Issued July 31, 1913.

U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE STATE OF ALABAMA, EMMETT O'NEAL, GOVERNOR;
REUBEN F. KOLB, COMMISSIONER AGRICULTURE AND INDUSTRIES;
EUGENE A. SMITH, STATE GEOLOGIST.

SOIL SURVEY OF ELMORE COUNTY, ALABAMA.

BY

R. A. WINSTON, OF THE U. S. DEPARTMENT OF AGRICULTURE,
AND A. C. McGEHEE, OF THE ALABAMA DEPARTMENT
OF AGRICULTURE AND INDUSTRIES.

HUGH H. BENNETT, INSPECTOR IN CHARGE SOUTHERN DIVISION.

[Advance Sheets—Field Operations of the Bureau of Soils, 1911.]

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1913.

BUREAU OF SOILS.

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SOIL SURVEY.

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J. W. McKericher, *Secretary.*

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., February 12, 1913.

SIR: I have the honor to transmit herewith the manuscript and map covering the soil survey of Elmore County, Alabama. This area was selected after conference with the State officials cooperating in the work in this State and upon representations of persons interested in the development of the agricultural resources of the county. The various requests received by the bureau bore the indorsement of the Hon. J. T. Heflin, Representative from the fifth district of Alabama.

I have the honor to recommend that the accompanying report be published as advance sheets of the Field Operations of the Bureau of Soils, 1911, as authorized by law.

Very respectfully,

MILTON WHITNEY,
Chief of Bureau.

Hon. JAMES WILSON,
Secretary of Agriculture.

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SOIL SURVEY OF ELMORE COUNTY, ALABAMA.

By R. A. WINSTON, of the United States Department of Agriculture, and A. C. McGEHEE, of the Alabama Department of Agriculture and Industries.

DESCRIPTION OF THE AREA.

Elmore County lies a little to the east of the geographical center of the State of Alabama. It has an area of 656 equare miles, or 419,840 acres. It is rectangular in form and is bounded on the north by Chilton, Coosa, and Tallapoosa Counties, on the east by the Tallapoosa River, on the south by the Tallapoosa and Alabama Rivers, and on the west by Autauga and Chilton Counties.

The county was established in 1866 from portions of Montgomery, Autauga, Coosa, and Tallapoosa Counties. It remains the same in outline as when originally formed and embraces much valuable agricultural land. The present survey includes the entire county.

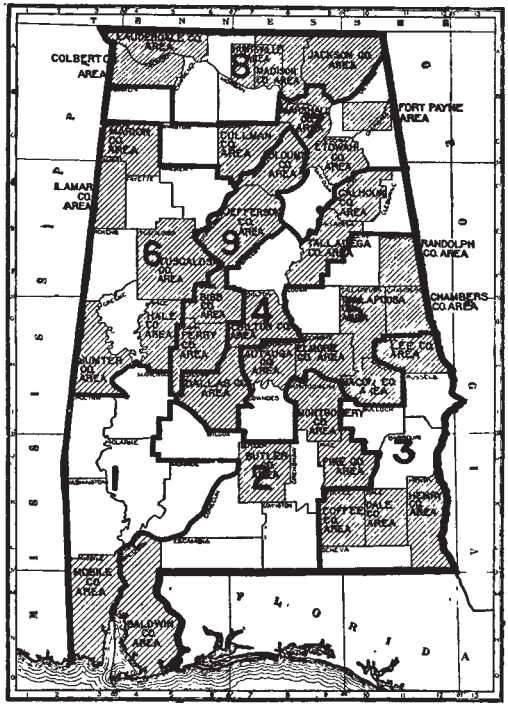

FIG. 1.—Sketch map showing areas surveyed in Alabama.

The physiographic features of the county are varied, embracing the broad and comparatively level terraces of the Tallapoosa, Coosa, and Alabama Rivers, the gently rolling upland region of the Coastal Plain, the rolling to hilly uplands of the Piedmont Plateau, and the hilly to broken and severely eroded areas adjoining the Coosa and Tallapoosa Rivers. The terrace formations are extensively developed in the southern and southeastern sections of the county. Along the Tallapoosa River the marginal strip of alluvial

material ranges in width from 1 to 3 miles, while that included between the Coosa and the Alabama Rivers, in the southwestern part of the area, reaches a width of 10 miles or more and includes at least four distinct terraces. These marginal strips include a large acreage of valuable farm lands of level to undulating topography, the undulation being more pronounced over the older terraces. The level character of the more recent terraces results in somewhat deficient natural drainage.

A large part of the county is included within the Coastal Plain region and is generally marked by a gently rolling surface. Some of this region along the river terraces has a rolling to hilly topography, particularly for a distance of about 10 miles east of Wetumpka. Erosion has been active in dissecting areas contiguous to the larger streams flowing through this region. Drainage is everywhere fairly well established.

The topography of the Piedmont Plateau region in the north and northeast is characteristically rolling and hilly, with series of ridges and hills just east of Wetumpka. The most pronounced surface relief of the county is found along the valley walls of the upper Coosa and upper Tallapoosa Rivers, where steep hills and bluffs are quite frequent, making agriculture almost impossible.

The drainage waters of the county flow through three systems—those of the Coosa, Tallapoosa, and Alabama Rivers, the latter river being formed from the confluence of the first two at the southern boundary of the county about 5 miles southwest of Wetumpka. The Tallapoosa River forms the entire eastern boundary and a portion of the southern boundary. Along the eastern boundary of the county it flows in a southerly direction to the Macon County line, where it bends to the west for about 25 miles along the southern boundary of Elmore County and joins the Coosa River, to form the Alabama. The Alabama continues in a southwesterly direction and completes the southern boundary of the county. The principal tributaries of the Tallapoosa River are Kowaliga and Channahatchee Creeks, which flow in a general easterly direction, and Wallahatchee, Tumkeehatchee, and Chubbehatchee Creeks, which follow a general southeasterly course. The general watershed between the Coosa and Tallapoosa Rivers extends from near Redland Academy, in the south, in an irregular northerly direction through Sandtuck to Central and Equality, and across the county line into Coosa County. The drainage to the east into the Coosa River is through Welona, Town, Weoka, and Pinkston Creeks, through Sofkahatchee Creek and its branches in the central part of the county, and through Corn Creek in the south. The drainage to the west is through Cargal, Shoal, Pigeonroost, and Callaway Creeks, the latter two creeks flowing almost parallel to the river. The extreme southwestern part of the

county is drained by Mortar, Hudson, and Cottonford Creeks, all flowing in a southeasterly direction into the Alabama River.

All parts of the county are well watered. Most of the larger tributaries of the principal rivers have considerable fall and have carved out wide valleys, this being particularly true in the southern half of the county. In the hilly Piedmont region of crystalline rocks the valleys are deep and narrow. Throughout the upland portion of the county the natural drainage is well established.

