Soil Survey
of
Marion County, Mississippi

By
J. W. MOON, in Charge
and
CLARENCE LOUNSBURY, ROBERT WILDERMUTH
C. S. SIMMONS, ARTHUR E. TAYLOR, and Z. C. FOSTER

Bureau of Chemistry and Soils
In cooperation with the
Mississippi Geological Survey

For sale by the Superintendent of Documents, Washington, D. C. - - - - - - Price 30 cents
CONTENTS

County surveyed.............................................................................. 1
Climate......................................................................................... 5
Agriculture..................................................................................... 7
Soil-survey methods and definitions.......................................... 14
Soils and crops.............................................................................. 15
  Soils suitable for crop production........................................... 17
    Soils of the uplands with gray topsoils over red subsols........... 18
      Ruston fine sandy loam..................................................... 19
      Ruston fine sandy loam, rolling phase............................... 20
      Ruston sandy loam, rolling phase..................................... 21
      Orangeburg fine sandy loam........................................... 22
    Soils of the uplands with gray topsoils over yellow subsols..... 22
      Pheba fine sandy loam.................................................... 23
      Pheba fine sandy loam, slope phase................................. 23
    Better drained soils of the bottom lands............................. 24
      Kalmia fine sandy loam.................................................. 24
      Kalmia fine sandy loam, hardpan phase............................ 25
      Kalmia loamy sand....................................................... 26
      Cahaba fine sandy loam............................................... 26
      Cahaba loamy sand..................................................... 27
      Ochlockonee fine sandy loam........................................ 27
      Ochlockonee silty clay loam.......................................... 28
  Soils adapted to timber and range......................................... 28
    Soils suitable for pasture.................................................. 29
      Myatt fine sandy loam.................................................. 29
      Leaf fine sandy loam.................................................... 30
      Plummer fine sandy loam.............................................. 30
      Bibb silty clay loam.................................................... 30
      Bibb fine sandy loam.................................................. 31
      Alluvial soils, undifferentiated................................... 31
    Soils adapted only to timber production............................ 32
      Ruston sandy loam, broken phase.................................. 32
      Outhbert fine sandy loam.......................................... 33
      Susquehanna fine sandy loam...................................... 33
      Eulonia fine sandy loam.......................................... 34
      Kalmia sand....................................................... 34
      Thompson sand..................................................... 34
      Johnston fine sandy loam......................................... 35
      Muck........................................................................ 35
  Morphology and genesis of soils............................................ 36
  Summary................................................................................ 39
  Map.
SOIL SURVEY OF MARION COUNTY, MISSISSIPPI

By J. W. MOON, in Charge, and CLARENCE LOUNSBURY, ROBERT WILDERMUTH, C. S. SIMMONS, ARTHUR E. TAYLOR, and Z. C. FOSTER

COUNTY SURVEYED

Marion County is in the south-central part of Mississippi (fig. 1). About 6 miles of its southern boundary forms the boundary line between Louisiana and Mississippi. Columbia, the county seat, is situated about midway between Jackson, Miss., and New Orleans. The land area of the county includes 535 square miles, or 342,400 acres.

The county lies entirely within that part of the Gulf Coastal Plain commonly referred to as the "longleaf pine region." This section embraces all that part of the State south of the Jackson prairie and east of the loess, or bluff, hills, except a narrow strip along the coast. It consists of a thoroughly eroded plain, sloping southeastward from an altitude of nearly 500 feet along its northern and western borders to slightly above sea level near the Gulf Coast. The relief ranges from hilly and broken along the larger stream valley bluffs to nearly level remnants of the original plain and lower benchlike formations.

*State Agricultural Experiment Station.

FIGURE 1.—Sketch map showing location of Marion County, Miss.

1LOWE, E. N. A PRELIMINARY STUDY OF SOILS OF MISSISSIPPI. Miss. State Geol. Survey Bull. 8, 220 pp., illus. 1911. See p. 58.

137929—38—1
Marion County, traversed by the deep Pearl River Valley, is probably more thoroughly dissected than the surrounding country. The erosion cycle has advanced to such a stage that the higher elevations are smoothly rounded ridges rather than small flat-topped plateaus. When viewed from a distance, however, the higher ridges and knolls present a horizontal sky line.

The land appearing to be remnants of a bench, immediately east of the Pearl River Valley and in the vicinity and north of Columbia, attains an elevation some 40 or 50 feet above the river terraces, but more than 100 feet lower than the higher hills. Such remnants of uneroded plains are estimated to aggregate only 10 or 12 square miles and practically constitute the total of the unbroken upland plains.

The more broken, hilly areas are on the bluffs and steeper slopes, overlooking the broad valley of Pearl River, especially between Morgantown and White Bluff, including Red Bluff; and in the southeastern part of the county. Similar hilly relief characterizes nearly 15 percent of the area of the county. That part of the slope east of the river and north of Lampton, where the above-mentioned bench occurs, is more gradual and less hilly.

The Pearl River Valley, comprising both first-bottom and second-bottom land, ranges from 3 to 6 miles in width and embraces about 30 percent of the total area of the county. The alluvial plains are smooth, nearly level, in part well drained, and in part wet or even swampy. The rest of the land is characterized by an undulating to rolling relief, and much of it is thoroughly dissected by a fine network of interdigitated drainage lines.

Available elevation data are inadequate. The elevation of the Pearl River terraces ranges from 187 feet above sea level at Sandy Hook near the southern boundary line, to 175 feet at White Bluff and 194 feet at Goss in the northern part of the county. The Gulf & Ship Island Railroad is officially reported to reach an altitude of 421 feet near the county line southeast of Pineburg, and the higher hills west of Pearl River in the vicinity of White Bluff probably attain even higher elevations. The elevation of a point near the western boundary is 384 feet. Although the extreme difference in elevation within the county is nearly 300 feet, local differences between the ridge tops and valley floors in few places are more than 100 feet. The general slope of the land is southward, but local topographic or drainage slopes extend from both east and west toward the Pearl River channel.

The drainage system is maturely developed and presents a complex dendritic, or treelike, pattern. The larger streams, especially Pearl River, have cut deep and broad channels. Drainage lines of small intermittent streams and so-called dry hollows follow narrow V-shaped channels and penetrate all parts of the uplands at close intervals. Although they have not eroded the land to a greater depth than 75 feet, their close network has reduced much of the land to a condition consisting principally of a series of narrow rounded ridges and small knolls.

---

2 Data on elevation were obtained from the U. S. Coast and Geodetic Survey and from the Gulf, Mobile & Northern and the Gulf & Ship Island Railroads.
The alluvial plains vary widely in natural drainage conditions, although there is little true swampland in the county. Practically all the uplands, or “piny woods hills”, are well to excessively drained. Minor local exceptions are to be found in remnants of level benches, many of which are underlain at a slight depth by comparatively impervious substrata.

With the exception of a few square miles in the extreme northeastern corner, drained by Black Creek, one of the tributaries of Pascagoula River, the entire county is within the Pearl River basin. As the Pearl River channel has cut to a depth of some 200 feet below the level of the higher ridges, and the slopes extend back from it for a distance ranging from only 8 to 12 miles, erosion and the invasion of drainage channels have been rapid. These processes are accentuated, owing to the fact that the textural and general physical character of the dominant soil materials render them highly erosive.

The natural forest of the uplands, locally designated “piny woods”, was dominated by longleaf pine at the time of acquisition by white men. Practically all of this has been cut, and most of the land is now in a cut-over condition. A small proportion is being protected against “pine-rooter” hogs and uncontrolled forest fires, in order to allow satisfactory natural reseeding to longleaf pine. Most of the uncultivated cut-over land supports a rather sparse and scrubby growth of blackjack, red, black, post, upland, willow, and white oaks, with a few scattered pines. A sparse ground cover of natural clump grasses, locally broomsedge, and carpet grass in the moist depressions, are characteristic. Range hogs uproot longleaf pine seedlings, and this causes the domination by loblolly pines among the second-growth pines in most places. Herbaceous undergrowth was light in the primeval pine forests, but a sparse ground cover of woods grasses grew in many places.

The tree growth in poorly drained sites consists in the main of tupelo, sweetgum, water-loving oaks, some maple, ash, tuliptree (locally known as tulip poplar), bay, magnolia, and swamp pine. On many of the terraces and higher sandy first-bottom land, loblolly pine dominates, and much pine has been harvested from such sites. Cypress and tupelo are abundant around and often in the so-called lakes, dead rivers, or ponds and abandoned river channels that hold more or less water most of the time. The courses of the smaller perennial streams are marked by a dense growth, dominantly of bay, maple bushes, and a network of vines and running briers. The muck areas (reed brakes) support a junglelike cover, in which bay, magnolia, swamp pine, and loblolly pine, are conspicuous.\(^8\)

Nearly all the small streams, which are numerous and well distributed geographically, are fed by springs. A few short streams on the broader terraces find their sources in mucky bays near the foot of steep seepage slopes. The water of such streams is slightly coffee colored, as is that of other streams during periods of drought and low water. The coloration is probably due to the presence of organic matter and the scarcity of lime. Most pastures and all range tracts are supplied by these natural water sources. Wells vary considerably

---
in depth, but they are sunk with little difficulty, as no indurated rock is encountered.

Although permanent settlements are known to have been made in this part of the Pearl River Valley as early as 1809, the county is very much younger agriculturally. Early pioneers came largely from the Carolinas, with smaller numbers from Virginia, Tennessee, Georgia, and Alabama. Many have come more recently from the last two States. The county was established December 9, 1811, and named in honor of Gen. Francis Marion of South Carolina, the noted "Swamp Fox" of Revolutionary days. In 1820, when the county was more than twice its present size, the population was 3,110. The increase in population was so slow that nearly 60 years were required to double the number of inhabitants. The increase was much more rapid, however, during the 50 years prior to 1920. Parts of the original area of the county entered into the formation of Pearl River, Lamar, and Walthall Counties between the years 1890 and 1914. According to the 1930 Federal census, the population of Marion County numbered 19,923 in that year, 24.3 percent of which is classed as urban and 75.7 percent as rural. The population consists of 61.6 percent native whites, only 0.2 percent foreign-born whites, and 38.2 percent Negroes. The whites are largely of English, Scotch, and Irish descent.

Columbia, the county seat, is the principal town and in 1930 had a population of 4,833. This town is centrally located and serves as the principal trade center of this county and parts of neighboring counties. Foxworth, Kokomo, Cheraw, Sandy Hook, Morgantown, Goss, and Hub are shipping and local trading points favorably distributed.

The county is served by three railroads—a branch line of the Illinois Central (Gulf & Ship Island), a branch line of the Gulf, Mobile & Northern, and the Fernwood & Gulf which connects these systems between Columbia and Fernwood. These roads connect all shipping and trading points with Columbia and serve as outlets to larger markets.

Two graveled State highways cross the county, intersecting at Columbia. The county roads, many of which are graveled, extend into all sections and for the most part are well maintained. The abundant local gravel deposits and the dominant sand-clay composition of the soil materials, which are favorable to road construction and maintenance, tend to offset the handicaps of a choppy relief and susceptibility of the land to erosion.

The county is served by an excellent system of consolidated schools, and transportation of students is provided by the public. Few rural telephones are in use. Churches and rural delivery of mail are convenient to all communities.

The industrial life of the county has centered around the production of lumber and other forest products during most of the last two decades, but, owing to the recent depletion of the pine forests and slow progress of reforestation to turpentine pines, the lumber industry is rapidly yielding to agriculture which is now, and promises to remain, the principal occupation of the people. Although the

---

4 Biographical and Historical Memoirs of Mississippi. 2 v. Illus. Chicago, 1891.
county is agricultural rather than industrial, a shirt factory, hose factory, sawmill, and canning factory, in addition to the usual industries associated with a town of its size, are under operation and are employing about 600 workers in Columbia.

CLIMATE

Climatic conditions prevailing in Marion County are characterized by long warm summers, short pleasant winters, heavy well-distributed rainfall, moderate rate of evaporation, and a comparatively high percentage of possible sunshine.

Although local climatic variations, such as those caused by differences in elevation, are minor, the influence of the Gulf of Mexico is doubtless slightly greater in the southern part of the county with reference to increase in amount of rainfall and moderation of temperature. Another slight local variation is that late and early frosts are slightly heavier in the stream valleys than on the higher elevations.

As is characteristic of this section of the country, the range between the mean winter and mean summer temperatures is comparatively narrow, being only 28.4° F. During the 20 years that the Columbia station of the Weather Bureau has been in existence, extreme temperatures of 9° and 102° have been recorded, although readings below 18° or above 100° are very rare. The winter climate is little different from that along the immediate Gulf coast, which attracts many winter tourists from the North. Outdoor occupations are carried on throughout the winter, and much plowing and other farm work is done during January and February. The warm summer evenings and nights are materially tempered by Gulf breezes.

Snow and severe freezes are rare. Killing frosts and short periods of damp, chilly weather frequently occur, however, during the winter. The usual winter weather cycle consists of rain followed by a few cool days which give way to a period of pleasant, warm, balmy days followed, in turn, by another rain.

The mean annual rainfall of 60.95 inches is well distributed throughout the year, averaging nearly 40 percent less during the fall months when the staple crops are ripening and being harvested. Electrical storms, especially in summer, and heavy downpours of rain are not uncommon. The wind velocity is generally low. Destructive winds and hailstorms are rather unusual. Although crop yields are sometimes materially reduced by extremely low or high amounts of rainfall, complete crop failures seldom occur. With the probable exception of the Ochlockonee soils (river-bottom soils), droughts cause the greatest crop injury on sandy soils, and wet periods reduce yields more particularly on the more level heavy soils.

