gulf of Mexico at a time when that body of water reached to or beyond the Tennessee line. These deposits belong to the geological series composing the Gulf Coastal Plain, of which the whole State of Mississippi is a part.

The underlying deposits are the oldest, though still comparatively young from a geological standpoint. They belong to the Jackson Eocene of the Tertiary period, as shown by their fossil-bearing beds. The Jackson Eocene is quite variable in lateral extent, but consists generally of alternate beds of clay, sand, sandy clay, impure limestone, and shell marl. These beds contain large quantities of fossil shells and lime concretions. In the clay beds are frequently found impressions of plant remains.

Overlying the Eocene beds is a series of cross-bedded sands, gravel, and clay, belonging to the Lafayette formation, first described and named by Hilgard in Lafayette County, Miss. This formation consists for the most part of red, orange, or yellow sands, though laterally the sands may grade into various-colored sticky clays, or even into beds of almost pure gravel. Both sands and clays may or may not contain gravel, the pebbles of which consist largely of chert and quartz, with occasional fragments of petrified wood. The Lafayette outcrops everywhere in road cuts and washes, where it may be seen as sands and clays 6 to 50 feet thick, complexly cross-bedded and of various colors, ranging from white to Indian red. It does not, however, enter into the formation of the soils of the area to any important extent.

The surface deposit overlying the Lafayette consists of a blanket of brown silty loam from 3 to 20 feet thick. The origin and geological age of this deposit are still unsettled problems, but it is undoubtedly as recent in age as the Quaternary. It is called loess, because of its resemblance to certain deposits bearing that name found in the valley of the Rhine and in China. The material consists of homogeneous yellow to brown fine-grained silty loam, and shows no evidence of stratification. Where most typically developed, the loess is characterized by its property of weathering into perpendicular bluffs and banks—which peculiarity is due to a system of vertical lines of weakness—and by the presence of lime concretions and land or fresh-

water shells. Both the latter, however, may be lacking, as in the present area. The loess is thickest and most typical along the Chickasaw Bluffs, its western boundary in the State, growing thinner and less typical to the eastward. It is from this loess that the soils of the Jackson area are almost entirely derived.

SOILS.

The soil conditions within the Jackson area are remarkably uniform. But three different types were encountered, and such variations as exist in the soils are due to rain wash and erosion.

*Areas of different soils.*

| Soil.                   | Acres.  | Per cent. |
|-------------------------|---------|-----------|
| Memphis silt loam ..... | 410,624 | 87.1      |
| Meadow .....            | 60,786  | 12.9      |
| Norfolk fine sand ..... | 320     | .....     |
| Total .....             | 471,680 | .....     |

MEMPHIS SILT LOAM.

The soil of the Memphis silt loam consists of from 6 to 12 inches of brownish-yellow to gray silt loam, underlain by heavier brown to chocolate-brown silt loam. The soil when wet is very sticky and plastic, acting in some respects like clay, but when dry it crumbles into a flourlike dust. When plowed too wet it has a tendency to cake into clods, which do not readily break down.

The variations which occur in this type are due for the most part to erosion by rainwater, which, on hillsides and even on slopes of moderate inclination, works with great rapidity. The result of this wash is to make deep trenches across fields or gradually to remove the soil, leaving the subsoil exposed. Frequently the gullies thus produced are many feet in depth, and reach down to the underlying sand of the Lafayette, which is then washed out and down the hillside. Occasionally the top of a steep hill will have its covering of loam entirely removed, leaving an area of sand or gravel generally too small to indicate upon a map of the scale used. Whenever wash has been excessive on a steep slope it is usual to find the soil deeper at the foot and almost or quite removed at the top, where the subsoil is often exposed.

In the valley bottoms and along the lower slopes of the Pearl River there occur areas in which both the soil and subsoil are gray in color and contain many iron concretions about the size of peas. This variation is known locally as "white buckshot land." Most of it is poorly drained and much has been mapped as Meadow.

The Memphis silt loam occurs over a great part of the area, covering the hilltops and valley sides alike, except where removed in small

spots by erosion. It is a peculiar soil in its drainage features, acting in this respect like an impervious clay. The rainfall is absorbed very slowly, and much of it rushes away into the streams, thus increasing the tendency to wash. So slowly does water penetrate this type that ponds are made for the purpose of watering cattle by simply building a slight dam across a depression, which will thus retain water for long periods, losing more by evaporation than by absorption. Much of this soil would undoubtedly be benefited by tile drainage. Open ditches are beneficial on level areas, where, owing to the tendency of the soil to stand in vertical banks, they do not fill up so rapidly as in other soil types.

The Memphis silt loam is derived from loess through the ordinary processes of weathering.

The crops grown on this type in the Jackson area are chiefly cotton and corn, the former being the sole export crop. Other crops, such as sweet and Irish potatoes, sugar cane, and vegetables, are grown for home consumption. The average yield per acre of cotton is one-half bale or less, while that of corn is from 15 to 30 bushels.