A large part of the territory now included in Elmore County was opened to settlement in 1814, when the Muskogee Indians ceded a portion of their domain west of the Coosa River to the Government. It was not until 1816, however, that anything approaching a steady influx of settlers began. They included native-born Americans from Virginia, the Carolinas, Georgia, and Tennessee, and the present white population consists almost entirely of descendants of these first settlers. Tallassee, on the Tallapoosa River, is the largest town in the county, and an important local manufacturing center. A few miles above the town a large water-power plant furnishes light for Montgomery, the State capital. Wetumpka is the county seat. Other towns of importance are Eclectic, Deatsville, Elmore, and Coosada.

CLIMATE.

The climate of Elmore County is typical of the southern portion of the temperate zone. The winters are short but moderately cold, December, January, and February being the coldest months with a mean annual temperature of 49° F. Frequent fluctuations occur during these months and the cold is keenly felt by reason of the humidity of the region. Severely cold seasons of short duration occur from time to time with a temperature little above zero, though such weather is exceptional. The summer months have an average temperature of 81°, with extremes ranging from 48° to 107°. Although the summer season usually extends well into September, it is seldom oppressively hot. The nights are pleasant. As a whole the climate is fairly equable and temperate throughout the year.

The annual precipitation, which averages about 50 inches, is favorably distributed throughout the year. January, February, and March are the wettest months, and September, October, and November the driest. Sufficient rainfall occurs at all seasons to insure the growth and maturity of all crops adapted to the region, particularly when any effort is made to conserve the soil moisture. The heavy winter rains tend to erode the rolling areas, which should, wherever possible, be terraced or protected by winter cover crops. Deep plowing in the fall also tends to check the damage from this source.

The growing season covers a period of 8 months, extending from early March to November. The records at Montgomery show March

11 as the average date of the last killing frost in spring, and November 8 as the average date of the first in the fall. In addition to the staple crops, many special crops, such as fruit, melons, cantaloupes, and medium early and medium late truck crops, can be readily matured during the long growing season. Tillage operations can be carried on practically throughout the year. The climate, in addition to being salubrious and pleasant, is favorable to any diversified system of agriculture adapted to the soils.

With an abundance of native grasses for pasturage and the possibilities of cultivated meadows, the raising of stock, including mules, horses, sheep, goats, cattle, and hogs, should be made a most profitable industry. Conditions are also highly favorable for dairying. The short, mild winters afford an open range for 10 months in the year, leaving but a short season for housing and feeding.

The following table, compiled from the records of the Weather Bureau station at Montgomery, Montgomery County, which lies just south of Elmore County, shows the normal monthly, seasonal, and annual temperature and precipitation:

Normal monthly, seasonal, and annual temperature and precipitation at Montgomery, Ala.

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.	Snow, average depth.
	°F.	°F.	°F.	*Inches.*	*Inches.*	*Inches.*	*Inches.*
December	49	79	8	4.5	4.2	4.7	0.5
January	48	79	5	5.0	7.2	17.8	0.4
February	51	83	−5	5.0	2.0	3.0	0.8
Winter	49	.....	.....	14.5	13.4	25.5	1.7
March	58	87	21	6.3	3.6	11.9	T.
April	65	92	30	4.5	8.2	1.1	0.0
May	74	98	43	3.8	2.6	2.6	0.0
Spring	66	.....	.....	14.6	14.4	15.6	T.
June	80	106	48	4.3	5.0	3.8	0.0
July	82	107	61	4.6	0.9	9.6	0.0
August	81	103	58	4.6	2.1	7.8	0.0
Summer	81	.....	.....	13.5	8.0	21.2	0.0
September	76	99	45	2.7	0.2	2.7	0.0
October	66	96	31	2.3	2.0	0.4	0.0
November	56	85	21	3.2	1.7	4.4	0.0
Fall	66	.....	.....	8.2	3.9	7.5	0.0
Year	66	107	−5	50.8	39.8	69.8	1.7

AGRICULTURE.

Cotton has always been the dominant and money crop of the county, with corn, oats, hay, and potatoes ranking in the order named. But little change was made in the original large plantation holdings up to the time of the Civil War, but during the reconstruction period many of them were partitioned into smaller farms. Nearly two-thirds of the farms in the county at the present time are worked by tenants, who grow only cotton, and as a result soil conservation and crop rotation receive but little attention. Aside from cotton, corn is the chief crop, and is grown principally for the stock. Oats, hay, wheat, potatoes, peas, peanuts, sugar cane, melons, cantaloupes, and various garden-truck crops are grown in small quantities for home use. Some medium early and late truck, and watermelons and cantaloupes in season, are marketed in Montgomery. The average yield of cotton per acre is low, owing unquestionably to continued cropping and a consistent disregard of the ordinary practices required to maintain a reasonable content of organic matter in the soil and to keep the land in good physical condition. Practically all of the uplands and a large part of the river terraces embrace soil types of a sandy nature, well adapted to a variety of crops, but easily reduced to a low state of productiveness through the injudicious methods of a one-crop system. The soils are open and porous, well drained, easily handled in cultivation, and susceptible of permanent improvement.

Under existing methods the use of commercial fertilizers is necessary, and is the universal practice for the staple crops. The average application is about 200 pounds to the acre at planting time. Many farmers, however, use larger quantities and also top dressings of nitrate of soda during the growing season. This practice is the more satisfactory over all of the sandy soils, for cotton and particularly for corn, because if applied at planting time the available constituents of the fertilizers are soon exhausted through leaching. The silty soils of the river bottoms which are subject to yearly overflow receive at each inundation a thin layer of alluvium which helps to maintain the productiveness without the aid of commercial fertilizers. These lands are particularly well suited to the production of corn. In recent years the tendency has been toward the abandonment of the one-crop system in favor of a rotation, including the use of legumes as soil builders. All rotations are made to include cotton as frequently as possible and still maintain average yields with small expenditures for fertilizers. The planting of cowpeas between the corn rows is a general practice, followed by oats or rye as a winter cover crop and to supply pasturage.

The present methods of tilling the soil vary little from those in practice for years. The tenant particularly does not favor innovations in methods of farming. Crops are planted and matured at a

minimum of expense and labor. Lands are allowed to stand untouched from harvest time until spring, when they are plowed broadcast from 2 to 5 inches deep. The land is then bedded and allowed to stand until planting time, when a harrow or drag is used to smooth off the beds in advance of the seed distributer or planter. The seed bed is only slightly elevated. This is desirable except over the poorly drained areas, where ridge culture is advisable. Except when plowed broadcast, the bedding is done by means of a scooter plow run down the old bed row to uproot the old stalks and to form new beds over the old water furrow. At or just prior to planting commercial fertilizers are drilled into the seed bed at the rate of 200 pounds to the acre. The landowner, who is generally a more progressive farmer, employs more efficient methods of soil management than the average tenant. The lands are plowed deeply in the fall and seeded to some winter cover crop to prevent washing and to furnish pasturage, crops are rotated and leguminous crops are plowed under, commercial fertilizers are judiciously used during the growing season, and the growing crop given frequent shallow cultivations.

Tenants work the land either on the basis of a cash rental, the rate ranging from $2 to $5 per acre, or for a share of the crops grown. The division of crops depends largely upon the expenditure incurred by the landowner, the conventional ratio being one-half the cotton and one-fourth of the corn. The tenant is supplied with house and fuel, subsistence being also provided, and secured by a lien on the growing crop.