Although it is true that the climate, directly or indirectly through soils, prevents profitable or successful competitive production of cooler climate crops, such as wheat, or heavy soil-feeding crops, such as corn and many feed and grass crops, the prevailing climatic conditions allow the growing of an extremely wide variety of crops, both general and special. The long average frost-free season, from March 13 to November 7, inclusive, the ample rainfall, and the mild winters encourage the growing of a number of crops during all seasons of the year. Two or more crops of certain combinations may be suc-
cessfully grown on the same land in 1 year. Either corn, peanuts, sorgo, potatoes, hay, or peas may be grown following a crop of small grain; or any of these, and even cotton or a number of truck crops, may be seeded after a crop of winter legumes or winter cabbage has been harvested. Under careful planning, three crops of vegetables can be grown during the same season on the same land.

Wild-grass pastures can be grazed for an average of 9 months a year, and good sods of clovers and introduced grasses may be expected to provide good grazing throughout the year when the winters are mild. With such pastures supplemented with small grain, winter field peas, and rape during the winter, under normal conditions grazing can be had for the entire year.

The climate allows the winter growing of such field crops as oats, rye, and other small grains; vetch; and winter field peas, including the Austrian and Canada varieties. Such vegetables as cabbage, collards, onions, radishes, turnips, and lettuce also may be grown during the winter. Less hardy vegetables, such as peas, beans, and potatoes are planted in early March with little danger of being killed by frost. Roses normally bloom profusely until December 1 and resume blooming in March. Japonica (Japanese quince), violets, narcissus (locally called jonquil), and hyacinths bloom in February, and wild azalea and dogwood are conspicuous among the wild flowers of the woods in March.

Table 1 gives the normal monthly, seasonal, and annual precipitation and temperature as compiled from the records of the Weather Bureau station at Columbia.

**Table 1.—Normal monthly, seasonal, and annual temperature and precipitation at Columbia, Marion County, Miss.**

<table>
<thead>
<tr>
<th>Month</th>
<th>Temperature</th>
<th>Precipitation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Absolute</td>
</tr>
<tr>
<td></td>
<td>°F.</td>
<td>maximum</td>
</tr>
<tr>
<td></td>
<td>°F.</td>
<td>Inches</td>
</tr>
<tr>
<td>December</td>
<td>51.7</td>
<td>80</td>
</tr>
<tr>
<td>January</td>
<td>50.8</td>
<td>81</td>
</tr>
<tr>
<td>February</td>
<td>54.9</td>
<td>95</td>
</tr>
<tr>
<td>Winter</td>
<td>52.4</td>
<td>86</td>
</tr>
<tr>
<td>March</td>
<td>60.0</td>
<td>88</td>
</tr>
<tr>
<td>April</td>
<td>66.4</td>
<td>89</td>
</tr>
<tr>
<td>May</td>
<td>72.9</td>
<td>96</td>
</tr>
<tr>
<td>Spring</td>
<td>66.4</td>
<td>96</td>
</tr>
<tr>
<td>June</td>
<td>79.7</td>
<td>102</td>
</tr>
<tr>
<td>July</td>
<td>81.6</td>
<td>100</td>
</tr>
<tr>
<td>August</td>
<td>81.3</td>
<td>101</td>
</tr>
<tr>
<td>Summer</td>
<td>80.8</td>
<td>102</td>
</tr>
<tr>
<td>September</td>
<td>77.5</td>
<td>100</td>
</tr>
<tr>
<td>October</td>
<td>67.3</td>
<td>98</td>
</tr>
<tr>
<td>November</td>
<td>57.1</td>
<td>89</td>
</tr>
<tr>
<td>Fall</td>
<td>67.3</td>
<td>100</td>
</tr>
<tr>
<td>Year</td>
<td>96.7</td>
<td>102</td>
</tr>
</tbody>
</table>
AGRICULTURE

The history of early agriculture in Marion County is essentially that of this section of the country and typifies American pioneer farming, in that it consisted primarily of growing home supplies and subsistence crops.

In the early days, Pearl River afforded the principal means of transportation. For this reason, among other probable reasons, initial settlements in the county were made along its valley as early as 1809. Timber was first harvested along the larger streams, and rafting down Pearl River was the only economic means of transporting it to mills or markets. The first farms naturally followed the timber harvest.

Corn was the principal crop, and rice, sweetpotatoes, and garden vegetables were grown. The abundance of oak mast on the first-bottom land and pine seed on the second bottoms and in the piny woods afforded sufficient hog range for the production of a plentiful supply of pork for home use. At that time switch cane on the bottom lands and woods grass in the piny woods were much more abundant than at present, and ranging of cattle and sheep was more profitable and was generally practiced. Marion is one of the formerly designated “cow counties” of Mississippi. Cattle, sheep, wool, and timber were the principal sources of cash income. Cotton was added later, before the Civil War. The coastal towns of Mobile and Pass Christian were the principal markets for these products, as well as the sources of simple necessities which the pioneers could not produce at home.

Although settlements were being made in the larger stream valleys 125 years ago, settlement and development were very slow for three-quarters of a century. By 1880, when the county was considerably more than twice its present size, the population was only 6,901, and only about 2 percent of the land had been cleared or improved. The agriculture at that time consisted primarily of a corn-cotton and range-livestock combination, together with the production of some oats, sweetpotatoes, sugarcane, rice, and the common garden vegetables. Farming was essentially of the subsistence type. A rather meager cash income was obtained from the sale of range cattle, sheep, wool, cotton, and timber. Although these have been the principal agricultural sources of cash income throughout the entire history of the county, they have varied widely in relative importance, and a number of alterations in agriculture have been effected from time to time.

The most significant changes regarding the acreages of the important field crops have been a rapid increase in the acreage devoted to cotton, corn, and hay, and a consistent decrease in that in oats during the last 50 years. The census data indicate a small decrease in the average acre yields of cotton following the invasion of the boll weevil, but a rather consistent increase during the last 50 years in those of corn, sweetpotatoes, sugarcane, hay, and forage crops. The minor crops, rice and tobacco, have been eliminated. Clover is a comparatively new crop in this county.

---

8 R. M. Coman, Marion County agricultural agent, supplied much of the information in this section.
Table 2 gives the acreage of the principal crops for the census years 1879 to 1934, inclusive.

<table>
<thead>
<tr>
<th>Crop</th>
<th>1879</th>
<th>1889</th>
<th>1899</th>
<th>1909</th>
<th>1919</th>
<th>1929</th>
<th>1934</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>4,717</td>
<td>12,081</td>
<td>14,262</td>
<td>18,692</td>
<td>18,484</td>
<td>55,127</td>
<td>21,079</td>
</tr>
<tr>
<td>Corn harvested for grain</td>
<td>9,067</td>
<td>13,331</td>
<td>21,929</td>
<td>17,033</td>
<td>24,357</td>
<td>22,490</td>
<td>35,168</td>
</tr>
<tr>
<td>Oats</td>
<td>1,348</td>
<td>1,327</td>
<td>1,508</td>
<td>754</td>
<td>451</td>
<td>79</td>
<td>357</td>
</tr>
<tr>
<td>Hay and forage</td>
<td>12</td>
<td>193</td>
<td>463</td>
<td>874</td>
<td>2,629</td>
<td>1,500</td>
<td>3,200</td>
</tr>
<tr>
<td>Peanuts</td>
<td>71</td>
<td>352</td>
<td>345</td>
<td>148</td>
<td>226</td>
<td>786</td>
<td>786</td>
</tr>
<tr>
<td>Sweetpotatoes and yams</td>
<td>729</td>
<td>820</td>
<td>774</td>
<td>755</td>
<td>1,237</td>
<td>1,983</td>
<td>1,868</td>
</tr>
<tr>
<td>Potatoes</td>
<td>17</td>
<td>169</td>
<td>67</td>
<td>60</td>
<td>167</td>
<td>513</td>
<td>513</td>
</tr>
<tr>
<td>All other vegetables</td>
<td>167</td>
<td>322</td>
<td>458</td>
<td>470</td>
<td>702</td>
<td>604</td>
<td>1,594</td>
</tr>
</tbody>
</table>

During the last 50 years the number of livestock farms has decreased, owing probably to less favorable range conditions and a change in market demands, although the breeds are being improved. The annual value of dairy products and of poultry and eggs has increased markedly since 1899, but the value and amount of wool produced has decreased materially.

Fruit growing has never been important, and during the last 40 years there has been a decided decrease in the production of apples and some in that of peaches; whereas the production of pecans, grapes, figs, and plums seems to have increased as the population has increased. Practically no strawberries have ever been grown.

During the last 50 years the population has increased from 6.3 to 37.2 persons a square mile. The proportion of improved land in farms has increased from about 2 to 21 percent and has been accompanied by a corresponding expansion in the production of farm products. The value of all agricultural products increased during the period between 1909 and 1929.

Table 3 gives the value of all agricultural products by classes as reported by the Federal census for the years 1909, 1919, and 1929.

<table>
<thead>
<tr>
<th>Crops</th>
<th>1909</th>
<th>1919</th>
<th>1929</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereals</td>
<td>$241,657</td>
<td>$610,099</td>
<td>$349,814</td>
</tr>
<tr>
<td>Other grains and seeds</td>
<td>12,504</td>
<td>6,519</td>
<td>20,110</td>
</tr>
<tr>
<td>Hay and forage</td>
<td>12,742</td>
<td>55,656</td>
<td>32,011</td>
</tr>
<tr>
<td>Vegetables (including potatoes and sweetpotatoes)</td>
<td>86,260</td>
<td>304,901</td>
<td>158,659</td>
</tr>
<tr>
<td>Fruits and nuts</td>
<td>4,397</td>
<td>10,388</td>
<td>13,394</td>
</tr>
<tr>
<td>All other field crops (mainly cotton)</td>
<td>702,682</td>
<td>1,271,157</td>
<td>1,260,009</td>
</tr>
<tr>
<td>Forest products</td>
<td>(1)</td>
<td>(1)</td>
<td>74,494</td>
</tr>
<tr>
<td>Value of all domestic animals</td>
<td>105,772</td>
<td>879,626</td>
<td>684,741</td>
</tr>
<tr>
<td>Dairy products sold</td>
<td>38,531</td>
<td>42,392</td>
<td>38,633</td>
</tr>
<tr>
<td>Poultry and eggs</td>
<td>41,520</td>
<td>93,305</td>
<td>141,045</td>
</tr>
<tr>
<td>Wool, mohair, and goat hair</td>
<td>1,189</td>
<td>1,579</td>
<td>288</td>
</tr>
<tr>
<td>Total</td>
<td>1,245,063</td>
<td>3,365,995</td>
<td>2,721,360</td>
</tr>
</tbody>
</table>

*1 No figures are available for the value of forest products prior to 1929, though their value was much greater in the earlier census years.

The agricultural history of this county is interwoven with that of the lumber industry. Although timber has been since pioneer days, and still is, a source of more or less cash income, by far the greater part of the magnificent longleaf pine forest, covering the entire
uplands of the county, was harvested and locally processed during the two decades, 1910–20 and 1920–30. During the decade following 1917 the industrial life of the county revolved around the lumber industry. Harvesting the timber encouraged farm development of the so-called piny woods lands, however, and during the last few years agriculture has regained its former position, and much land has been improved and many farms established on the cut-over uplands. In this connection it is interesting to note that the number of farms increased 37 percent between 1920 and 1930.

Depletion of the pine forest, slow process of reforestation, cessation of the local lumber industries, and the planting of new farms here and there over the recently cut-over lands, breaking up and restricting the range territory—are all factors instrumental in the make-up of a new local agricultural setting. Such a set-up has prevailed only a few years in this county, but already there are indications that the average farmer is beginning to appreciate more the necessity of soil conservation, better livestock, more diversification, and a type of farm more conservative and self-sufficing rather than exploitive and speculative.

The number of farms to a square mile has consistently increased from about 1.6 to nearly 5 during the last 30 years, and the average size of farms has steadily decreased from 165 acres in 1890 to 62.3 in 1935. The most rapid change in both number and size occurred during the decade following 1900. During the years 1880 to 1930 the percentage of improved land per farm steadily increased from 15.9 to 41.4 percent, whereas the actual acreage of improved land per farm remained about the same, fluctuating between 26 and 29 acres. In 1935, 38.4 percent was classed as improved land. The percentage of the county in farms has steadily increased from 33.7 to 54.6 percent. It is estimated by county officials that some 20 percent of the land is in four or five very large holdings. The rest consists of farms ranging in size from a very few to 3,000 acres. About one-third of the farms are 40 acres each. The next most popular size is 80 acres. Most of the farms are so-called one-horse farms, on which probably about 15 acres are cultivated, mostly to cotton and corn.

According to the 1935 census, there are 3,000 farms which represent 54.6 percent of the total area of the county. Of these 52.8 percent are operated by owners, 47.1 percent by tenants, and 0.1 percent by managers. About 64 percent of the tenants are croppers; 7 percent pay cash rent; and about 29 percent give a stipulated amount of cotton or one-fourth of the produce as rental for the land. The croppers furnish the labor and one-half of the commercial fertilizer, and they receive one-half of the proceeds.

Labor has been plentiful since activities of local lumber industries ceased, and farm wages range from 75 cents to $1 a day, and from $15 to $25 a month. Available labor consists of both native-born whites and Negroes. It is essentially similar in quality to that throughout southeastern United States. The total amount expended for labor on the farms of this country has increased from $18,690 to $34,466 during the last three decades.

The average total investment a farm has increased from $555 to $1,775 during the last 50 years. According to the 1930 census, 58 percent of this is invested in land, 23.1 percent in buildings, 13.7
percent in domestic animals, and only 5.2 percent in farm implements. The proportion invested in land has shown a slight upward tendency during the last 30 years, whereas that in domestic animals has decreased materially during the last 50 years.

Although a rather large number of the farm homes are rather inexpensive structures, they range from those of the pioneer type to the most modern. Owing to the warm climate and the fact that livestock are kept most of the time on the range, the average farm has made a comparatively small investment in outbuildings. In vicinities where the more productive soils prevail, general improvements, such as fences and buildings, are more common.

The soils are in general of easy-working properties. Partly for this reason heavy implements and deep plowing are not so essential as they might be otherwise. Also the loose consistence characterizing the surface soils of the dominant soils discourages the use of tractors.