The Memphis silt loam is undoubtedly suited to a wider range of crops than those at present produced. It seems especially adapted to Bermuda grass, some of which is at present grown, though not so much as its importance demands. A wider extension of forage crops, such as Bermuda grass, cowpeas, and Japan clover, and more attention to the production of cattle and hogs are to be recommended as substitutes for exclusive cotton growing. All sorts of vegetables do well upon this type of soil, and a few small peach orchards show the possibilities of fruit growing with more careful cultivation and attention. The growing of early potatoes for the northern market also promises good returns.

The following table gives the mechanical analyses of this soil:

*Mechanical analyses of Memphis silt loam.*

| No.   | Locality.                | Description.                       | Gravel, 2 to 1 | Coarse sand, 1 | Medium sand,    | Fine sand, 0.25 | Very fine sand, | Silt, 0.05 to 0.005 | Clay, 0.005 to |
|-------|--------------------------|------------------------------------|----------------|----------------|-----------------|-----------------|-----------------|---------------------|----------------|
|       |                          |                                    | mm.            | to 0.5 mm.     | 0.5 to 0.25 mm. | to 0.1 mm.      | 0.1 to 0.05 mm. | mm.                 | 0.001 mm.      |
|       |                          |                                    | P. ct.         | P. ct.         | P. ct.          | P. ct.          | P. ct.          | P. ct.              | P. ct.         |
| 10646 | 2 miles SE. of Florence. | Yellow silty loam, 0 to 8 inches.  | 0.0            | 0.2            | 0.2             | 0.8             | 9.0             | 79.4                | 10.2           |
| 10642 | 3 miles W. of Jackson.   | Yellow silty loam, 0 to 12 inches. | .0             | .6             | 1.9             | 11.0            | 4.1             | 59.1                | 23.1           |
| 10644 | 4 miles W. of Terry.     | Yellow silty loam, 0 to 8 inches.  | .2             | 1.3            | .6              | .8              | 4.1             | 67.5                | 25.4           |
| 10645 | Subsoil of 10644 ..      | Yellow silty loam, 8 to 36 inches. | .1             | .5             | .4              | .5              | 5.4             | 73.8                | 19.2           |
| 10643 | Subsoil of 10642 ..      | Brown silty loam, 12 to 36 inches. | .1             | .7             | 2.5             | 14.4            | 4.4             | 57.3                | 20.3           |
| 10647 | Subsoil of 10646 ..      | Brown silty loam, 8 to 36 inches.  | .5             | 1.4            | .6              | .7              | 3.7             | 72.5                | 20.5           |

NORFOLK FINE SAND.

The Norfolk fine sand consists of from 6 to 8 inches of gray to yellow sand underlain by white or orange sand. There is little difference between soil and subsoil, except that the former is generally richer in organic matter.

This type is found chiefly in small patches, too small to be shown on a map of the scale used, but one large area, about half a mile in extent, occurs east of the Pearl River, in Rankin County.

The Norfolk fine sand is for the most part in forest, being considered too poor for corn and cotton, and, as a rule, is too badly gullied to be of any agricultural importance.

The soil is derived from the Lafayette deposits uncovered through erosion of the Memphis silt loam.

The following table gives mechanical analyses of this type:

*Mechanical analyses of Norfolk fine sand.*

| No.   | Locality.              | Description.                  | Gravel, 2 to 1 | Coarse sand, 1 | Medium sand,    | Fine sand, 0.25 | Very fine sand, | Silt, 0.05 | Clay 0.005 to |
|-------|------------------------|-------------------------------|----------------|----------------|-----------------|-----------------|-----------------|------------|---------------|
|       |                        |                               | mm.            | to 0.5 mm.     | 0.5 to 0.25 mm. | to 0.1 mm.      | 0.1 to 0.05 mm. | mm.        | 0.001 mm.     |
|       |                        |                               | P. ct.         | P. ct.         | P. ct.          | P. ct.          | P. ct.          | P. ct.     | P. ct.        |
| 10650 | 5 miles E. of Jackson. | Medium sand, 0 to 10 inches.  | 0.3            | 2.7            | 16.4            | 47.9            | 10.0            | 21.0       | 1.6           |
| 10648 | 5 miles E. of Jackson. | Gray sand, 0 to 12 inches.    | .0             | .8             | 8.9             | 58.8            | 6.2             | 20.5       | 4.8           |
| 10651 | Subsoil of 10650 ..    | Medium sand, 10 to 36 inches. | .0             | 1.8            | 19.2            | 47.3            | 9.4             | 19.3       | 2.9           |
| 10649 | Subsoil of 10648 ..    | Gray sand, 12 to 36 inches.   | .2             | 1.1            | 8.8             | 53.4            | 6.5             | 23.0       | 7.1           |

MEADOW.

The Meadow in the Jackson area consists of low-lying, poorly drained soils bordering stream courses, and varying in texture from true Memphis silt loam to sand. It is subject to overflow at every heavy rainfall, and is known locally as "bottom land."