According to the census of 1910 there were 296,754 acres in farms in the county, with improved farms aggregating 149,716 acres, as compared with 312,585 acres in farms, of which 139,323 acres were improved in 1900. The average farm in 1910 contained 73.6 acres, and 41.6 per cent of the farms were operated by the owners. The value of all farm property, including lands, buildings, implements, machinery, and live stock, amounted to $6,022,741.

Practically all the wage labor in the county is colored, and though largely unskilled, is satisfactory under supervision. Employment always includes board, and is usually secured by contract for the year, at a monthly wage of $10 to $17. During the rush of chopping and picking cotton much day labor is employed, at wages ranging from 75 cents to $1, according to the demand. Women and children constitute a large proportion of such labor during these seasons. Farm labor is not always available, as the local lumber and turpentine enterprises and the various industries at Montgomery offer opportunities for higher wages, often resulting in a scarcity of hands during harvesting. The shortage, however, has never reached an acute stage.

The wide occurrence of a variety of sandy loam soils in the county renders the area well adapted to a highly developed and diversified

agriculture. These soils are almost all capable of being markedly improved and a variety of intensively cultivated crops can be grown.

The impending advent of the boll weevil makes a system of farming independent of cotton as a money crop of vital importance to the county. It is not necessary that cotton be dropped, but that other crops be grown more extensively, enabling the farmer to meet boll-weevil conditions by reliance on other crops not affected by this pest. More attention should be given to stock raising and such crops as corn, oats, peas, clovers, hay, sugar cane, tobacco, potatoes, melons, and medium late and medium early truck. Alfalfa could probably be grown in some sections and offers an attractive crop where conditions favor its growth.

The upland soils are, as a whole, light and sandy, and invariably deteriorate in productiveness under injudicious treatment. The rolling areas, where erosion is likely to prove destructive, should be properly tilled and protected by winter cover crops, and the steeper areas should be terraced. The productivity of the soil should be maintained by a constant supply of organic matter. Barnyard manures are valuable for this purpose and should be conserved and used. Green manuring crops, such as cowpeas, should be plowed under frequently, and the summer staple crops should be varied from year to year in a regular rotation. The incorporation of organic matter in the soil tends to increase its moisture-holding capacity and to hold the soil together. The heavier soils of the river bottoms, where drainage is well established, are naturally more fertile and more productive than the light upland types, and can withstand the drain of clean-cultured crops year after year without the addition of fertilizers. Deep plowing helps all of these soils.

Little attention has been given to growing fruits. Apples are not very successful, though small quantities of seasonable fruit of good quality are produced in different sections of the county. Peaches do much better and are grown in small quantities on every farm. The fruit is of good quality and commercial peach growing might do well with modern methods of management. Small fruits and berries are grown with good results.

The most necessary requirements for maintaining a generally progressive and prosperous agriculture include a diversification and rotation of crops, frequent green manuring in summer and winter cover crops, deep fall plowing as an aid in the thorough preparation of the seed bed in the spring, the judicious use of commercial fertilizers, and frequent shallow cultivation of the growing crops in summer.

SOILS.

Elmore County lies across the boundary between the two broad physiographic divisions known as the Piedmont Plateau and the

Coastal Plain. These divisions represent two distinct geological regions, and give rise to separate classes of upland soils. The Piedmont region, embracing the igneous and metamorphic crystalline rocks, such as gneiss, granite, and mica schists, includes all the residual soils of the area, derived in place from the weathering of consolidated material. The Coastal Plain region consists of a number of geological formations representing marine deposits, largely characterized by sand, gravel, and yellow and red sandy clays, which give rise to a variety of soils classified as sedimentary, implying an origin from water-deposited unconsolidated material.

The line of juncture between these two broad geological formations is exceedingly irregular and nowhere very definitely marked, there being a gradual thinning of the sedimentary mantle over the crystalline substrata until it finally disappears. Roughly, the line extends from the mouth of Sofkahatchee Creek, on the Coosa River, in an easterly direction by way of Weoka and Central to the mouth of Channahatchee Creek, on the Tallapoosa River.

The crystalline rocks underlie the northern part of the county east of the Coosa River and extend as far south as Wetumpka and Tallassee, as evidenced by exposures along the lower slopes of all the stream valleys. To the south of this general line and west of the Coosa River, no evidence of this substratum is encountered. The mantle of sedimentary material extends in a northerly direction some 10 to 12 miles beyond Wetumpka, gradually becoming thinner and finally disappearing, as a result of erosion, from the slopes of the larger stream valleys. Along the northern border of the Coastal Plain deposits and along many of the valley walls the mantle is less than 3 feet in thickness, and a soil profile to that depth will show an admixture of sedimentary and residual material.

The peculiarities of this soil material are sufficient to warrant the establishment of two series of soils made up of this mixed material. They are the Chesterfield gravelly sandy loam, including the areas having a yellowish to yellowish-brown subsoil, and the Bradley gravelly sandy loam to include the areas having a reddish to reddish-brown subsoil. The surface soil of both types is composed of an admixture of sedimentary and residual materials, while the subsoil is entirely of residual origin, chiefly derived from mica schists.

The residual soils of the Piedmont region are derived largely from the weathering of mica schists, as is evidenced by the occurrence of fragments of the parent rock and by the presence of finely divided mica flakes in both the soil and subsoil. The subsoils all have a greasy feel. Two series were identified, the Louisa and the York. The Louisa series includes the gray to brown soils having a red micaceous clay subsoil, and the York series the gray to

brown soils having a yellow micaceous clay subsoil. The Louisa series includes two types, the sandy loam and the gravelly sandy loam, and the York series only one type, the sandy loam. The gravel content of the gravelly loam type consists principally of fragments of white quartz of varying sizes.

A number of geological formations have been identified in the Coastal Plain region proper, each of which contributes to peculiar soil conditions. The principal ones influencing broad soil distinctions are the Lafayette and the Tuscaloosa. These formations give rise to six soil series varying in color and other characteristics. Small outcrops of Selma chalk were encountered in a few instances, but no attempt was made to map them.

The Greenville series is represented by a single type, the sandy loam. This series is characterized by the red to brown color of the surface soil and the red color of the friable sandy clay subsoil. Of the Orangeburg series three types were established, the sandy loam, fine sandy loam, and gravelly sandy loam. These soils are marked by gray to brownish surface soils and red sandy clay subsoils. The gravelly loam type is distinctive because of the high content of round quartz gravel on the surface and in the soil.

The Ruston series includes the gray to brownish surface soils underlain by brown to yellowish-red sandy clay subsoils. Three types were found, the sandy loam, the gravelly sandy loam, and the sand. The Susquehanna series is represented by one type, the clay. The peculiarity of this type is the impervious, plastic nature of the red to mottled red, yellow, and gray clay subsoil. The Guin series is represented by one type, the sandy loam, embracing a heterogeneous mixture of red, brown, yellow, and gray soils underlain by sandy clay subsoils of varying colors. The Norfolk series is represented by the sandy loam member, which occurs extensively throughout the area and constitutes a desirable soil for general farming. This series includes the gray soils having a yellow sandy clay subsoil, which may be derived in part from the Lafayette formation.