Mules are the principal work animals, and very few of them are raised locally. Few oxen are used in farm work, other than in connection with logging or lumbering.

The principal field crops are cotton, corn, and hay. The more important vegetable and patch crops, grown in part for market, are sweetpotatoes, potatoes, sugarcane, string beans, tomatoes, peas, spinach, pimento peppers, turnip greens, okra, cucumbers, and some lima beans.

The hay crop consists in the main of soybeans, lespedeza, cowpeas, and Mexican-clover (which is not a true clover and belongs to the same family as the poverty weed). Soybeans, lespedeza, and cowpeas are usually seeded alone when grown for hay, although some farmers interplant velvetbeans or soybeans with corn for soil improvement, grazing, or a combination of the two. Mexican-clover, usually with more or less native grass, appears in cultivated crops, especially early corn, as a volunteer crop following the completion of cultivation. Before frost but after the corn or cotton has been harvested, the "clover" is in some instances cut for hay.

Plowing for most of the crops is done in January and February; the land for English peas usually is plowed in the fall. The common practice consists of only listing or bedding the rows for cotton and corn; but for patch and special crops this operation is ordinarily preceded by plowing or flat breaking. Cotton and truck crops are seeded on the beds, whereas corn and sugarcane are usually planted in the water furrow between the beds. Methods of cultivation are those typical of the Southeastern States. A few riding cultivators are used, but harrows and sweeps drawn by one mule are the more common implements. Some hand hoeing of all cultivated crops is done, particularly of cotton and the more intensive crops.

The use of commercial fertilizer has become almost universal throughout the county. According to the Federal census data, the amount spent in the county for this purpose has increased from $22,110 to $247,854 during the last 30 years. In 1929, 88.7 percent of all farms used it, and it is probably applied to more than 90 percent of the total cultivated acreage. It is estimated that about one-third of the fertilizer is home-mixed. A 4-8-4\(^7\) mixture is very popular.

---


\(^7\) Percentages, respectively, of nitrogen, phosphoric acid, and potash.
both in the home- and factory-mixed goods. The source materials are usually nitrate of soda or sulphate of ammonia, phosphate rock, and muriate of potash or kainit. Most of the complete fertilizer is used under the cotton crop at a rate ranging from 100 to 300 pounds an acre of the 4–8–4 mixture. Lighter amounts are applied under the corn crop by a few farmers, but the greater part of this crop receives only a dressing of nitrate of soda or sulphate of ammonia usually applied at the rate of 50 or 75 pounds an acre just before the corn bunches for tassel. The heaviest applications are made to the vegetable crops and often approximate 1,000 pounds an acre of a 4–8–4 mixture.

Although a few years ago considerable fertilizer was purchased through the local office of the Farm Bureau, now practically all is obtained through local merchants.

The agriculture has not as yet advanced to the stage where any general concerted effort is being made to adjust fertilizer to soil type, although many farmers are beginning to appreciate the advisability of modifying formulas to accord somewhat with conspicuous soil variations and susceptibility of crop plants to certain diseases.

From the point of view of their disposition, the crops may be considered in three groups—(1) subsistence crops, or those consumed within the county; (2) market crops, or those grown entirely for outside markets; and (3) dual-purpose crops, or those grown in part for home consumption and in part for outside markets.

The principal crops of the first group are corn and hay. The corn is consumed locally, both as food for man and feed for livestock, and the hay is fed mainly to livestock. Some of both crops is redistributed through the local merchants. The census data indicate that the annual amount expended by the farmers of the county for feed has increased from $15,145 to $63,251 during the last 20 years. Minor crops of this group include many of the garden vegetables and most of the fruits.

Cotton, the principal crop, is the only crop of importance grown entirely for outside markets. Cotton is ginned by nearly a dozen different gins well distributed throughout the county. Probably one-third of the crop is marketed through the Mississippi Cotton Association and the rest through local merchants and agents. The 1935 census reports 88.4 percent of all farms as cotton farms. According to data compiled by the United States Department of Agriculture, Marion County ranked fifth among the 22 counties of the longleaf pine region in average acre yields of cotton, over a period of 5 years preceding 1933.

The third group—the dual-purpose crops—include a number of less important crops, such as sweetpotatoes, potatoes, sugarcane, peanuts, pecans, and common vegetables. The surplus sirup, sweetpotatoes, and potatoes are marketed through local merchants, and surplus cucumbers through a local receiving or shipping station of a Chicago firm. The surplus of the other vegetable crops in this group, over and above that locally sold and consumed, is processed by a canning factory located in Columbia. According to records and estimates furnished by this factory, about $40,000 will be expended this year (1934) for vegetables, practically all of which are grown in this county. Small quantities of pecans are disposed of through local merchants and by small personal shipments to outside parties.
Livestock raising consists largely of the production of cattle and poultry, with the raising of swine, sheep, and goats of less importance.

The raising of cattle for beef production is probably the most important branch of the livestock industry, although census data indicate that nearly 25 percent of the total number of cattle are milked daily. Most of the beef cattle are grades ranging from moderately low to medium in quality. A number of purebred Hereford and Red Poll bulls are kept, however, to raise the grade level. Practically all the beef cattle are raised on the range. They range the entire year with little, and often no, supplementary feed, even during the winter. The range area ordinarily is ample, and most of the cattle seem to be maintained in fair condition during the greater part of the year. The range is materially improved by a volunteer carpet grass sod appearing on the more open moist or wet places. Some 12 or 15 farmers in this county specialize in producing range-fed beef cattle. Most of the beef is in demand by local markets, and some is sold to field agents of outside concerns. Occasionally a carload is shipped to New Orleans.

Two types of dairying are carried on. Jersey is the predominant breed of dairy cattle. There are extremely few highly specialized modern dairy farms, but they supply the greater part of the need for dairy products in Columbia. On a few of these farms especial interest is taken in the development of permanent pasture grasses, including carpet grass, lespedeza, and Dallis grass, and the degree of success appears satisfactory. The ease with which good pastures can be developed favors an increase in dairying and livestock raising. During the last few years, three milk routes have been established in that part of the county west of Pearl River. Dairying here is of a less specialized type and is carried on more as a side line, in conjunction with cotton growing or other types of farming. The milk from the farms is collected at a cooling station in Tylertown and taken by truck to New Orleans.

In 1929, 16,370 pounds of butter and 3,936 pounds of cream (as butterfat) were sold, practically all of which was marketed locally. The census indicates that the value of all dairy products annually sold has increased from $2,437 to $38,633 during the 30 years preceding 1929; and, according to the estimate of the county agent, the income from dairy products has more than doubled since the 1930 census was taken.

There are only five specialized poultry farms. The annual value of poultry and poultry products has increased from $20,247 to $141,048 during the last 30 years. Chickens constitute over 96 percent of the poultry, and nearly every farmer keeps a small flock. Most of the poultry and poultry products are marketed through local merchants.

Hog raising for market is of minor importance. Most of the farmers meet their needs for a home supply of meat and lard, and a few farmers, who have access to range land, offer some hogs for sale on the local market. Some hogs were shipped to New Orleans 4 or 5 years ago, but now very few are sold to outside markets. Poland China, Hampshire, and a few Duroc-Jersey hogs are raised. A little more than 10,000 head were raised in 1933.
There are very few sheep and goats. These animals are sold locally, and the wool is usually marketed in Poplarville. Practically all the sheep are raised in the eastern part of the county. Only 166 sheep and 910 goats were reported by the 1935 census. Both sheep and goats are run on the range.

Under the prevailing natural and normal economic conditions, proper land use presents the primary problem in the agriculture of the county. Regarding proper use and natural adaptation, the soils of the county are logically grouped as follows: (1) Soils suitable for crop production, which constitute 60.8 percent of the land; (2) soils best adapted to use as pasture, which embrace 16.4 percent of the county; and (3) soils suitable only for growing timber, which include the rest (22.8 percent) of the area.

A considerable acreage of the soils better adapted to use for timber and pasture are being cultivated to field crops. Much of this land has been cleared recently and put into cultivation. The fertility of the virgin soil, although not durable, stimulates yields for the first 3 or 4 years, after which the yields decline abruptly, erosion ensues, and the ability of the soil for natural reforestation is materially impaired. On the other hand, there is an even greater acreage of uncleared soils well suited to crop production. Practices of land use will eventually adjust themselves by force of economic necessity, but voluntary correction would result in a more rational adjustment.

The progress of natural reforestation on the timber soils differs in different localities, and it is rather slow in most places. Owing largely to uncontrolled forest fires, range hogs, and scarcity of seed trees, reforestation to pine, especially the longleaf variety, is severely restricted in most places, and scrubby oaks and loblolly pines are dominating. If burning were properly controlled, hogs removed from the range, and the scrubby oak growth culled, the timberlands would naturally produce a second longleaf pine forest, in places where a seed supply is adequate. It seems probable that, on the moist lowlands, thinning the stand of timber by culling the useless species and retarding the growth of weeds by heavy grazing are all that is necessary in most places to establish an excellent carpet grass sod. General interest and concerted effort are necessary to bring about the efficient use of soils devoted to forest and pasture, but once accomplished, the gain to the community would be both immediate through improved grazing and potential through the production of turpentine, pulpwood, and other forest products within the next few decades.

As agriculture in this county is for the most part comparatively young, the virgin fertility of the land, augmented by commercial fertilizers during the last few decades, has been depended on largely for crop production. As brought out in the section on Soils and Crops, even the virgin fertility of soils in this county was not high, and natural conditions favor processes of rapid soil deterioration. Therefore, one of the fundamental problems of agriculture is that of soil conservation. The almost universal use of complete commercial fertilizers is the equivalent of a general concession on the part of both experience and investigation that the agricultural soils of this county are deficient in certain plant nutrients. They are also low in organic matter, and since organic matter serves the multiple
purpose of supplying certain plant nutrients and improving the physical and biological properties of the soil, the use of compost and leguminous green-manure crops is highly recommended.

About 90 percent of the cropped soils are susceptible to destructive erosion. Considerable terracing has been done recently, and a moderate degree of interest is evident. Terracing and the use of commercial fertilizers are good practices indispensable to a permanent scheme of agriculture in this section, but they are not sufficient to maintain the soils in a state of permanent productivity. Adequate terracing should prevent severe gullying, but cover crops or sods are essential for controlling sheet erosion. The addition of soil amendments and terracing should be supplemented by the proper rotation of crops, including as many summer and winter leguminous cover crops as can be used in a feasible cropping scheme. It is also essential to incorporate as much plant residue, barnyard manure, or other organic matter in the soil as efficient management will allow. Besides the benefits realized from the addition of organic matter and the control of erosion, the summer cover crops provide a shade which reduces the rate of evaporation of soil moisture and helps to preserve organic materials in the soil.

Alternating between the two principal crops, cotton and corn, is about the extent of rotation practiced by the majority of the farmers, but a few of the more progressive practice a rotation about as follows: Cotton or one of the vegetable crops, corn interplanted with either soybeans or velvetbeans, and an oat and hay crop or a hay crop alone of lespedeza, velvetbeans, soybeans, or cowpeas. The scheme of crop rotation necessarily must be varied to meet varying conditions, not only on different farms, but also from year to year on the same farm. Although the system must be flexible, certain fundamental requirements must not be violated if permanent productivity is to be maintained. Chief among such requirements are the maintenance of growing crops on the fields as continuously as is practical and the periodic addition of new supplies of organic matter to the soil.

SOIL-SURVEY METHODS AND DEFINITIONS

In soil-survey procedure, the soils are classified according to those characteristics, both physical and chemical, which can be determined by observation, examination, and simple tests in the field. Excavations or borings are made at frequent intervals, and the character of the soil is carefully observed. It will be noted that each hole exposes a series of layers or horizons, and the entire exposure from the surface down is known as the soil profile. The classification is based largely on the character of the soil profile, the color, texture, and color of the several horizons, together with such external characteristics as drainage, relief, and stoniness. The vegetation—either native vegetation or crops—is observed, and its correlation with the soils is studied. In this way the natural productivity of the soil and its adaptation to different crops can be determined or estimated with a fair degree of accuracy. In classifying virgin lands which may be brought under cultivation, the observation of like soils now cultivated is an important part of the work.
Three units are commonly used in the field mapping of soils—the series, type, and phase. Most important of these is the series, which is a group of soils including those having certain features in common, as color, structure, thickness, and chemical composition of the horizons of the soil profile; essentially the same natural drainage conditions; and in most instances similar relief and parent material. The series are given geographic names taken from locations where they were first identified. Ruston, Pheba, Kalmia, and Susquehannas are names of soil series in Marion County.

The soil texture, that is the size of the soil particles and the relative amounts of the particles of different sizes, may vary considerably within a series. As texture is a characteristic of importance in determining the use to which a soil is put and the ease with which it may be tilled, it is taken into consideration in soil classification. The soil types are classified according to the texture of the surface soil. Thus, the class name of the soil texture, such as sand, loamy sand, sandy loam, loam, silt loam, clay loam, silty clay loam, and clay, is added to the series name to give the complete name of the soil type. For example, Kalmia fine sandy loam, Kalmia loamy sand, and Kalmia sand are types within the Kalmia series. With the exception of the texture of the surface soils, these soils have approximately the same general characteristics. A phase of a soil type is a soil which varies from the type in some minor characteristic that may have special practical significance. Differences in relief, depth of soil material, and content of gravel or stone are frequently the bases for phase separations. These differences may not influence soil character materially but may be of great significance in land use.

SOILS AND CROPS

The soils of this county differ widely in color, texture, consistence, fertility, and moisture conditions, all of which bear relationships to productivity and natural crop adaptation. They exhibit many shades of color—from nearly black through gray to light red. The range in texture and consistence is from tenacious clay loams and cemented sandy clays to loose incoherent sands. Fine sandy loams and sandy loams dominate, representing about 86 percent of the area. Only 4.5 percent consists of lighter sandy soils, 8 percent of silty clay loams, and about 1.5 percent of muck and undifferentiated alluvial soils. About 80 percent of the soils range from well to excessively drained, and the natural drainage of the rest is inadequate for cultivation. Taking the soils of the longleaf pine section as a standard, 21 percent of the county has productive arable soils, and an additional 40 percent might be considered as having soils of medium productivity, whereas 39 percent is thought best adapted, under normal conditions, to grass, game preserves, and timber.