It is most extensively developed along the Pearl River, where it varies from 1 to 4 miles in width. Its surface is uniformly flat, and water collects in pools upon it after every rain. While the streams are at their normal level, however, this surface water might be quickly carried off by ditching, for the surface of these bottoms lies, on an average, from 6 to 15 feet above normal water level.

The Meadow is formed of sediments washed from the valley slopes by the rains and deposited by the streams along their banks. The soil consists largely of silt, and does not vary in important details of texture from the Memphis silt loam, except where, nearer the stream channels, it is occasionally sandier. However, it contains the surface

wash from the uplands, and is thus much richer in organic matter than the Memphis silt loam and gives larger yields of all crops.

Recently the Meadow along the smaller creeks has been planted extensively to cotton, giving an average yield of 1 bale per acre. This cotton, however, is later than that on the hills, as it is necessary to wait for the passing of the spring floods before planting, and even then it is frequently necessary to replant on account of overflows. Bermuda grass, being uninjured by these overflows, is especially adapted to this type of soil.

Much of the Meadow now contains dense canebrakes, which furnish good pasturage for cattle, and other areas not fit for cultivation might well be allowed to grow up in cane.

The large areas of Meadow along the Pearl River are now mostly in forest, with an undergrowth of cane and wild grasses. Parts of this area are high enough to be flooded but a few inches, and such areas are usually cultivated, the same crops being grown as on the Meadow bordering the smaller streams.

#### AGRICULTURAL METHODS.

The agricultural methods in use in the Jackson area admit of great improvement, the present system and practice in a majority of cases resulting in small returns and much economic waste. Cotton and corn are sometimes grown alternately, or the former is grown year after year until the yield drops to the minimum. The land is then allowed to lie idle, becoming gullied by erosion, while new land is brought under cultivation by the wasteful method of girdling the standing timber. In some instances, however, there is a liberal use of commercial fertilizers, which act as a stimulant for the immediate crop, but leave the soil finally in as unproductive a condition as does the other method of constant cropping without rotation or manure.

Some of the more advanced planters have adopted more or less complete systems of crop rotation, but they form only a small minority of the total number.

One of the principal causes for the continuance of the imperfect methods above noted is the mortgage or crop-lien system. Under this the tenants are provided with food and implements with which to grow a cotton crop; and they, having no capital themselves and not owning the land, crop it to exhaustion and then move to new land elsewhere.

In the majority of cases in this area plowing is done with one mule, and the plows commonly used are incapable of stirring the soil to a sufficient depth. Larger plows are coming into use, however, and it is to be hoped that they will in time supplant the present inadequate

implements. Deep plowing will undoubtedly improve the soils of this area, and in many cases subsoiling is recommended. This, with a system of rotation with legumes, will greatly improve conditions.

#### AGRICULTURAL CONDITIONS.

As a rule, the owners of large estates which are farmed in small parcels by tenants are in a prosperous condition, but the state of the farmers of small areas leaves much to be desired.

The system of rental is as follows: The planter furnishes the tenant with tools, stock, and provisions, taking a lien on the stock and prospective crop to insure his rental and the repayment of any advancements made. The tenant then produces as much cotton as his own industry and prevailing conditions will permit, out of which the landowner gets his rent money and any other debts due him. Owing to the limitations of yield and the area which can be cultivated, the tenant seldom has anything to show for his year's labor after the disposal of the cotton. There are exceptional cases where tenants have made and saved money and now own farms, but they are few in number.

Most of the farm lands are held free from mortgage, it being more common to borrow money on the future crop than on the land itself. Farms vary greatly in size, ranging from 40-acre plots to plantations of 1,000 or more acres.

Farm labor is not so dependable or skillful as could be wished. It is therefore difficult to farm with day labor alone. These labor conditions are a chief cause of the continuance of the crop-lien and rental system, and form one of the great drawbacks to the introduction of special crops and better methods of agriculture.

Cotton is the principal crop, and all other crops now grown are subsidiary to it. Corn is grown as feed for horses and mules, but there is not always enough to meet the farm demands. Other forage and feed crops now grown are Bermuda grass, cowpeas, peanuts, and some oats. The production of these crops, however, is insufficient properly to carry the stock through even the short, mild winters of the region. Some sugar cane is grown for the making of sirup for home consumption.

The luxuriance with which Bermuda grass, cowpeas, Japan clover, and cane grow on the Memphis silt loam indicates that the cattle-raising industry could be easily and profitably extended in the Jackson area. Truck would undoubtedly do well if reliable and efficient labor could be obtained, and fruit, especially peaches, gives promise of success. Pecans also do well in this area.

Four railroads center at Jackson—the Illinois Central, the Queen

and Crescent, the Yazoo and Mississippi Valley, and the Gulf and Ship Island lines. They afford unusually good shipping connections with the markets of the North, East, South, and West. One or another of these roads runs within easy reach of every part of the area.

Jackson is the only local market of any importance for farm products other than cotton, but the steady increase of manufacturing and other industries throughout the South gives promise of better and more prosperous conditions for this agricultural area in the near future.

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