A third general group of soils found in the county is derived from material of Recent age, represented by deposits of the Coosa, Tallapoosa, and Alabama Rivers and their tributaries. In the aggregate these alluvial soils form a wide extent of valuable farm lands. They occupy first bottoms and a series of higher terraces. The smaller streams of the area have only narrow marginal strips of first bottoms and contribute but slightly to this class of soils. These narrow bottoms are represented by Meadow, and are further qualified as Ocklocknee material or Congaree material, depending upon whether the materials are of sedimentary origin or from the Piedmont region. In either case the material represents an undifferentiated deposit of reworked soils.

Broad stretches of alluvial soils occur along the Coosa, Tallapoosa, and Alabama Rivers in their course through the Coastal Plains region. In the Piedmont region, as far south as Wetumpka, on the Coosa, and Tallassee, on the Tallapoosa River, practically no bottom land is encountered. The valleys are narrow, with steep walls, and are often marked by fragments of crystalline rock outcrops. The broadest expanse of alluvial soils is developed to the west of the Coosa River, in the southwestern part of the county, where a maximum width of 10 miles is reached. The average width of the terrace formations along the Tallapoosa River does not exceed 2 miles. The Coosa River enters the northwestern corner of the county and flows in a southeasterly course to Wetumpka, where it makes a right-angle bend to the southwest, flowing some 5 miles in this direction before joining the Tallapoosa River to form the Alabama. It is in this great bend that the maximum expanse of terrace soils is developed, and no less than four distinct terraces are clearly outlined. All of these recent terrace formations represent material reworked by water action and deposited from river waters subsequent to the recession of the ancient sea. So remote has been the period of reworking that some of the oldest terraces retain but faint evidences of river action, and the character of the soil profile differs but little from that of the Orangeburg soils found in the Coastal Plain uplands. A very large part of the better drained terraces is under cultivation and constitutes valuable farming land.

The "second bottoms," including a number of older terraces, were separated into two general soil series—the Cahaba and the Kalmia.

The Cahaba series includes the better drained areas where an efficient aeration has permitted the oxidation of iron compounds, imparting to the subsoil material a reddish to brownish color. Three types were mapped—a fine sandy loam, loam, and a silt loam. The Cahaba fine sandy loam occurs over the highest and oldest of the alluvial terraces, and is little subject to overflow. The loam member occupies positions slightly less elevated, while the silt loam is confined to the higher positions of the most recent second bottoms, representing a deposit from slowly moving overflow waters.

The poorly drained areas of the second bottoms, where moisture conditions have prevented a free oxidation, and where the underlying subsoil material has a yellowish to mottled yellow and gray appearance, particularly at lower depths, have been included in the Kalmia series under three types—the sandy loam, silt loam, and sand—according to textural differences in the surface material.

The first bottoms, or overflow lands, were included in the Huntington series, of two types—the silt loam and the sandy loam. The silt loam predominates, occurring extensively along both the Alabama and Tallapoosa Rivers. It is one of the strongest soils of the area

for general farming purposes, its fertility being maintained by annual deposits of rich sediments. A few small areas of the sandy loam are developed near the stream channels. The Huntington series is distinguished by dark-gray to brown surface soils underlain by subsoils of practically the same character, though slightly heavier in texture and lighter in color.

Along the Tallapoosa River, in the northeastern part of the county, the topography is so broken and the surface so sprinkled with rock fragments and outcrops that cultivation is practically impossible. Such areas are suitable only for timber land or pastures for sheep, goats, and hogs. They were mapped as Rough stony land.

Twenty-seven types of soil were mapped in the county, derived from underlying geologic formations and reworked by surface waters, transported in suspension, and deposited from river waters during seasons of overflow. Local modifying conditions have resulted in the occasional intermingling of two or more formations, creating such characteristic differences that distinct types were established to cover them.

The following table gives the name and the actual and relative extent of each type:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Ruston sandy loam	53,632	12.8	Cahaba loam	8,704	2.1
Louisa sandy loam	51,520	12.3	Kalmia silt loam	7,168	1.7
Cahaba fine sandy loam	38,400	9.2	Orangeburg gravelly sandy loam	4,800	1.1
Ruston gravelly sandy loam	37,120	8.9	Kalmia sand	3,520	.8
Louisa gravelly sandy loam	34,560	8.2	Orangeburg fine sandy loam	3,392	.8
Meadow (Ocklocknee material)	28,160	6.7	York sandy loam	3,008	.8
Kalmia sandy loam	25,600	6.1	Cahaba silt loam	2,752	.7
Orangeburg sandy loam	25,280	6.0	Greenville sandy loam	1,792	.4
Norfolk sandy loam	24,960	6.0	Rough stony land	1,792	.4
Chesterfield gravelly sandy loam	18,176	4.3	Susquehanna clay	1,408	.3
Bradley gravelly sandy loam	12,864	3.0	Swamp	960	.2
Huntington silt loam	11,008	2.6	Guin sandy loam	768	.2
Meadow (Congaree material)	9,600	2.3	Huntington sandy loam	384	.1
Ruston sand	8,512	2.0	Total	419,840	

Since every different soil condition affects crop growth it will be seen that Elmore County has great possibilities of growing a variety of crops. The fertile alluvial soils having a favorable surface relief constitute a large acreage of silt loam, loam, and sandy loam that can be easily improved and readily maintained in a high state of productiveness. The upland soils are for the most part sandy and are desirable for light general farming and special crops. None of these soils have reached the limit of their producing capacity, and only

small areas are intensively cultivated. The question of adaptation to staple or special crops receives but little attention. Yields are generally low, owing to inefficient methods of tillage and cropping. Commercial fertilizers are generally used, this treatment being necessary for all sandy soils of low organic content planted to clean cultivated crops without rotation. There is little land in the county that does not possess good agricultural possibilities.

LOUISA SANDY LOAM.

The surface soil of the Louisa sandy loam consists of a gray to brownish sandy loam from 5 to 10 inches deep, and carries varying quantities of white quartz fragments and chips of the parent rock. The subsoil is a red, heavy, micaceous clay of greasy feel and containing small angular quartz grains.

The Louisa sandy loam is a residual soil derived in place from the weathering of a variety of crystalline rocks, mainly mica schist. The small fragments of white quartz generally found in abundance over the type represent the veins seen so universally in the parent rock outcrops and subsequently weathered into the soil mass. The resistant quartz material accumulates on the surface during the weathering of the softer minerals composing the parent rock which with small quantities of granite and gneiss contributes to the formation of this type of soil. These rocks would give rise to the Cecil characteristics, and no doubt some areas of the Cecil sandy loam were included, but as a whole the soils mapped carry conspicuous amounts of mica and are therefore included in the Louisa series.