The well-drained soils, which have developed from noncalcareous materials, in an environment of forest cover, high temperature, and heavy rainfall, are naturally poor in organic matter. The admixture of sand through the finer materials of the surface soil assures splendid tilth or favorable physical tillage properties.
The physical character of these soils renders them susceptible to erosion. The heavy rainfall, which at times comes in terrific downpours, serves to intensify the destructive process. The relief, or lay of the land, is therefore an important factor entering into any consideration of a soil from the point of view either of productivity or utilization. The relief ranges from that of a smooth plain to denuded broken hilly waste land. It is estimated that about 45 percent of the land is rolling, 15 percent hilly, and 40 percent nearly level.

The soils are grouped, on the basis of fundamental characteristics, into soil series and types, and these are combined in two major groups on the basis of their natural adaptation to different uses. These two major groups are the soils suitable for crop production—the agricultural group, and the soils better adapted to use for timber or pasture—the timber and range group. As the name implies, the agricultural group includes those soils possessing characteristics fundamentally necessary to the satisfactory production of the cultivated crops common to the general region. The timber and range group includes all soils of this county thought to be more profitably devoted to timber, range, game preserves, and recreational purposes than to crop production under present conditions.

Although soils of the two major groups are geographically intermingled more or less intricately in most places, it is true that soils within one of the groups dominate in most localities; and, with minor exceptions, the dominant soils of a locality largely determine the prevailing type of agriculture as well as the intensity of its development. With other factors nearly the same, as they are throughout this county, the prevailing soil conditions are closely correlated with the extent of social and economic development in general.

The agricultural soils dominate in the northeastern quarter of the county, especially in the vicinities of Bunker Hill and Improve Schools and east and south of Columbia; also in the western part near, north, and southeast of Kokomo. There are, of course, other small bodies composed largely of agricultural soils, especially in the Pearl River lowlands. The most highly developed agricultural communities are in these localities. Probably more than 90 percent of the farms in these localities derive their principal income from cotton, supplemented with less amounts from poultry and minor special crops. Some livestock and livestock products are produced primarily for home needs.

The larger areas of timber and range soils are in the Pearl River lowlands and along bordering bluffs, particularly those on the west, and in the southeastern corner of the county. Smaller areas are widely scattered. The type of agriculture prevailing on the timber and range lands is more primitive, miscellaneous, and transitory. The farms are usually widely spaced, and the cultivated acreage is small, ordinarily occupying small isolated fields. The crops are inclined to the subsistence type, with less cotton and minor cash crops. A few livestock are kept, largely on the range, and more or less timber products are marketed, especially within a 10-mile radius of Columbia. A small number of individuals engage rather extensively in the production of range cattle during times of normal market conditions.
The influence of dominant soil conditions is apparent, not only in type and intensity of agricultural development, but also in density of population, prevalence of roads and churches, proximity to schools, and economic status of the rural community. Although no specific data are available as to the extent of such variations between localities of the agricultural soils and those of timber and range soils, the contrast is conspicuous even to a casual observer. The 1930 Federal census data are compiled by minor civil divisions or beats in this State, but, since all beats include parts of both major land divisions, no clear-cut comparisons are possible. A comparison of figures for beat 2, which is nearly three-fourths agricultural land, with those for beat 5, which is only about one-fourth agricultural land, shows that the former has a larger rural farm population, greater number of farms, larger percentage of land in harvested crops, greater value of all farm buildings, and higher value of farm implements a square mile. The figures for beat 2 are 74, 67, 100, 70, and 254 percent greater, respectively, than those for beat 5.

In the following pages the different soils of this county are described in detail, and their agricultural relationships are discussed; their location and distribution are shown on the accompanying map; and their acreage and proportionate extent are given in table 4.

<table>
<thead>
<tr>
<th>Type of soil</th>
<th>Acres</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ruston fine sandy loam</td>
<td>25,216</td>
<td>7.4</td>
</tr>
<tr>
<td>Ruston fine sandy loam, rolling phase</td>
<td>36,167</td>
<td>10.7</td>
</tr>
<tr>
<td>Ruston sandy loam, rolling phase</td>
<td>46,784</td>
<td>13.7</td>
</tr>
<tr>
<td>Orangeburg fine sandy loam</td>
<td>1,472</td>
<td>4</td>
</tr>
<tr>
<td>Pheba fine sandy loam</td>
<td>3,776</td>
<td>1.1</td>
</tr>
<tr>
<td>Phase fine sandy loam, slope phase</td>
<td>30,928</td>
<td>10.8</td>
</tr>
<tr>
<td>Kalina fine sandy loam</td>
<td>12,416</td>
<td>3.6</td>
</tr>
<tr>
<td>Kalina fine sandy loam, hardpan phase</td>
<td>13,760</td>
<td>4.0</td>
</tr>
<tr>
<td>Kalina loamy sand</td>
<td>6,120</td>
<td>1.5</td>
</tr>
<tr>
<td>Cahaba fine sandy loam</td>
<td>8,128</td>
<td>2.4</td>
</tr>
<tr>
<td>Cahaba loamy sand</td>
<td>3,776</td>
<td>1.1</td>
</tr>
<tr>
<td>Ochlockonee fine sandy loam</td>
<td>5,640</td>
<td>1.6</td>
</tr>
<tr>
<td>Ochlockonee silty clay loam</td>
<td>5,376</td>
<td>1.6</td>
</tr>
<tr>
<td>Myntt fine sandy loam</td>
<td>18,688</td>
<td>5.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of soil</th>
<th>Acres</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaf fine sandy loam</td>
<td>1,536</td>
<td>0.4</td>
</tr>
<tr>
<td>Plummer fine sandy loam</td>
<td>576</td>
<td>0.2</td>
</tr>
<tr>
<td>Bibb silty clay loam</td>
<td>22,256</td>
<td>6.5</td>
</tr>
<tr>
<td>Bibb fine sandy loam</td>
<td>9,000</td>
<td>2.8</td>
</tr>
<tr>
<td>Alluvial soils, undifferentiated</td>
<td>3,392</td>
<td>1.0</td>
</tr>
<tr>
<td>Ruston sandy loam, broken phase</td>
<td>22,502</td>
<td>6.6</td>
</tr>
<tr>
<td>Cuthbert fine sandy loam</td>
<td>15,760</td>
<td>4.0</td>
</tr>
<tr>
<td>Susquashanna fine sandy loam</td>
<td>13,504</td>
<td>3.9</td>
</tr>
<tr>
<td>Eulonia fine sandy loam</td>
<td>4,288</td>
<td>1.3</td>
</tr>
<tr>
<td>Kalina sand</td>
<td>2,880</td>
<td>0.8</td>
</tr>
<tr>
<td>Thompson sand</td>
<td>5,326</td>
<td>1.0</td>
</tr>
<tr>
<td>Johnston fine sandy loam</td>
<td>16,384</td>
<td>4.8</td>
</tr>
<tr>
<td>Muck</td>
<td>1,472</td>
<td>0.4</td>
</tr>
</tbody>
</table>

**Table 4.—Acreage and proportionate extent of the soils mapped in Marion County, Miss.**

**SOILS SUITABLE FOR CROP PRODUCTION**

The soils suitable for crop production are so grouped and named because each soil within the group embodies characteristics essential to successful production of crops common to the county. That is, all members of the group are adequately drained; their subsoils are free from extreme toughness, plasticity, and cementation, and contain sufficient proportions of silt and clay or fine materials to retain an adequate supply of moisture for satisfactory crop growth. Erosion has not been severe, and the relief of these soils generally is nearly level or smoothly rolling in places where measures of protection against gullying may be maintained at permissible cost.
The principal soils conforming to these requirements are the fine sandy loams of the Ruston, Orangeburg, Pheba, Kalmia, Cahaba, and Ochlockonee series. These soils occupy 60.8 percent of the area of the county and are widely distributed both on river flats and uplands, in bodies ranging in size from less than 1 square mile to several square miles. The larger continuous areas are in the northeastern quarter of the county in the vicinities of Bunker Hill and Improve Schools, and east and south of Columbia; and in the southwestern part near and southeast of Kokomo. Smaller areas are well scattered over all sections including the Pearl River Valley.

These soils are free of stone, and although the slopes are sufficiently steep in places to interfere somewhat with cultivation, in most places the physical nature of the soils renders them easily workable.

As compared with the average well-drained forested soils of this section, these soils are high in fertility or available plant nutrients. As compared with soils developed in an environment of grass cover and lower rainfall, however, they have been rather severely leached of plant nutrients. Consequently, under normal economic conditions, investments in commercial fertilizers are common and ordinarily profitable.

Although the various soils making up the agricultural group have a number of characteristics in common, they differ from one another in one or more features, in fact, the degree to which even the common characteristics are developed differs between different soils. On a basis of such differences this group of soils is subdivided into three subgroups, the members of which logically are more closely related, one to another, than are the members of the agricultural soils as a whole.

These three subgroups are (1) soils of the uplands with gray topsoils over red subsoils, (2) soils of the uplands with gray topsoils over yellow subsoils, and (3) the better drained soils of the bottom lands, which include all agricultural soils occurring on the terraces and flood plains of the major streams.

SOILS OF THE UPLANDS WITH GRAY TOPSOILS OVER RED SUBSOILS

These soils are designated by local farmers as “red soils” and are generally recognized as the best soils for cotton in the county. Their subsoils are red or reddish yellow, and their surface soils are gray. The members of this group are extensive and include the best agricultural soils of the county.

The color of the soil has little effect on the worth or use of the soil, but as an indication of the presence or absence of certain soil characteristics of agronomic consequence, color becomes a significant feature. This fact is well exemplified in a comparison of the soils with red and those with yellow subsoils. The red soils have more organic matter in the surface soil; they are characterized by better tilth and withstand extreme amounts of moisture better than do the yellow soils. The explanation is found in the nature of the subsoils and underlying material, the substratum.

In the red soils the subsoil is red or reddish-yellow friable light sandy clay or sandy loam, which extends to a depth ranging from
It is free of any tight, hard, or cemented development that would interrupt circulation of moisture, air, or heat, or prevent the penetration and development of roots. The material underlying the subsoil—the substratum—is variable in many respects, but it is characteristically free of a tight development which would obstruct the normal downward movement of surplus soil water. The textural composition, or proportion of coarse and fine soil materials composing these soils to considerable depth, is such that the soil is sufficiently open to allow downward movement of water, and such that capillary circulation, or movement of soil moisture from greater depths upward toward the surface, is normally active during dry periods. These characteristics of the red soils render them absorptive and retentive of both moisture and easily soluble plant nutrients, and they tend to furnish growing crops with a comparatively even supply of moisture during periods of extremely high rainfall or severe drought. Indirectly, through a tendency to avoid alternate very wet and very dry conditions of the surface soil, these same soil characteristics favor the accumulation and preservation of organic matter.

The presence of air and warmth in the soil is just as essential to plant growth as is that of moisture. And when a soil is in a saturated condition, that is, full of water, air is virtually excluded, and warming of the soil is delayed. The red coloration of these subsoils is a product of chemical action restricted to a range of conditions requiring the presence of both heat and air. Thus the red coloration requires normal aeration which depends largely on drainage conditions, and drainage conditions in an upland soil are, in turn, largely determined by the physical nature, or consistence, of the subsoil and substratum. So far as the upland soils of this county are concerned, those free of tight or hard developments are characterized by good internal drainage and have red subsoils, whereas those with less pervious subsoils or substrata have yellow subsoils.

**Ruston fine sandy loam.**—Ruston fine sandy loam is one of the locally termed red soils. It occupies the smooth broader ridge tops and is one of the best agricultural soils in the longleaf pine section. Owing to the fact that this soil has the smoothest relief of the red upland soils of the county where erosion has been less active, it not only possesses the common characteristics of the red soils, but it is in this particular soil that such characteristics are most typically developed.

The cultivated surface soil is grayish-brown or gray loose fine sandy loam extending to a depth ranging from 10 to 20 inches. A moderate amount of finely divided organic matter imparts a dark stain to the topmost 3 to 5 inches. Although the content of organic matter is rather low, and dissipation is moderately rapid under cultivation, it is more abundant and durable in this soil than in soils having rolling relief or impervious substrata.

The subsoil consists of yellowish-red or reddish-yellow friable light sandy clay and extends to a depth ranging from 4 to 6 feet. It is free of any tight development, and circulation and root penetration are normal. Although the percentage of sand is high, sufficient fine material is dispersed through the mass to give a gloss to a fresh cut and render it relatively retentive of moisture and plant nutrients.
The material is easily broken up and naturally crushes into a mass indicating little definite structure.

The material to considerable depth underlying the subsoil is more variable and ordinarily more sandy. The color is dominantly yellowish red, with splashes of yellow, gray, and some of rusty brown, and layers containing a few pebbles are not uncommon. Patches and thin lenses of clayey material occur here and there.

The loose physical nature of the surface soil, absence of stone, and gentle relief afford excellent tillage conditions, and improved farm machinery could readily be used.

This soil, occupying the smoother ridge tops, borders areas of the rolling phases of the Ruston soils, which lie below the breaks of the slopes. In many places where such breaks are gradual, lines on the map separating the typical soils and the rolling phases are placed more or less arbitrarily, and small areas partaking of an intermediate nature are included in each. The texture of small local areas included with Ruston fine sandy loam is coarser than typical, and the usual minor variations in color are to be expected.

Ruston fine sandy loam has a wide distribution over the uplands of the county, but the greater part is mapped in the northeastern quarter and the western half. The areas are irregular in outline, border roughly along contours, and range in size from a few acres to nearly a square mile. Some of the larger bodies are mapped in the vicinity of St. Maries Church, north of Bunker Hill School, east of Kokomo, and northwest of Hurricane Creek Church.