The type occupies a broad expanse of rolling country in the northern part of the county and shows many minor variations throughout in texture, color, structure, and gravel content. The widest range is in color and depth of surface soil as affected by erosion where this agency has been active on the slopes. In many instances the type presents a mottled appearance, the steeper slopes having a reddish color. These reddish spots also show a shallow phase of sandy material due to the removal by erosion of much of the loose incoherent sand to lower elevations. Likewise, crests of hills and ridges have a larger content of white quartz gravel.

The type is comparatively easy to handle, particularly the gray sandy phases. The stiff subsoil necessitates a heavy farm equipment.

The topography of the type ranges from gently rolling to hilly, and drainage is everywhere well established. Areas of severer surface relief suffer from excessive drainage, and the rapid run-off often develops into destructive erosion. One of the chief problems confronting the farmer on this type is that of protecting his land

from this source of injury. Winter cover crops will tend to prevent washing. The steeper slopes might be terraced.

The type is cultivated chiefly to cotton and corn, with sugar cane, peas, beans, oats, and various vegetables as supplementary crops. Yields of the staple crops are fair to good when commercial fertilizers are applied, cotton producing from one-third to two-thirds of a bale, and corn from 15 to 40 bushels to the acre. Much larger yields have been recorded for both crops. Tobacco could be grown and clovers seeded as a forage crop or to be turned under for green manure. The control of moisture through deep plowing, the incorporation of organic matter, rotation of crops, frequent shallow cultivation, and the judicious use of commercial fertilizers should be given careful attention. Under the present system of cropping and tillage growing crops often suffer from a two or three weeks' drought during the summer months. This could be avoided by deeper plowing in the fall and the incorporation of organic matter. By working up a deep mellow seed bed and giving frequent shallow cultivation the soil becomes capable of absorbing and retaining sufficient moisture to carry the growing crops through short periods of drought.

A rotation for summer crops should include frequent leguminous cover crops, such as cowpeas or clover, to be plowed under. The incorporation of organic matter is essential for the prevention of erosion and for any substantial improvement of the land. Clean-cultivated crops, such as cotton and corn, should receive frequent shallow cultivation during the growing season. Barnyard manures should be conserved and used on the land as an additional source of organic matter. The judicious use of commercial fertilizers is likewise recommended, to be applied chiefly as a top-dressing during the growing season.

The timbered areas of the type support a growth of pine, with other hardwoods and gum.

Land values range from $5 to $25 an acre, depending upon location and improvement.

LOUISA GRAVELLY SANDY LOAM.

The Louisa gravelly sandy loam is a gray to reddish-brown sandy loam, 4 to 12 inches deep, containing varying amounts of white quartz fragments and underlain to a depth of 36 inches or more by a red, micaceous clay. The surface material is variable in character, ranging from a light sandy loam to a rather heavy loam, according to the extent to which erosion has affected it, and contains fragments of quartz and of the parent rock. The subsoil has a very noticeable content of minute mica flakes, imparting a greasy feel to the material, and small quartz grains are also present.

The type is a residual soil, derived from the weathering of a variety of crystalline rock formations, chiefly mica schists. The large amount of rock fragments on the surface and in the soil represents the more resistant parts of the rocks left during the disintegration of the underlying beds, the white quartz coming from veins in the mica schist formation.

The type includes the broken areas, or steeper slopes, along the streams flowing through the region of crystalline rocks, and might in places be classified as a stony loam. Owing to the condition of cultivation noticed over the type, however, it seemed better to map it as a gravelly sandy loam, although the fragments were often of large size. With the exception of some small areas, where the surface relief is rather severe or where the content of large quartz fragments is exceptionally high, most of the type is capable of cultivation.

The type is found mainly in the northeastern portion of the county and along the slopes of the larger drainage lines of the northern section. It occurs in close proximity to the sandy loam, and differs from that soil in having a higher rock content and a more broken topography, making cultivation correspondingly more difficult.

The topography of the type ranges from rolling to hilly or broken. Drainage is everywhere well established and is usually excessive, particularly over the rougher areas. The protection of the soil from erosion is one of the chief problems confronting the farmer. A part of the type is under cultivation, and fair to good yields are produced. The uncultivated areas support a timber growth of pine and hardwood.

Cotton and corn are the principal crops, and oats, peas, hay, and various vegetables are produced for home use. The recommendations with respect to the use of the Louisa sandy loam apply equally to this type. Land values range from $5 to $15 an acre.

YORK SANDY LOAM.

The York sandy loam consists of a gray to yellowish-brown sandy loam, 6 to 8 inches deep, containing varying quantities of small angular rock material, and underlain by a yellow to brownish-yellow micaceous clay. The type differs from the Louisa sandy loam principally in the coloring of the subsoil. The surface soil varies in depth and color, the shallow phases partaking of the color of the underlying subsoil, which sufficiently approaches the surface to influence it in this respect.

The type is derived from the weathering in place of crystalline rocks of the Piedmont region. The parent rock is chiefly a micaceous schist, and small mica flakes are encountered in both the soil and the subsoil.

The topography ranges from gently rolling to rolling. Natural drainage is well established, and the rapid run-off tends to destructive erosion.

A fair percentage of the type is under cultivation to cotton and corn. Cotton yields from one-fourth to one-half bale and corn from 15 to 30 bushels to the acre. Commercial fertilizers are generally used, at the rate of 200 pounds to the acre, applied at planting time. Little attention is given to upbuilding the soil or to crop rotation.

The chief needs of the York sandy loam are deep plowing, a rotation of crops, to include frequent cover crops of cowpeas or clovers, to be plowed under, and the judicious use of commercial fertilizers during the growing season.

Land of this type is held at prices ranging from $5 to $15 an acre.

CHESTERFIELD GRAVELLY SANDY LOAM.

The surface soil of the Chesterfield gravelly sandy loam is a gray to yellowish sandy loam from 4 to 8 inches deep, containing varying quantities of quartz gravel and rock fragments. This is underlain to a depth of 36 inches or more by a yellow to yellowish-brown clay subsoil, containing small quartz grains and minute mica flakes. Very little of the type is under cultivation, although the soil can be handled without great difficulty.

The type is found extensively throughout the central portion of the county as marginal strips of varying widths along the numerous stream courses. It occupies a position between the Meadow lands and the upland Coastal Plain soils. The streams have in almost every instance cut their channels below the line of contact between the sedimentary deposits and the underlying crystalline rocks, and as a result the slopes of the narrow valley walls show an admixture of residual and sedimentary material. In some instances the sedimentary material may be from 12 to 20 inches deep, while in other places it is hardly perceptible. Typical areas include an admixture of sedimentary and residual materials in the surface soil and are underlain by a yellow to yellowish-brown subsoil of residual origin. The gravel content of the type varies considerably, although conspicuous amounts of rock material are generally present.

The topography is rolling and drainage is everywhere well established. Occurring as it does on the direct slopes of the stream valleys, there is ready relief for all excess rainfall.

Some areas along the line of junction between the Coastal Plain and the Piedmont, in the northern part of the county, are used for cotton and corn, with average yields. The steeper areas are used for pasture. This soil has a value of $5 to $15 an acre.

BRADLEY GRAVELLY SANDY LOAM.

The Bradley gravelly sandy loam consists of a gray to brown sandy loam, from 4 to 8 inches deep, which contains varying amounts of rounded gravel and smaller angular rock fragments. This is underlain by a red to reddish-brown micaceous clay, containing small fragments of white quartz and having a greasy feel. The surface soil is often an admixture of sedimentary and residual material to a depth varying from 6 inches to 2 feet.

The type is found extensively in the northwestern section of the county, along the middle slopes of the stream valleys, and represents a gradation of materials from those of the Coastal Plain to the Piedmont. The crests and upper slopes of the interstream areas carry sedimentary soils, while the lower slopes of the valleys comprise soils which are entirely of residual origin. The Bradley gravelly sandy loam includes the gradation material that is underlain by a brown to reddish-brown subsoil. It is similar to the Chesterfield gravelly sandy loam in all respects save the color of the subsoil.

The topography is rolling to hilly. Drainage is well established and often excessive. Little of the type is under cultivation, though the soil is easily tilled and produces fair to good yields of cotton and corn. The rock content does not seriously interfere with farming operations, the chief difficulty being the position of the type. In a virgin condition it supports a good growth of pine and hardwood, and furnishes fair pasturage for cattle, sheep, and hogs. The land is valued at $5 to $15 an acre.

ROUGH STONY LAND.

This classification is used to include a small area in the northeastern part of the county near the Tallapoosa River, where a very strong surface configuration in addition to a high content of rock fragments and rock outcrops has rendered the soil unfit for any agricultural purposes other than a scanty pasturage for sheep, goats, and hogs.

The type occurs in narrow bodies along the steeper slopes of the immediate valley walls and as rough hills and ridges. It is included entirely within the Piedmont region of crystalline rocks. Its value depends entirely upon the timber growth.

NORFOLK SANDY LOAM.

The Norfolk sandy loam consists of a gray to pale-yellow loamy sand to light sandy loam, ordinarily loose and incoherent in structure and averaging from 12 to 15 inches deep. This is underlain by a friable, yellow, sandy clay, which shows a tendency toward a red or brownish color over small areas on the slopes where aeration has

hastened the oxidation of iron compounds in the subsoil, and which is slightly mottled with gray in the lower portion in areas of deficient drainage. The sand content varies from coarse to fine, the medium texture predominating, while a low percentage of fine-grained material renders the soil somewhat loamy, particularly over the shallower phases. Accumulations of quartz gravel are encountered in spots too small to be shown on the map. Their occurrence is probably due to unequal erosion.

A peculiar characteristic of the type is the presence of small angular white quartz fragments varying in size from that of a pea to as large as an egg in the surface few inches of soil. This is especially noticeable along the northern boundary of the Coastal Plain deposits and along the stream courses to the south, where the mantle of sedimentary material is thin and where exposures of quartz have resulted in a sprinkling of small fragments over the surface.

The type is of sedimentary origin derived from Coastal Plain deposits, and represents a rather thin mantle of the Coastal Plain sediments over the old metamorphic rocks of the Piedmont division. It marks the present final extension of the Coastal Plain material. In some instances the residual soil from the crystalline schists and gneisses is barely 3 feet beneath the surface, such areas being characterized by the presence of angular fragments of white quartz having their origin in small outcrops of veins and seams that are abundant in the crystalline substrata. It is not unlikely that there is an admixture of residual soil in places, since the boundaries of areas where there was a gradual thinning of the Coastal Plain mantle were of necessity somewhat arbitrary.

The type is of good moisture-holding capacity and is easily cultivated and responsive to fertilization. An equipment of light farm machinery is entirely adequate.

The topography varies from gently rolling to undulating. From the crests of the interstream areas, where a nearly level surface is found, the perspective is that of a broad, level plain broken by an intricate system of shallow valleys. The stream valleys are due to erosion, the soil material being originally laid down over an irregular surface. The soil is loose and porous, and drainage, as a rule, is well established. Erosion is not a serious source of damage at any point.

The loose, open surface soil and the moisture-retaining properties of the subsoil render the type especially desirable for the production of the staple farm crops and many special crops, including late and early market vegetables. Cotton and corn are the chief crops, with oats, sugar cane, peas, and peanuts as crops of relatively little importance. Every farmer cultivates a small garden of vegetables. Yields of all crops grown are usually good, especially under a system which

tends to improve the land and with a liberal use of commercial fertilizers. No system looking to the permanent improvement of the soil is general, commercial fertilizers being relied upon to sustain crop yields, particularly in the case of the renter or tenant. Some of the more progressive land owners of small tracts who operate their own farms employ advanced methods and secure excellent results from all crops. Cotton, the main crop over the type, yields from one-fourth bale to a bale to the acre, and corn from 15 to 50 bushels. Bur clover, winter or hairy vetch, and winter rye can be grown as cover crops.

The type constitutes a good medium late trucking soil, and Irish potatoes, sweet potatoes, English peas, snap beans, watermelons, cantaloupes, cucumbers, tomatoes, asparagus, and cabbage should give good returns. Peaches, grapes, and berries do well. Pecans could doubtless be grown profitably.

In the improvement of the Norfolk sandy loam the first essential is an adequate amount of organic matter in the surface soil. Barnyard manures take precedence over all other forms in this respect, but in the absence of a sufficient supply the practice of green manuring can be employed. Cowpeas, bur clover, vetch, and rye represent excellent crops for this purpose. A system of crop rotation including leguminous cover crops every two or three years to be plowed under and a judicious use of liberal amounts of commercial fertilizers will do much to increase crop yields. The type is especially adapted to peanuts, and this crop should be given an increased acreage. In addition to the nuts produced a good yield of vine hay is obtained. The vines make excellent pasturage for hogs and are a good soil builder.

The type ranges in value from $5 to $40 an acre, according to location and improvements.

RUSTON SANDY LOAM.

The surface soil of the Ruston sandy loam, over areas taken as typical, consists of a gray, light sandy loam or loamy sand, about 9 inches deep. The subsoil is a reddish-brown to yellowish-red, friable, sandy clay, the color being intermediate between the red of the Orangeburg and the yellow of the Norfolk. The red is more pronounced over the better drained areas, giving way to lighter colors with gray mottlings as drainage becomes deficient. Rounded gravel and occasional small, angular, white quartz fragments are found throughout the type. The gravel is confined largely to the slopes, while the white quartz represents the underlying crystalline formations which occasionally outcrop. Iron concretions are also encountered throughout the soil section.

There is a lack of uniformity of texture in the type, the sand content ranging from coarse to fine, with the medium grade predominating. No type differentiation was made, however, as the variations, while numerous, were confined to small areas. The surface soil varies from 4 to 24 inches in depth, the deeper areas being found on the lower slopes or adjacent to the Ruston sand, where the texture approaches a loamy sand. The boundaries between the type and the sand member are of course more or less arbitrary. Many of the higher-lying areas on the upper slopes and crests of ridges contain only a shallow covering of soil owing to erosion. In many places the color of this soil mantle is affected by the proximity of the brown or reddish subsoil to the surface.