It is estimated that over 80 percent of this soil is under cultivation, and that the rest is devoted to pasture and woodland. Cotton, the leading crop, probably occupies about 60 percent of the cultivated area; corn about 35 percent; and the rest is devoted to hay, patch crops, and special crops, such as sugarcane and the vegetables commonly grown. Yields of cotton generally range from one-half to three-fourths bale an acre. Acre yields of 20 bushels of corn, 1 1/2 tons of hay, 175 bushels of sweetpotatoes, and 200 gallons of sugarcane syrup are not unusual. Although corn, grass, and sugarcane are somewhat better adapted to soils of higher average moisture and organic content, Ruston fine sandy loam is among the best soils of the county for cotton and truck crops.

Commercial fertilizers are generally used under important crops. A 4-8-4 is the popular mixture, although the State experiment station recommends a 6-8-4 mixture. Most of the corn receives in addition a side dressing of nitrate of soda or sulphate of ammonia. The common practice is to apply from 100 to 300 pounds an acre of 4-8-4 to the land for cotton at planting time, and heavy amounts—often 1,000 pounds—of this same mixture are applied to most vegetables. Little stable manure is used, although when applied it increases yields. Considerable terracing is being done, and a few farmers are including leguminous cover crops for soil improvement, but on most farms the virgin fertility and commercial fertilizers are relied on entirely for crop production.

Very few, if any, farms consist entirely of this soil. It is, however, one of the more valuable farming soils in the county.

**Ruston fine sandy loam, rolling phase.**—The rolling phase of Ruston fine sandy loam is essentially similar to typical Ruston fine
sandy loam, but it differs from that soil in that it has a more rolling relief or steeper slopes. This is a good agricultural soil, but its high susceptibility to erosion impairs its usefulness.

The 8- to 20-inch surface soil is loose gray or grayish-brown fine sandy loam. Owing to more active erosion on the more rolling soil, the organic content is ordinarily a little less than on the smoother areas of Ruston fine sandy loam. For the same reason, the surface soil is more variable, both as to thickness and general nature, than that of the typical soil. The subsoil consists of red or yellowish-red friable sandy clay or sandy loam, and both this layer and the sub-stratum are practically identical with the corresponding layers of Ruston fine sandy loam.

This is one of the more extensive soils and is widely distributed throughout the uplands. The greatest number of large areas are mapped in the northeastern and southwestern quarters of the county, and smaller areas are in the southeastern quarter. The bodies vary greatly in shape and size. They range in size from a very few acres to more than a square mile.

The rolling phase of Ruston fine sandy loam is closely associated with the other Ruston soils, small areas of which are included. The usual minor variations in color and texture are included in mapped areas.

This soil is adapted to about the same crops as those grown on the smoother Ruston fine sandy loam, but, owing to the steeper slopes and more uneven surface of the rolling phase, probably less than 30 percent of it is now in cultivation, and it is estimated that yields average about 15 percent less than on the typical soil. Terracing and other measures of protection against erosion are more essential on the rolling phase than on Ruston fine sandy loam. Steep slopes and the characteristic dissected condition resulting from numerous branching drainage channels, make the use of heavy farm machinery impractical. The use and management of the two soils otherwise are similar.

**Ruston sandy loam, rolling phase.**—The rolling phase of Ruston sandy loam is the most extensive soil in Marion County. A total of 73 square miles is mapped. It differs from the rolling phase of Ruston fine sandy loam in that it is even more rolling, eroded, and cut by drainage channels, the texture is coarser, and the surface soil is more variable. The extent of these conditions is such that the rolling Ruston sandy loam is little better, agriculturally, than marginal land. This is the most rolling of the important agricultural soils. The characteristics of corresponding layers are similar, however, in all the Ruston soils of this group.

Under cultivation the surface soil consists of loose gray or brownish-gray sandy loam or loamy sand. Owing to erosion and the deposition of materials in alternate strips, the depth and character of the surface soil vary considerably within short distances. The depth ranges from 12 to 16 inches. The organic content is slightly less and distribution of the material is less uniform than in Ruston fine sandy loam.

The subsoil is very similar to that of other Ruston soils in this group. It consists of red or yellowish-red friable sandy clay or sandy loam. It is, however, somewhat less uniform and extends to a
slightly deeper, in most places ranging from 3 to 5 feet. The typical sandy porous substratum of the Ruston soils lies beneath the subsoil.

In distribution and manner of occurrence, this soil resembles the rolling phase of Ruston fine sandy loam, with which it is closely associated. In the west-central part of the county are a few small widely scattered areas which are more sandy than typical. A few small areas that are more red than typical are near the county line east of Columbia. Owing to active erosion, the minor textural variations commonly included in a soil type are somewhat greater than usual in this soil. The more gravelly areas are indicated by symbols.

Probably less than 5 percent of the land is under cultivation. It is used and managed very much as the rolling phase of Ruston fine sandy loam. Yields of important crops are thought to average 15 or 20 percent lower on the sandy loam. Practically all the rest of the land is in a cut-over condition and is used for range or pasture and timberland.

**Orangeburg fine sandy loam.**—Orangeburg fine sandy loam differs from Ruston fine sandy loam primarily in having a redder subsoil. In regard to agricultural worth and natural adaptation, it is similar to Ruston fine sandy loam.

The surface soil, under cultivation is loose gray or grayish-brown fine sandy loam containing an average amount of organic matter, which is probably slightly higher than that of the Ruston soils. The subsoil is bright-red friable fine sandy clay which, as is also the underlying substratum, is very similar in color to those layers of the Ruston soils rather than the deeper red color associated with the Orangeburg soils.

Orangeburg fine sandy loam occurs principally in small areas on the uplands throughout the county, with less mapped in the southeastern corner and more in the northeastern corner. Its distribution and manner of occurrence are similar to those features of Ruston fine sandy loam, with which it is closely associated, but it is characterized by more variable relief. Several small patches in the northeastern part of the county occupy nearly level areas, whereas a few near the county line east of Columbia are rolling and coarser in texture than typical.

Regarding use, adaptation, and management, this soil closely resembles Ruston fine sandy loam, rolling phase, but yields are thought to average very slightly higher on the Orangeburg soil.

**SOILS OF THE UPLANDS WITH GRAY TOPSOILS OVER YELLOW SUBSOILS**

As previously discussed, the yellow soils, or more strictly speaking, the agricultural soils of the upland with yellow subsoils, are somewhat inferior to the soils having red subsoils. The cemented condition of the lower part of the subsoils and substrata is the characteristic which, through interference with soil drainage and capillary movement of water, accounts for the difference both in color and productivity.

The yellow soils occur in all parts of the uplands, but they are more prevalent near and north of Columbia, northeast of Hub, and north of Kokomo. A total of 63.6 square miles is mapped. The
Pheba soils comprise this group, and two separations are made on the basis of relief and related differences.

**Pheba fine sandy loam.**—Pheba fine sandy loam occupies smooth, nearly level plains, for the most part east and north of Columbia. A few areas are in the northwestern part of the county. This is a fair agricultural soil.

The cultivated surface soil is moderately loose light-gray fine sandy loam which continues to a depth ranging from 8 to 16 inches. The organic content is considerably lower than in the Ruston soils. Owing to this and associated tilth characteristics, the plowed soil often becomes rather compact following a heavy rainfall or a long wet period. The consistence of the surface soil, when freshly plowed and comparatively dry, suggests that of flour, and owing to the scarcity of organic matter, the color is but little darker.

To a depth of about 30 inches, the subsoil consists of yellow or buff friable fine sandy clay, which is somewhat sticky when wet. Beneath this the material is tight, apparently somewhat cemented, hard to break up, and comparatively dry even when the overlying subsoil layer is wet, although it is more sandy than the material above it. To a depth ranging from 6 to 7 feet, there is little change in texture and consistence, but red, purple, and gray colors splotch the yellow. The use of dye indicators shows that this cemented layer is more acid than any part of any soil tested in the county.

This soil occurs in irregular-shaped areas, varying widely in size, and in close association with the rolling phase of Pheba fine sandy loam, which occupies adjacent slopes. The degree of slope varies slightly from place to place. It is, however, invariably very mild. The depth of the cemented horizon beneath the surface also varies, and, therefore, the drainage conditions and general productivity. Drainage is nowhere very good, and productivity is not high. A few patches of Ruston fine sandy loam, which are fairly productive but too small to map, are included here and there.

The favorable lay of the land encourages farming despite the inability of the soil to withstand extreme rainfall conditions. Probably 70 percent of the land is cultivated to the general field crops, and special crops are grown in a very limited way. Yields of all crops, so far as is known, vary widely with seasonal conditions, but in general they are estimated to be about 30 percent lower than on Ruston fine sandy loam. The Pheba soil generally occurs in larger bodies than the Ruston soil, and, as above stated, most of it is in the vicinity of Columbia. The sales value of the Pheba is estimated to be only about 20 percent less than that of Ruston fine sandy loam.

**Pheba fine sandy loam, slope phase.**—The slope phase is the sloping and eroded equivalent of the smoother Pheba fine sandy loam. Surface drainage is of course better, but the character of the soil material is less uniform and the depth of the cemented substratum more variable but ordinarily closer to the surface.

The surface soil, as it appears in a cultivated field, consists of loose light-gray or grayish-brown fine sandy loam or medium sandy loam, in most places ranging from 8 to 20 inches in thickness. The organic matter is similar to that of the smoother Pheba fine sandy loam but probably is very slightly heavier. The subsoil is essentially
similar to that of the smooth soil but is less uniform, and in places the color is a little more inclined to a red tint.

A total of 57.7 square miles of this soil is mapped. It is widely distributed in all the upland parts of the county and predominates near Columbia, northeast of Goss, north of Hub, and in the extreme northwestern corner. It is closely associated with some of the Ruston soils and occupies slopes joining the smoother Pheba fine sandy loam. It grades into Eulonia fine sandy loam in places. Small areas and strips, which resemble this soil, are included. A few small scattered areas, in which the cemented substrata lie at a greater depth, resemble Norfolk fine sandy loam. Gravel deposits, some of which are mined, are not uncommon and are indicated on the map by symbols.

It is estimated that from 5 to 10 percent of this soil is cultivated to such crops as cotton, corn, and hay, with very little devoted to special patch crops. Yields average a little less than on the smooth Pheba soil. The sales price of the land is probably 50 percent less, owing largely to location, relief, and erosion conditions.

**BETTER DRAINED SOILS OF THE BOTTOM LANDS**

The soils of the stream terraces, locally termed “hammock soils”, occupy the second bottoms or higher valley plains of Pearl River and its larger tributaries. These terrace plains are stone-free, smooth, nearly level, and rise just a few feet above the highest flood waters. All towns of the county except Kokomo are located on these terrace, or hammock, lands. The land was at one time stream bottom, and the soils have developed from materials deposited by the streams. These soils occupy the better drained parts. Owing to the rather flat relief, surface run-off is sluggish, but internal drainage is ordinarily fair through the upper 2 to 4 feet, depending largely on the degree of perviousness in the underlying substratum. The depth to the natural water table is much less under the hammock soils than under the upland soils.

Patches, most of them too small to map, locally referred to as “dead spots”, occur here and there throughout the areas of these soils. These dead spots are well named, whether considered in the broad conception of soils as such or in the narrower conception of soils as crop producers. The spots are practically clean sand and are devoid of organic matter.

The agricultural soils of this group vary in color, texture, and, within a limited range, even in consistence of the deeper layers. Therefore drainage conditions and productive capacity also vary. Primarily on a basis of such differences, the soils of this subgroup are separated mainly into fine sandy loams and loamy sands of the Kalmia and Cahaba series. The yellow soils constitute the Kalmia, and the red soils make up the Cahaba. The better drained soils of the first bottoms or overflow lands, are included in the Ochlocknee series. Although they are subject to flooding, they may, nevertheless, be used for cultivated crops within the limitations discussed in the description of the soil types.

The total area of the soils of the terraces and bottoms is 89.4 square miles.

**Kalmia fine sandy loam.**—Kalmia fine sandy loam is one of the more extensive and important agricultural soils of the second bot-
toms. The cultivated surface soil, to a depth ranging from 10 to 18 inches, consists of gray loose fine sandy loam. The organic matter is barely sufficient to impart a dark stain to the plow soil, or topmost 4 or 5 inches. The texture is favorable to good tilth. The subsoil consists of yellow fine sandy clay which is friable but moderately sticky when wet and extends to a depth ranging from 2 to 4 feet. The material underlying the subsoil is dominantly light-gray sandy clay containing splotches of yellow and rusty brown, but is variable in consistence and degree of cementation.

This soil is ordinarily well drained to a depth ranging from 2 to 3 feet, but the depth to the water table varies somewhat, and the character of the substratum also varies. Therefore natural drainage conditions differ from place to place. A few small areas near Foxworth are a little coarser in texture than typical. This soil is very closely associated with the hardpan phase of Kalmia fine sandy loam and the Cahaba soils, and small patches of those soils are included in mapping.

Areas of this soil are well distributed over the terraces, or second bottoms, of Pearl River and its larger tributaries. Some of the larger bodies are in the vicinity of Lampton and north of that town, along Upper Little Creek, and some are along Lower Little Creek. The areas differ widely in size, but are not quite so irregular in outline as many areas of the upland soils.

This is a soil of fair or good productivity, and the favorable working quality and nearly level relief encourage cultivation. Probably from 50 to 60 percent of the land is under cultivation, divided almost equally between cotton and corn, with a minor part devoted to hay and special crops. A considerable part of the uncultivated land is in pasture and ordinarily produces a good grass sod. Acre yields of one-third to one-half bale of cotton or 15 bushels of corn are considered fairly representative. This soil responds well to fertilization and the addition of organic matter.