A well-defined phase of the type is encountered in the central portion of the county. Here the surface soil is somewhat shallower than that of the main type and slightly finer in texture. The red color of the subsoil is more pronounced and the structure more plastic, the mica content being sufficient to impart a slightly greasy feel. This phase rather closely approaches the most friable phase of the Susquehanna sandy loam. In many instances, along road cuts, the presence of stiff, heavy clays at a depth of 3 to 6 feet below the surface is noticed, indicating the close relation of the soil to the Susquehanna series. It is, however, a distinct sedimentary soil appearing immediately above the Tuscaloosa clays. The phase, because of its friability, must belong to the Ruston series.

The Ruston sandy loam is a sedimentary soil formed chiefly from the weathering of the Tuscaloosa formation of sands and clays. Unquestionably a part of it is from the formation known generally as the Lafayette. In many instances it was impossible to make any distinction in point of origin between the Ruston and the Orangeburg types. The characteristic color of the subsoil in the Ruston merely represents a less advanced stage of weathering and oxidation.

The Ruston sandy loam is a light soil, easily handled in cultivation and capable of being worked under a wide range of moisture conditions. It responds readily to careful management and to all forms of fertilizers, and constitutes a desirable soil for the lighter general farm crops.

The type is found over the central part of the Coastal Plain region of the county, where it occupies the gently rolling uplands and is closely associated with corresponding types of the Orangeburg and the Norfolk series. Both surface drainage and underdrainage are usually adequate. The porous character of the surface soil and the friable structure of the subsoil enables the type readily to absorb moisture and, under reasonable tillage methods, to withstand ordinary seasons of drought.

The agricultural uses of the Ruston sandy loam are practically the same as those of the Orangeburg sandy loam and the Norfolk sandy loam types. The soil is too light for heavy farming, although corn, cotton, oats, peas, beans, peanuts, potatoes, melons, fruits, etc., do well. The type is a light, warm soil, and crops mature rather early. The soil is fairly productive, cotton yielding from one-fourth to three-fourths of a bale and corn from 15 to 40 bushels per acre. Its open structure permits leaching, and any high state of productiveness must be maintained through a system of improvement that includes frequent applications of organic matter and proper tillage methods to conserve moisture. The use of commercial fertilizers is generally practiced with good results for all crops. The practice of applying plant food during the growing season is a profitable one, particularly in connection with the growing of corn on the sandy uplands.

The type is well adapted to a variety of crops, and reasonably productive when well fertilized. Peaches, berries, small fruits, and medium early truck should do well. Tobacco could unquestionably be grown profitably, though the crop is not included in the present system of general farming. The principal forest growth is pine, with a scattering of hardwoods.

Land of this type ranges in value from $8 to $30 an acre, depending on location and improvements.

RUSTON GRAVELLY SANDY LOAM.

The surface soil of the Ruston gravelly sandy loam consists of a gray, medium-textured, loamy sand to light sandy loam, from 12 to 15 inches deep and containing rounded gravel often in sufficient quantities to make boring difficult. The subsoil is a yellowish-red to brownish sandy clay, showing the usual variations in color from red to yellow, and slightly less friable than the characteristic Orangeburg subsoil. Gray mottlings are conspicuous in the lower subsoil over most of the type, being more pronounced in areas of poor drainage. The surface few inches of soil contain a larger percentage of gravel than the underlying material. This concentration of gravel is due to the removal of the fine sand grains to lower elevations by the surface waters.

The Ruston gravelly sandy loam is a sedimentary soil formed mainly from the weathering of the Tuscaloosa formation and modified somewhat by the Lafayette, particularly over areas adjacent to distinct Lafayette soils. The gravel content is derived from the gravel deposits of the latter formation. As a rule, the type occupies situations below the Lafayette and is distinguished from the Orangeburg type by its high percentage of chert pebbles and the yellowish-red color of the subsoil. In many instances where the sedimentary

mantle overlying the crystalline rocks is very thin the streams have cut their channels below the plane of juncture, areas of the type along the lower slopes showing an admixture of residual material in the subsoil.

The areas of this type almost universally show an accentuated topography. Occurring as it does along the stream slopes and over rolling territory, drainage is well established and in places is excessive.

The type occurs extensively in the western and northwestern parts of the county, occupying the gentle hills and ridges of the Coastal Plain uplands and the slopes of the numerous stream valleys. It is closely associated with the Orangeburg soils that occupy the level interstream areas, much of the gravel content of the stream slopes, particularly in the eastern part of the county, representing no doubt a residue of the gravel beds of the Lafayette formation left during the period of erosion by the streams in cutting their present channels.

Where cultivated, cotton and corn constitute the chief crops, with fair yields. With liberal applications of fertilizers and adequate tillage much of the type could be made reasonably productive. Berries, fruits, and truck should do well. The timber growth consists of pine and oak. The type is held at $5 to $25 an acre.

RUSTON SAND.

The typical Ruston sand consists of a gray to slightly brownish, medium-textured sand to loamy sand, underlain at 36 inches or more by a reddish-yellow to reddish-brown sandy loam or sandy clay. Rounded gravel is found throughout the sand section of the profile, and fragments of iron crust occur over the crests and slopes of the steeper areas. Small patches of the gravelly sand were encountered, but were included under the sand type, being too small to separate on the map. Fragments of ferruginous sandstone were occasionally found in large quantities over small areas, making cultivation difficult. Some small, unimportant areas were included in which the sandy clay subsoil was encountered within about 18 inches of the surface, representing local developments of the Ruston sandy loam too small to map.

In origin the type is similar to the sandy loam, being formed by the weathering of Coastal Plain deposits, probably belonging to the Tuscaloosa formation.

The Ruston sand occupies hilly to rolling areas in the south-central section of the county and is often found in small tracts associated with other Ruston soils. Over many of the hilly areas cultivation is more or less difficult, owing to the pronounced topography. Drainage is

always ample for all agricultural purposes and in places excessive. The forested areas support a scrubby growth of pine and hardwoods.

The type is a light, warm soil and is devoted chiefly to the cultivation of cotton and corn, of which fair yields are obtained with liberal applications of commercial fertilizers. In its virgin state the soil contains a rather large amount of organic matter and is fairly productive, but its fertility is soon exhausted when brought under cultivation. Under a comprehensive system of fertilization a moderately productive condition can be maintained for ordinary crops. The type is well adapted to peaches, berries, melons, and all early truck. Probably a fair grade of tobacco could be produced under skillful management. The soil is mainly in need of abundant supplies of humus and of mineral plant food, to be applied during the growing season.

ORANGEBURG SANDY LOAM.

The Orangeburg sandy loam consists of a gray to reddish-brown sandy loam with an average depth of 8 inches, underlain by a red, friable, sandy clay extending to a depth of 36 inches or more. Below this depth the sandy clay may alternate with layers of gravel or sand, or it may continue to a depth of 20 feet without appreciable change. Ordinarily there is no clearly defined line of demarcation between the sandy loam surface soil and the friable, sandy clay subsoil. The sand content is largely of medium texture, although varying quantities of the coarse and the fine grades are present. Iron concretions and rounded quartz pebbles are encountered in places, particularly on the crests of small knolls and along the line of juncture with the gravelly types.