**Kalmia fine sandy loam, hardpan phase.**—The hardpan phase differs from typical Kalmia fine sandy loam in having a cemented layer at a depth ranging from about 24 to 36 inches. The layers of this soil are similar to corresponding layers of Pheba fine sandy loam, and the hard cemented lower subsoil layers and substrata, common to the two soils, are equally detrimental to the productive capacity.

The cultivated surface soil of the hardpan phase of Kalmia fine sandy loam is gray or nearly white moderately loose fine sandy loam. The organic content is very low, and in many places the soil assumes a packed condition, particularly following a heavy rainfall. The subsoil, to a depth of about 30 inches, is firm yellow fine sandy clay which is friable, though sticky when wet. The underlying material is essentially like that of the Pheba soils. It is dominantly yellow tough cemented comparatively impervious fine sandy clay splotched with gray, yellow, and rusty brown.

Although the texture of this soil is rather uniform throughout, the depth to the cemented substratum is somewhat variable, as are also drainage conditions and consequent productivity.

The hardpan phase of Kalmia fine sandy loam is more extensive than typical Kalmia fine sandy loam. It occurs widely scattered in the higher parts of the valleys of Pearl River and its larger tribu-
taries. Practically all of it lies east of Pearl River. Its greatest development is near and south of Lampton, north of Columbia, and along Upper Little Creek and its tributaries.

This is one of the less productive agricultural soils. Much of it is considered better adapted to pasture grasses, and the greater part is little better than a marginal soil for crops. It is estimated that about 25 percent is under cultivation to about the same crops as are grown on typical Kalmia fine sandy loam, but yields are about 20 percent lower on the hardpan phase.

Kalmia loamy sand.—Kalmia loamy sand differs from Kalmia fine sandy loam in that it is lighter textured. It is one of the less important agricultural soils as it is inexpensive and of low productivity.

The cultivated surface soil is gray loose loamy sand or fine sand. The organic content is low and disappears rapidly under cultivation. The underlying material, to a depth ranging from 3 to more than 4 feet consists largely of grayish-yellow loamy sand or fine sand, and it contains barely enough fine materials to impart a very slightly loamy feel. Generally, at a depth ranging from 3 to 4 feet, the moisture content is greater and splotches of gray and yellow are in evidence.

This soil is mapped in close association with the other Kalmia soils and the relief, tilth, and depth to the natural water table are similar for all of them. Minor variations in color, texture, character of substratum, and drainage conditions are included. Several areas near and north of White Bluff are coarser in texture than the average.

This soil occurs in all sections of the county, on the higher sandy plains of the large stream valleys. Some of the larger areas are near Hub, Sandy Hook, and Morgantown.

Profitable crops of cotton and corn hardly can be expected under average conditions. Cucumbers, cantaloupes, watermelons, and berries are fairly well adapted, but even these crops thrive much better on less sandy soils. For a few years after clearing, yields are ordinarily fair, but it is difficult and expensive to maintain a state of productivity sufficient to justify cultivation.

Cahaba fine sandy loam.—Cahaba fine sandy loam is closely related to Kalmia fine sandy loam in most important respects. It differs from that soil in that it has a red subsoil, a more porous substratum, and consequently better internal drainage. The average organic content is a little greater in the Cahaba soil, and this soil is slightly more productive than the Kalmia soil.

The cultivated surface soil is gray or brownish-gray loose fine sandy loam to a depth ranging from 12 to 18 inches. The organic content in the virgin soil is sufficient to stain the topmost 3 inches dark, and it is somewhat more durable under cultivation than in the Kalmia soils. The subsoil, to a depth ranging from 3 to 4 feet, is reddish-yellow firm fine sandy clay which is friable under average moisture conditions but distinctly sticky when wet. The deeper material is typically slightly lighter in texture, comparatively permeable to water, and is a friable fine sandy clay material broken without difficulty.

This soil is geographically intermingled with Kalmia, Leaf, and other Cahaba soils, and small transitional strips and patches of these
soils are included. The soil in a few areas is a little coarser in texture, but considered in its entirety it is comparatively uniform.

The soil occupies various sized and shaped areas on the higher plains of the larger stream valleys in all parts of the county. Some of the larger areas are in the southeastern quarter and in the vicinities of Columbia and Lampton.

As regards adaptation, management, and use, this soil is very similar to Kalmia fine sandy loam. It is considered about 10 percent more productive, however, of both field and special crops. About 15 percent more of the land is in cultivation. The sales price is about 15 percent higher than that of Kalmia fine sandy loam.

Cahaba loamy sand.—In color Cahaba loamy sand resembles Cahaba fine sandy loam, but in texture and other significant features it is essentially like Kalmia loamy sand. It is neither extensive nor agriculturally important.

The soil material, to a depth ranging from 3 to 4 feet, consists of loose loamy sand or fine sand. The 12- to 18-inch surface layer is gray, stained dark with organic matter in the topmost 3 or 4 inches, and the subsoil is reddish yellow. The deeper material is similar to that beneath other Cahaba soils.

The loamy sands of both the Cahaba and Kalmia series are similar in distribution, manner of occurrence, natural adaptation to crops, present use, productivity, and sale value.

Ochlockonee fine sandy loam.—Ochlockonee fine sandy loam is developed on the first bottoms or overflow land of Pearl River, and it is flooded occasionally. It consists of comparatively recently deposited material. Although the river traverses the Jackson prairie, the soil material here has been found very acid.

This soil is well drained to a depth ranging from 20 to 40 inches. The material in the surface layer consists of grayish-brown or brownish-gray loose fine sandy loam, with the topmost few inches stained dark with a small amount of organic matter. The land is nearly flat, the water table is rather high, and drainage is poor below a depth of 3 feet. The colors below this depth are gray, yellow, and brown, mixed in varying proportions.

This soil is closely associated with the more poorly drained bottom soils and it merges very gradually with them in many places, making border strips more poorly drained than typical. For a similar reason small areas and strips of heavier texture bordering Ochlockonee silty clay loam are included.

With a few minor exceptions this soil occurs only in the Pearl River bottom lands and is generally developed near the river banks. Some of the larger areas are mapped between Morgantown and Cheraw.

Probably less than 10 percent of this soil is cultivated. Many of the areas are isolated by surrounding wet bottom lands. This condition and the susceptibility to overflow discourage cultivation, despite the relative fertility of the soil. The soil is well adapted to all the field and special crops commonly grown, but since invasion by the cotton boll weevil it is less desirable for cotton than are the Ruston soils. There seems to be a tendency to abandon the river-flat soils in favor of the piny woods land. Practically all that part of this
soil not cultivated supports a heavy cover of forest, primarily of hardwoods, and it serves as range for livestock.

**Ochlockonee silty clay loam.**—Ochlockonee silty clay loam is another Pearl River first-bottom soil. It is developed in the same environment as Ochlockonee fine sandy loam, with which it is very closely associated. It is the heaviest textured agricultural soil in this county and is locally known as “thirsty swampland.”

This soil is well drained to a depth ranging from 20 to 30 inches, to which depth the material is grayish-brown or brownish-gray firm silt loam or clay loam. The plow soil, or topmost 3 to 5 inches, is stained dark with organic matter. Below a depth of about 3 feet, drainage is not good, and the color of the soil material is dominantly gray with varying proportions of yellow and brown splotches. The material is strongly acid to a great depth.

Boundaries between this soil on the one hand and Ochlockonee fine sandy loam and the Bibb soils on the other in many places are indistinct, and minor areas of the associated soil types are included. The range in texture in the included areas is from silt loam to heavy clay loam, and the depth to which the well-drained brown layer extends also is rather variable.

This soil is restricted to the Pearl River flood plain, over which it is well scattered. Some of the larger areas lie north of Sandy Hook, south of Columbia, and near Morgantown.

Owing to the droughty character of this soil, it is generally considered inferior in productivity to Ochlockonee fine sandy loam. In some places Ochlockonee silty clay loam is underlain at a depth ranging from 3 to 4 feet by sand and gravel beds which may have something to do with its droughtiness. The structural nature, or absence of proper granulation, extremely acid condition of the material, and high wilting point may also be factors. The addition of lime might be of some benefit.

Probably about 5 percent of this soil is cultivated to very much the same crops as those grown on Ochlockonee fine sandy loam, but it is not so well adapted to corn, and yields in general are about 20 percent lower. The tendency to abandon cultivated lands is more pronounced in the case of this soil than in that of Ochlockonee fine sandy loam.

**SOILS ADAPTED TO TIMBER AND RANGE**

It has been brought out in the previous discussion that such features as good drainage, favorable physical development, proper ratio and mixture of coarse and fine materials, and mild relief are essential characteristics of an agricultural soil for this section of the country. Each agricultural soil type and phase previously discussed embodies these elementary characteristics, at least to some degree. Each soil type and phase in this group, however, is lacking in one or more fundamental features and is, therefore, too unproductive for crop use and can be devoted more economically to the production of timber or grass. Hence, they are designated timber and range soils.

The timber and range soils occupy 39.2 percent of the land area of the county, and they predominate on the flood plains of Pearl River and its tributaries, in the southeastern quarter, and on the
west bluff of the Pearl River Valley. Smaller areas lie north of Kokomo and in the northeastern quarter of the county. It is estimated that about 48 percent of the soils of this group is nonarable because of poor drainage or frequent overflow, about 17 percent because of broken relief and high susceptibility to severe erosion, about 28 percent because of impervious subsoils, and about 7 percent because of sandiness. They are all submarginal crop soils.

The natural adaptation of many of these soils is practically restricted to the production of timber, a few of them because of continuous saturation and frequent flooding, but most of them because of droughtiness; whereas on some of the soils either grass or timber and in some places a combination of both are naturally produced. The fundamental soil features largely explaining such variations in adaptation are texture, natural moisture conditions, relief, and stage of and susceptibility to erosion. Therefore, for clarity and convenience, the timber and range soils are subdivided into two subgroups on the bases of these characteristics and crop adaptations.

The pasture soils include those soils high in natural moisture but free from long periods of saturation or very frequent overflow. The timber soils include those on rough or steep land, where erosion is severe; those with impervious subsoils; those which are very sandy; and those saturated most of the time.

**SOILS SUITABLE FOR PASTURE**

The soils suitable for pasture, or pasture soils, are practically restricted to the stream valleys. They are naturally poorly drained and are in part subject to overflow. Although the natural drainage is sufficiently poor to prevent cultivation, it is ordinarily adequate for the production of a good stand of grass. That part inundated long enough to materially injure a grass sod is negligible. Longleaf pine is better adapted to the rolling timberlands, but slash pine will do equally as well or better on many of these soils. The areas subject to overflow are well adapted to pasture grasses, but an encroaching luxuriant timber growth naturally tends to crowd out the grass.

Although timber or grass, or for the most part a combination of the two, naturally do well on most of these soils, in view of the fact that the county has a vast acreage of rolling timber and range lands better adapted to timber than to grass, it is logically expected that these wetter soils will be utilized largely as pasture land. Natural adaptation and efficient land utilization, therefore, set this group apart as pasture soils.

The pasture soils represent a total area of about 88 square miles, or 16.4 percent of the county. More than 90 percent of their total acreage is in the Pearl River Valley, and the rest is along the tributaries of that river.

The pasture soils vary as regards texture, consistence, drainage, and overflow conditions. They are accordingly subdivided into the Myatt, Leaf, Plummer, and Bibb soils, and alluvial soils, undifferentiated.

**Myatt fine sandy loam.**—Myatt fine sandy loam is mapped for the most part on the poorly drained parts of the higher plains or terraces of the Pearl River Valley. A small part of it is subject to overflow during very high waters.
The 10- to 20-inch surface soil is gray moderately loose fine sandy loam. The organic content varies somewhat, but it is ordinarily low and is confined to the topmost 3 to 5 inches. The subsoil, to a depth ranging from 2 to 3 feet, consists of moderately sticky fine sandy clay which is dominantly gray but contains numerous splotches of yellow and some of brown. In most places the material beneath a depth of 40 inches is harder, slightly compact, and less permeable to water.

Mapped areas of this soil differ somewhat in texture, drainage conditions, character of substratum, and content of organic matter, but very little of it is too wet for the production of grass.

The greater part of Myatt fine sandy loam is mapped in the south-central part of the county on the Pearl River flats. The largest areas are south of Hub, south of Sandy Hook, south of Cheraw, and near Hathorn.

The greater part of this soil now supports a timber growth and serves as range for livestock, although most of it is well adapted to lespedeza, carpet grass, and Dallis grass. A few excellent pastures have been developed. Practically none of the land is cultivated.

**Leaf fine sandy loam.**—Leaf fine sandy loam is neither extensive nor of agricultural importance. It is characterized both by poor drainage and a slowly pervious subsoil.

The 10- to 15-inch surface soil is gray fine sandy loam or very fine sandy loam. The organic content is slight and is present in only the topmost few inches. The subsoil consists of tight heavy plastic silty clay which is comparatively impervious and variable in color, with mixed gray and red dominant in most places.

A comparatively large area is mapped southeast of Sandy Hook, but the more common occurrence is in small areas well scattered over the higher plains of the Pearl River Valley.

Practically none of the land is cultivated, and the few attempts made to cultivate it have proved discouraging. Its best use is for timber, grazing, or a combination of the two.

**Plummer fine sandy loam.**—Plummer fine sandy loam is another comparatively minor soil type both as regards area and value. It is essentially similar to Myatt fine sandy loam but has a more varied environment and broader geographic distribution. It is mapped in the poorly drained parts of the larger stream terraces, along intermittent drainage lines, and in depressions within the uplands.

The gray sandy surface soil contains little organic matter. That part in the depressions within the uplands has a subsoil of sticky sandy clay or silty clay, mostly gray but splotched with yellow and brown; and that developed on the stream plains is characterized by a subsoil of saturated gray fine sand or loamy fine sand.

This is a very inextensive soil occurring in very small areas widely scattered throughout the county. It is adapted to the same purposes as is Myatt fine sandy loam.

**Bibb silty clay loam.**—All the Bibb silty clay loam areas are in the flood plain of Pearl River. This soil occupies a lower level than the Ochlockonee soils and is therefore more poorly drained and more frequently overflowed.

The soil material to a depth of several feet consists of dominantly gray silty loam or clay loam, with yellow and rusty-brown splotches.
To a depth of 1 inch the material is generally slightly stained with a small quantity of organic matter, and gray becomes more dominant with increasing depth to the water table which, in most places, lies from 4 to 6 feet beneath the surface.

Although drainage is universally poor, only a small part of this soil is almost continuously saturated. Small areas of closely related bottom soils are included, and in the extreme southern part of the county there are a few areas which are intermediate between the Bibb and Ochlockonie soils in general characteristics.

Although this soil is well distributed over the Pearl River flood plain, many of the larger areas lie west of the river, south of Foxworth.

Very little grass is grown on this soil, owing to the prevalence of a luxuriant hardwood forest. If the trees were removed, an equally vigorous grass cover would follow. Because of poor drainage and frequent overflow none of the land is cultivated, and for the same reasons none of it is adapted to cultivated crops.

**Bibb fine sandy loam.**—Bibb fine sandy loam differs from Bibb silty clay loam principally in two respects—it is lighter textured and less uniform, and it is subject to an entirely different type of overflow as it occurs on the flood plains of much smaller streams.

The materials composing this soil are recent depositions by small streams, and they have become little altered since deposition. Such layers as appear in Bibb fine sandy loam are, therefore, those incident to stream stratification rather than to soil development. The soil is consequently very ununiform, but it consists in the main of fine sandy loam or medium sandy loam with practically no accumulation of organic matter in the surface soil. Very little of it is constantly saturated, and, although it becomes flooded rather frequently, it remains so for short periods only.

This soil characteristically occurs in long narrow sinuous strips following small streams and intermittent drainage lines, especially in association with the Pheba and Susquehanna soils. It is mapped in all parts of the county. The larger areas are in the vicinity of Darburn, southwest of Columbia, and along Holidays Creek.

Bibb fine sandy loam is an excellent soil for grass. Its occurrence in long narrow strips depreciates somewhat its value as a pasture soil, as fencing would be difficult. It is not suited to the production of cultivated crops.

**Alluvial soils, undifferentiated.**—The undifferentiated alluvial soils are inextensive and of little agricultural consequence. They occupy the very narrow alluvial or colluvial plains along streamlets and intermittent drainage lines. The source of the material is wholly eroded material from the local slopes. It represents the surface waste caused by heavy rainfalls and deposited at the foot of the slopes. No organic accumulation has taken place, and no true soil has developed. The separation represents a mere deposition of soil materials. The land is more fertile than the adjacent slopes and is in general well drained, but it is frequently overflowed during all seasons of the year. It is an excellent grass soil, and good field crops may be harvested if they escape destruction by flood waters.

This material is very ununiform and has essentially the same characteristics as when deposited. The dominant colors are gray
and brown, and the texture is fine sandy loam or medium sandy loam. Land of this kind is very inextensive. It occurs in long narrow strips. Practically all of it is in the northern and western parts of the county.

**SOILS ADAPTED ONLY TO TIMBER PRODUCTION**

The subgroup of soils that are adapted only to timber production includes a number of very different soils, none of which can be profitably utilized for cultivated crops, and none of which is a good native-grass producer. Some of these soils are unfitted for profitable crop production because of sharp relief and erosion, some because of heavy impervious subsoils, a few because of sandiness, and others because of their characteristic saturated condition. They are poor grass soils because of unfavorable moisture conditions—two of them being too wet and the rest too drouthly. Since these soils cannot profitably be employed for the production of crops or grass, they are, as a group, designated timber soils.

They aggregate a total of about 122 square miles, or 22.8 percent of the county. Although smaller areas appear promiscuously scattered in all parts of the county, these soils predominate along the west bluff of the Pearl River Valley and in the southeastern corner.

The subgroup of timber soils is composed of a broken phase of Ruston sandy loam, and Cuthbert, Susquehanna, Eulonia, Kalmia, Thompson, Johnston, and muck soils.

**Ruston sandy loam, broken phase.**—The broken phase of Ruston sandy loam has been badly gullied by erosion. It consists of a series of narrow sharp ridges and knolls separated by a fine network of deep branching V-shaped valleys.

The soil materials differ widely from place to place, largely according to the stage, rate, and character of erosion. For the most part, however, they consist of disturbed materials of Ruston sandy loam. The less eroded soil has in most places the following profile: The 6- to 20-inch surface soil is gray loose sandy loam containing a small proportion of organic materials. The subsoil in most places is reddish-yellow friable fine sandy clay or medium sandy clay, extending to a depth ranging from 2 to 6 feet. The underlying material is very erratic in general character. It consists of sandy clay, gravel, sand, or any mixture of these materials, but it is generally pervious. In small spots the subsoil may be deep red, and in other places it may be pale yellow. Local deposits of gravel appear, in some places largely embedded in the soil material but not infrequently outcropping on the surface. Such areas are indicated on the map by gravel symbols.

This soil occurs in all the upland parts of the county, but more than 75 percent of the total area occupies the bluff immediately west of the Pearl River Valley.

An original stand of longleaf pine has been recently harvested. Ordinarily few seed trees are left, and hogs, cattle, and uncontrolled forest fires have free range. The young second growth of forest consists almost entirely of a variety of scrubby oaks and loblolly pine, and the grass growth ordinarily is very poor. This soil should
be reforested to longleaf pine, as it is suited neither to cultivated crops nor to grass.

**Cuthbert fine sandy loam.**—For the most part Cuthbert fine sandy loam occupies slopes along small streams, where erosion is very active. Like Ruston sandy loam, broken phase, it is restricted to the uplands, but it is more variable in relief.

The 8- to 16-inch surface soil is gray loose fine sandy loam or medium sandy loam, and the organic content is very low. The subsoil is compact, comparatively impervious, fine sandy clay which is dominantly reddish yellow but is variable in color. At a depth ranging from 2 to 3 feet, the color becomes a more mixed or mottled arrangement of gray, yellow, and rusty brown.

Although internal drainage, or downward movement of water, is obstructed by the physical character of the subsoil and substratum, surface run-off is very rapid. The impervious character of the subsoil seems to be accounted for in part by cementation and in part by heavy texture and plasticity. Plasticity, especially of the lower subsoil material, in most places is more pronounced in areas closely associated with the Susquehanna soils; whereas in most other places cementation predominates. Minor variations in texture and color are present.

Areas of this soil are well distributed throughout the uplands of the county. Very little of the soil is in the southeastern quarter. The larger areas are in the extreme northeastern part and a few miles north of Columbia.

Owing largely to the impervious character of the deeper soil material, rough or steep relief, heavy erosion and surface loss of rainfall, this soil cannot profitably be devoted to crops or grass. Its best use is probably for the production of a second forest of longleaf pine.

**Susquehanna fine sandy loam.**—Susquehanna fine sandy loam occupies uplands which range in relief from rolling areas to eroded, broken hills. It differs from Cuthbert fine sandy loam mainly in that the subsoil and substratum are everywhere heavy and plastic rather than cemented. Natural drainage and moisture conditions are very similar for both soils.

The 8- to 16-inch surface soil is gray or brownish-gray loose fine sandy loam or very fine sandy loam. The organic-matter content is very low and in general coarse and unstable. The subsoil consists of a heavy plastic very fine sandy clay or silty clay. This layer is comparatively impervious and varies widely in the proportions of mixed red, gray, and yellow colors.

The principal variations included in this soil as mapped are those of depth and color of the surface soil, caused largely by erosion and the wide range in relief. The color of the subsoil also is somewhat variable from place to place.

Practically all of this soil occurs in the uplands east of Pearl River; about 75 percent of it in the southeastern quarter of the county. Several large areas are east of Columbia near Enon Church, in the northeastern part, and south of Bunker Hill School.

This soil is unsuited for crops and pasture mainly for the same reasons that Cuthbert fine sandy loam is unsuited for these purposes.
Both soils seem to be better suited for the production of longleaf pine.

**Eulonia fine sandy loam.**—Eulonia fine sandy loam also is an upland soil with a comparatively impervious subsoil. It is geographically associated with Susquehanna fine sandy loam and differs from that soil principally in that the impervious part of the subsoil is a few inches farther below the surface, slightly less plastic, and lighter in texture. The soil also is generally of milder relief.

The 8- to 14-inch surface soil is loose gray or pale yellowish-gray fine sandy loam. Beneath this is an 8- to 12-inch layer of bright-yellow friable fine sandy clay or clay loam. The comparatively impervious layer of tough plastic (in places) or somewhat cemented sandy clay generally appears at a depth ranging from 20 to 24 inches. The color is dominantly gray, with splatters of reddish yellow or brown, and the material grades into the unweathered substratum with little change.

In general, the more plastic materials erode in very much the same manner as do the Susquehanna soils, leaving tall vertical banks and peaks to break into columnar blocks on drying. The cemented materials erode more like the Cuthbert soils by cutting shallower and broader gullies with sloping banks. The depth to the impervious layer is rather variable, and small areas are included in which such layers are entirely missing.

This soil is not extensive. Most of it occurs in a few areas northeast of Columbia, associated with the Pheba and Susquehanna soils.

Although it produces a better stand of grass than the Susquehanna and Cuthbert soils, it is not a good pasture soil, owing to its poor resistance to extremely wet or droughty periods. It is strictly a submarginal soil for crops, but it is well adapted to reproduction of a second longleaf pine forest.

**Kalmia sand.**—Kalmia sand is almost pure sand and occupies the higher plains of the larger stream valleys.

The surface soil consists of gray incoherent sand or fine sand. The organic content is coarse, scarce, and unstable. The lower part of the soil is incoherent yellowish-gray sand or fine sand, and at a depth ranging from 3 to 4 feet yellow splatter is apparent.

A few areas here and there are subject to infrequent overflow. The largest such area is along Upper Little Creek near Lampton. A few small areas with a little more red in the subsoil are included, some on Hurricane Creek south of Cheraw and others farther east on the Pearl River terraces.

This soil is comparatively unimportant, as it is inextensive and it is too sandy and droughty for the economical production of cultivated crops or grass. It is well adapted to the production of slash pine or longleaf pine.

About 80 percent of the total area is mapped on the Pearl River terraces south of Cheraw and Hub.

**Thompson sand.**—Thompson sand consists of nearly pure sand, as does Kalmia sand, but it differs from that soil in that it has been more recently deposited and lies immediately along the banks of the larger streams where overflow is frequent. Vegetation grows on very little of it, and the material is more or less shifted or altered by high waters. Practically no accumulation of organic matter or de-
velopment of soil layers has taken place. Most of this material has been deposited along the inside curves of Pearl River, and some is mapped along Upper Little Creek, Lower Little Creek, Tennile Creek, Mays Creek, and other tributaries of Pearl River. Some gravel deposits occur in places. This land has a low value, and only a few scattered trees grow here and there.

**Johnston fine sandy loam.**—As mapped in this county, Johnston fine sandy loam consists of narrow strips of swampland along the smaller streams. The material is collected and deposited by streams of local origin. The land is subject to frequent overflow and remains in a state of saturation most of the time. It is frequently altered through cutting or deposition by flood waters and locally by the accumulation and even the transportation of muck or other organic materials. Small areas of muck are included. From place to place and from time to time the material changes in an erratic way, but it is dominantly fine sandy loam.

A fairly large acreage is covered by this soil. Some of the larger areas are in the northeastern quarter of the county along Black Creek and Upper Little Creek. Narrow sinuous strips border small streams throughout all parts, except the southeast corner and the Pearl River Valley. The small quantity of grass grown is coarse and unpalatable. The economic value of this land is largely restricted to its production of natural forest.

**Muck.**—Muck, as developed in this county, may be properly considered, from the point of view of utilization, as organic swampland. It would appear that an almost continuously saturated condition is necessary to the accumulation and preservation of organic deposits, or mucky material, in this climatic environment. Like mineral swampland (Johnston fine sandy loam), and for similar reasons, under average conditions muck is more economically devoted to the production of timber.

Upon examination, the muck was found to be finely divided, black or nearly so, and granular, even when in a temporarily semidrained condition. It ranges in depth from little more than a foot to more than 6 feet, and it may be underlain by white waterlogged sand or gray sandy clay. A few small areas of coarser material, which is more brown than typical, are included. The streams and flood waters follow no definite channel, but in general they meander and deposit a certain quantity of fine sandy material which now is distributed through the organic material in many places.

The tree growth on muck is distinguishable, even at a long distance. There is a large proportion of bay and magnolia. When viewed more closely, the characteristic junglelike network of briers, vines, and herbaceous plants is evident. Locally spruce pine, loblolly pine, and some slash pine make up a considerable percentage of the forest cover. The fact that these organic deposits are locally referred to as “reed brakes” probably indicates the growth of wild cane at some former time, but no wild cane or succulent grasses grow at present. Little of the original timber has been removed, owing primarily to the difficulty of logging on the boggy saturated land.

Practically all the small total area of muck is between Foxworth and Morgantown, immediately at the foot of the west bluff of the
Pearl River Valley, where drainage and seepage waters from the hills accumulate. A few small areas lie along the small streams. Cultivation of one small patch is being attempted, with a limited degree of success. Extensive drainage would be expensive and difficult, because of the sand which is washed from the adjacent steep slopes. This land in all probability is best suited to the production of timber, with grass on the more shallow bordering areas.

**MORPHOLOGY AND GENESIS OF SOILS**

Marion County is in the south-central part of Mississippi, about 65 miles north of the Gulf coast. It lies in the coastward part of the sand-clay belt which crosses the State from north to south between the silty belt on the west and the clay belt on the northeast. The entire belt is within the coastal plains. The Red soils predominate, and this belt is referred to as the Ruston soil belt. The county is a rather typical portion of that part of the State south of the Jackson prairie, known as the longleaf pine section of the State.

The soils of this county have developed in an environment characterized by high temperature, heavy rainfall, and a forest cover. The principal factors inhibiting soil development have been rapid run-off and erosion in the uplands and the high moisture content of the lowlands. Nearly one-third of the surficial area of the county consists of recent alluvium, and many of these soils are young, because of the short time their materials have been in place.

The original forest cover of the normally drained soils consisted of a nearly pure stand of longleaf pine. There was practically no brushy undergrowth, and the amount of grass present was of little significance. The forest of the wet soils consisted of hardwoods, largely deciduous oaks.

The materials from which the soils are derived consist mainly of the noncalcareous sands, clays, and gravel of the Citronelle formation. Here and there, thin beds of clay are interstratified with the other materials. Geologists report that these materials are remarkably low in lime and magnesia. Field tests of the soil and underlying material to considerable depth with chlorophenol red, bromocresol green, and other dyes indicate that the pH values range around 5, and in many instances the pH value of the unaltered geologic material was lower than the material of the A and B horizons. There are probably small patches of the blue and gray clays and sands of the Pascagoula clays outcropping along the deeper stream valleys, but on account of their small area they are insignificant as a source of soil material.

As they have developed from rather light textured noncalcareous parent materials, under conditions of high temperature, heavy rainfall, and forest cover, the soils of this county are low in organic matter. Active erosion and heavy B and C horizons (in part heavy and plastic and in part cemented) are also factors inhibiting the accumulation and preservation of organic materials in the soils so affected. Nearly half the total area is characterized by one or both conditions to a significant degree.

Pearl River has cut a channel across the middle of the county to a depth of more than 200 feet below the highest ridges of the upland
plain. A number of the larger tributaries have ramified all sections, cutting proportionally deep channels. Drainage slopes to these valleys occupy about 65 percent of the total area of the county. Sheet erosion has been almost universal, and gullying is common. Dissection is thorough and in places deep, particularly in the coastward part of the coastal plains. Consequently normal soil development, although stimulated by mature drainage, has been materially disturbed by erosion.

Both organic and inorganic soils are present, but the organic soils are relatively insignificant in area. The inorganic soils are divided into two broad groups: (1) The well-drained soils, or those containing the normal amount of moisture for the general region; and (2) the poorly drained soils, or those in a permanently wet or semiwet condition.

The well-drained soils occupy about 80 percent of the land area of the county and include the more nearly mature soils. The well-drained soils are logically subdivided into two subgroups: (1) Those with red or reddish-yellow B horizons and (2) those with yellow B horizons.

The soils with red subsoils occupy about 45 percent of the county and include soils of the Ruston, Orangeburg, and Cahaba series. The Ruston soils constitute over 90 percent of this group and represent the regional profile, not only of the county but of the southern sand-clay belt of the State. They belong with the great group of Red soils.

The Ruston soils are characterized by gray or grayish-brown loose light fine sandy loam or medium sandy loam A horizons ranging from 8 to 20 inches in thickness. Their B horizons are yellowish-red or reddish-yellow friable sandy clay or sandy loam of single-grain structure, which, in most places continue to a depth ranging from 4 to 6 feet. The parent material is open porous sandy material, free of any pronounced cementation and, with its splotches and streaks of red, gray, yellow, and brown, presenting a mottled pattern. A representative profile of a virgin area of Ruston fine sandy loam, examined on a mild slope in the SE1/4SE1/4 sec. 31, R. 17 W., T. 4 N., where there is a second-growth cover of mixed pine and deciduous trees follows:

1. Less than one-half inch of coarse loose organic matter consisting chiefly of pine needles and partly disintegrated leaves of deciduous trees.
2. 0 to 3 inches, loose gray-brown fine sandy loam stained dark with a relatively high percentage of finely divided organic matter and a few roots.
3. 3 to 14 inches, loose pale yellow-gray fine sandy loam containing very little organic matter and few roots.
4. 14 to 30 inches, reddish-yellow friable light sandy clay.
5. 30 to 60 inches, yellowish-red friable sandy loam.
6. 60 to 84 inches, yellowish-red light sandy loam material, irregularly checked with light-gray streaks less than 1 inch in width and extending in all directions. The material becomes slightly cemented where exposed in gullies or cuts, but it is open and porous compared with the parent material of the yellow soils.

It seems that the horizon of maximum clay content is restricted to the upper foot or so of the red horizon. That is, the textural and color horizons are not coincidental as regards thickness or depth. This discrepancy, or irregularity, if it be such, appears to characterize Ruston sandy loam throughout the longleaf pine region.
The Orangeburg soils, as mapped in this county, are not decidedly distinct from the Ruston soils, as regards parent material, relief, or geographic distribution. The horizon of maximum clay concentration of the Orangeburg soils is a little redder, but this difference is not so distinct as it might be. There is a probability, however, that this horizon of maximum fine materials is thicker, more nearly approaching that of the red B horizon in Orangeburg sandy loam, but further study is necessary for definite determination. It is thought probable that the Orangeburg soils, as developed here, are the equivalents of the older Ruston soils, whether the more advanced stage of development be accounted for by a longer period of undisturbed soil development of the soil material in place or by exceptionally good drainage conditions. The Ruston soils may represent a younger stage of Orangeburg soils, depending on the point of view.

The Cahaba soils are not important and are about the equivalents of the Ruston soils, though developed on terraces.

The Yellow soils differ from the Red soils in that their B horizons are yellow, and the lower part of the B horizon, the C horizon, or both, are cemented, plastic, or otherwise very slowly pervious to the penetration of water and roots.

A profile of a virgin area of Pheba fine sandy loam, examined on a mild slope in the NW 1/4 SW 1/4 sec. 3, R. 18 W., T. 3 N., is representative of this group of soils. The forest cover is a second growth of mixed pines and deciduous hardwoods. A 1/2-inch layer of coarse dark organic debris covers the surface. A description of this profile follows:

0 to 1 inch, loose gray-brown fine sandy loam stained dark with organic matter.
1 to 8 inches, pale yellowish-gray loose fine sandy loam containing very little organic matter.
8 to 24 inches, yellow or buff friable fine sandy clay. In many places numerous incipient accretionary cubical-shaped particles about one-eighth inch in diameter, some of which are hard to crush between the fingers, are present. Their insides are bright yellow or slightly reddish yellow.
24 to 60 inches, yellow hard cemented fine sandy clay material, with splottes of gray, brown, and red, increasing with depth. Incipient hard particles similar to those in the B horizon are present. The material may be disrupted with difficulty, breaking out in flakes which crush to a friable mass.
60 to 96 inches, compact or hard cemented friable sandy clay material which is rather easily crushed when once disturbed. The material is dominantly gray and is coarsely splotted with yellow, brown, and conspicuous reddish yellow.

The significant feature of the Yellow soils, including the Pheba and Kalmia soils, is the comparatively impervious character of the material below a depth ranging from 20 to 50 inches.

The heavier textured Kalmia soils, as developed in this county, are essentially Pheba soils in profile, or Pheba soils on stream terraces. They are, however, a little more variable as regards the depth of the cemented zone, and for this reason Kalmia fine sandy loam is differentiated from Pheba fine sandy loam. In addition the accretionary cubical particles, occurring in much of Pheba fine sandy loam, are practically lacking in the Kalmia soils. The relief of the Pheba soils is more variable than that of the Kalmia soils.

So far as soils of good surface drainage are concerned, the consistency and the degree of permeability of the subsoil and substratum
apparently have largely determined the soil color. In places where the consistence is such that normal movement of water and moisture is allowed, Red soils (Ruston, Orangeburg, or Cahaba) have developed. Where either one or both of these layers is very slowly permeable to water—whether such obstruction be due to heavy texture, compaction, or cementation—Yellow soils (Pheba, Eulonia, or Kalmia) have developed. This interesting relationship is especially noticeable in this particular county. The Red soils are materially higher in organic matter, provide a more even supply of moisture to plant growth, and are recognized as more generally productive than the Yellow soils.

The Susquehanna, Eulonia, and Cuthbert soils are developed from the heavier textured materials on the uplands. They are not normally developed soils, in fact the Susquehanna is distinctly a young soil, and the Eulonia and Cuthbert soils may be considered youthful. The influences inhibiting soil development in all these soils are incident to the slowly pervious character of the lower subsoil layers or substrata. The condition is one of heavy texture and extreme plasticity in the Susquehanna soils, whereas in the Eulonia and Cuthbert soils it is due in part to plasticity and in part to cementation. The value of these soils as crop producers is materially impaired, in that surface erosion is more severe, the amount of moisture varies more rapidly from one extreme to another, according to rainfall, and conditions are much more unfavorable to the accumulation and preservation of organic matter as a result of the comparatively impervious character of the lower horizons.

A generalized profile of the poorly drained soils consists of (1) a dark-gray or brown thin surface soil, (2) a thin white or lightgray layer, (3) a heavy-textured gray layer, splotted with one or more colors—yellow, brown, red, and, in places in the heavy-textured soils, blue. Materials similar to this layer generally continue to a depth with the gray and blue tints increasing.

The amount of organic matter in the topsoil varies from only a trace to nearly 12 inches of mucky material, although it is not abundant in many places. The soils vary from incoherent white sands to heavy plastic clay loams.

The muck developed in this county consists almost entirely of nearly black finely divided material which, for the greater part of the time, remains in a saturated condition. In occurrence it is restricted almost entirely to the outer edges of the Pearl River Valley where seepage from the slopes is sufficient to maintain the deposits in the saturated condition apparently necessary to their accumulation and preservation. More or less sand or other inorganic material has been washed from adjacent slopes and deposited by small streams meandering over the muck swamps. Practically all the muck land still supports its original junglelike swamp growth consisting mainly of bay, magnolia, and swamp pines, interwoven with vines and running briers. Blackberry briers, titi, huckleberry and gallberry bushes, mosses, and ferns appear in the undergrowth.

**SUMMARY**

Marion County is in the south-central part of Mississippi, about 65 miles north of the Gulf of Mexico. Climatic conditions are favorable to a diversified type of agriculture with cotton as the principal
crop. Columbia, the county seat, is the principal town. Three railroads, two graveled State highways, and good county roads afford ample transportation facilities. There is an excellent system of consolidated public schools, and transportation is provided the pupils. Few telephones are in use throughout the rural communities, but churches and rural delivery of mail serve all sections.

The county is situated in that part of the coastward sand-clay belt of the State, commonly designated the "longleaf pine region." The relief is that of a thoroughly eroded plain traversed by the broad valley of Pearl River.

Although settlements were made as early as 1809, development was slow. Most of the original pine forest on the uplands has been harvested, and much of the cut-over land is now under cultivation. The number of farms has increased nearly 40 percent in the last decade, as the extensive tracts of range land have been divided into smaller units.

The soils have developed from noncalcareous water-laid sands, clays, and gravel of the coastal plains. The high proportion of sand in the soils, combined with the sharp relief, favors erosion, especially of the gully type which presents an important problem of soil conservation here.

Although the soils are infertile as compared with the dark Prairie soils of the Middle West, they compare favorably in fertility with other soils of the longleaf pine region and are responsive to careful management. Those with favorable texture, consistence, and relief can be built up and maintained in a fairly good state of productivity. About 70 percent of the land is suitable for crop production.

The soils range from loamy sands to clay loams, most of them being fine sandy loams with comparatively retentive clayey subsoils. The Red soils are the best agricultural soils, although the Yellow soils are considered fairly good for crops and excellent for pasture.

The soils over the 30 percent of the county considered nonagricultural land are poorly drained, have impervious subsoils, or are extremely hilly. One-half of this land is naturally adapted to pasture grasses, and the other half is better suited for use as timberland, game preserves, and recreation purposes.

The advent of the cotton boll weevil and, more recently, other factors have interfered with the production of cotton, and a new agricultural set-up has been established. Cotton still is the principal cash crop. Some livestock, a rather large acreage of corn, and some hay are produced, largely in connection with cotton farming. During recent years a few truck crops have been grown.

For best results it is essential that judicious rotations of crops be practiced. The nonagricultural land could profitably be reforested with longleaf pine.
Authority for printing soil survey reports in this form is carried in the Appropriation Act for the Department of Agriculture for the fiscal year ending June 30, 1933 (47 U. S. Stat., p. 612), as follows:

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 soil area surveyed by the Bureau of Chemistry and Soils, Department of Agriculture, in the form of advance sheets bound in paper covers, of which not more than two hundred and fifty copies shall be for the use of each Senator from the State and not more than one thousand copies for the use of each Representative for the congressional district or districts in which a survey is made, the actual number to be determined on inquiry by the Secretary of Agriculture made to the aforesaid Senators and Representatives, and as many copies for the use of the Department of Agriculture as in the judgment of the Secretary of Agriculture are deemed necessary.
Areas surveyed in Mississippi shown by shading. Detailed surveys shown by northeast-southwest hatching.
Accessibility Statement

This document is not accessible by screen-reader software. The U.S. Department of Agriculture is committed to making its electronic and information technologies accessible to individuals with disabilities by meeting or exceeding the requirements of Section 508 of the Rehabilitation Act (29 U.S.C. 794d), as amended in 1998. Section 508 is a federal law that requires agencies to provide individuals with disabilities equal access to electronic information and data comparable to those who do not have disabilities, unless an undue burden would be imposed on the agency. The Section 508 standards are the technical requirements and criteria that are used to measure conformance within this law. More information on Section 508 and the technical standards can be found at www.section508.gov.

If you require assistance or wish to report an issue related to the accessibility of any content on this website, please email Section508@oc.usda.gov. If applicable, please include the web address or URL and the specific problems you have encountered. You may also contact a representative from the USDA Section 508 Coordination Team.

Nondiscrimination Statement

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA’s TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the
Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at http://www.ascr.usda.gov/complaint_filing_cust.html and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by:

(1) mail: U.S. Department of Agriculture
        Office of the Assistant Secretary for Civil Rights
        1400 Independence Avenue, SW
        Washington, D.C. 20250-9410;

(2) fax: (202) 690-7442; or

(3) email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer, and lender.