The gray phase of the type generally presents a maximum depth of surface material and has a lighter structure. In a virgin state it possesses a darker color, owing to accumulations of organic matter, and is usually more productive. Under the existing farm practice wherein clean cultivated crops succeed each other, little care is taken to maintain or restore the organic matter, resulting in the light-gray color, loose structure, and a decline in productivity.

The reddish phase of the Orangeburg sandy loam approaches the characteristics of the Greenville series and represents the most productive areas of the type. The topography is level to undulating. The texture is slightly heavier than that of the gray phase, particularly in the small depressions, where the soil approaches a loam. The darker brown color of the soil in these depressions is due to the accumulation of material washed from higher areas. The type as a whole is of loose, open structure, and responds readily to cultivation under a wide range of moisture conditions.

The Orangeburg sandy loam is a sedimentary soil, derived largely from the weathering of sands and clays probably belonging to the

Lafayette formation. Occurring as it does in places over a rather level topography, the type apparently occupies an ancient terrace of river origin, so remote that its characteristics can not be distinguished from the Lafayette. Such areas must represent a deposit at the close of the Lafayette when the waters were confined to certain broad stream depressions which now mark the river valleys.

The Orangeburg sandy loam occurs at almost any position over the Coastal Plain, but is more extensively developed over the level to undulating interstream plateau areas flanking the older terrace formation. In the eastern part of the county, along the Tallapoosa River, the uplands are dissected into long, narrow interstream ridges, upon which this soil is typically developed. To the south along the edges of the terrace lands of the Tallapoosa River the same condition is encountered, but with broader table-lands between the stream valleys. The type is also encountered in the northwestern part of the county under similar conditions.

The topography ranges from gently rolling to nearly level, the areas being broken by low, rounded ridges or bounded by sharp hill slopes, often badly eroded and gravelly. Drainage is everywhere well established. While the surface relief may not appear entirely adequate at all times, the porous, friable character of the soil and subsoil permit the ready percolation of ground waters, particularly by reason of the elevated position of the type above drainage levels. Erosion is generally active, especially along the borders of the type, and constitutes a permanent source of danger to farm lands.

Practically all of the type is under cultivation and is held in high esteem for the production of cotton. It is included with a number of other types of the series and with the Greenville soils under the term "red lands." It is devoted entirely to the staple crops, principally cotton and corn, and yields are generally satisfactory. Cowpeas, oats, sugar cane, peanuts, vegetables, and the usual farm crops are grown for local needs. The type is easily handled, responds readily to fertilizers, and can be highly improved. The sandy clay subsoil readily absorbs moisture, which it retains for the use of growing crops. The type should produce fruits, berries, grapes, strawberries, melons, tomatoes, etc. Peaches do well. Crimson clover and alfalfa might be grown successfully with proper management, and certainly merit a trial, as they make excellent forage crops and contribute to the upbuilding of the soil. Certain varieties of tobacco should do well. Trucking would be profitable in areas which are convenient to transportation facilities. The yield of cotton ranges from one-third bale to 1 bale to the acre, and corn from 15 to 40 bushels, according to local conditions. Larger yields of both crops have been reported.

Careful tillage, deep fall plowing, the use of winter cover crops to prevent washing and to provide stubble to be plowed under in the spring, together with a well-balanced system of crop rotation, includ-

ing a cover crop of cowpeas or crimson clover to be plowed under every two or three years, and the judicious use of commercial fertilizers during the growing season would soon bring this soil into a condition of high productivity.

The type is held at prices ranging from $10 to $40 an acre, depending upon improvements and quality of standing timber.

ORANGEBURG FINE SANDY LOAM.

The surface soil of the Orangeburg fine sandy loam consists of a gray to brownish fine sandy loam from 6 to 15 inches deep, with an average depth of 8 inches. The subsoil is a red to reddish-brown friable fine sandy clay. The clay content varies widely and is in places sufficiently small to render the lower depths exceedingly open and porous. Ordinarily the maximum clay content is encountered at approximately 2 feet. The color of the surface soil varies according to the proximity of the red sandy clay subsoil, the shallower phases showing a pronounced brownish cast. This shallow phase usually occurs over the undulating to level areas of the interstream plateaus and approaches the characteristics of the Greenville series. A shallow phase is also found over some of the upper hillside slopes, and in some instances small patches of red subsoil are left entirely exposed through the action of erosion. The sand content varies from medium to fine, the fine texture predominating. The type as a whole is a light soil, easily cultivated under a reasonably wide range of moisture conditions and very desirable for general farming purposes.

The Orangeburg fine sandy loam is found most extensively in the west and northwestern sections of the county. Small, isolated bodies occur throughout the county.

The type is derived from the weathering of Coastal Plain deposits belonging probably to the Lafayette formation, the gray phases representing complete weathering and the brown to reddish-brown phase a less advanced stage.

The topography varies from undulating over the broad interstream plateaus to rolling over the narrow divides. Drainage is well established. The open character of the soil and subsoil insures good underdrainage of even the more level areas. The surface relief is occasionally accentuated, and drainage may be excessive. Such areas are subject to erosion.

A large part of the type is under cultivation. Cotton and corn are the principal crops, cotton particularly appearing to be well adapted to this soil. Yields are generally good, cotton producing from one-third bale to 1 bale and corn from 15 to 40 bushels to the acre. Peas, beans, oats, peanuts, potatoes, etc., do well. Crimson

clover could unquestionably be made a very valuable forage crop and soil builder. Tobacco, peaches, berries, and truck could be grown profitably. Sugar-cane produces large yields of sirup, though the quality is not so good as when grown over the less productive sandy soils. Experiments in growing alfalfa over the level, brown phases of the type are recommended as a means of securing a valuable forage crop and soil builder.

The Orangeburg fine sandy loam is considered a rather strong soil. New lands are very productive, but under the usual system of cultivation the humus content is soon exhausted and the soil reduced to a point where a liberal use of commercial fertilizers is imperative. Little attention is given to upbuilding the land. The type responds readily to improvement and could be made very productive of the usual crops, or even of special crops. Like all sandy soils, it requires a large amount of organic matter. Barnyard manures take precedence over other forms, but as the supply is so entirely inadequate a system of green manuring and liming must be resorted to. Deep plowing in the fall, followed by a winter cover crop to prevent washing and afford stubble to be turned under in the spring, a rotation of summer crops, including frequent leguminous cover crops to be plowed under, and frequent shallow cultivation during the growing season to conserve the soil moisture are recommended for the betterment of the soil.

The timber growth consists of pine and hardwood. Land of this type is held at prices ranging from $10 to $40 an acre.

ORANGEBURG GRAVELLY SANDY LOAM.

The Orangeburg gravelly sandy loam consists of a gray to brownish, gravelly sandy loam from 4 to 8 inches deep, underlain by a brick-red, friable, sandy clay extending to a depth of many feet. The texture of the surface material is variable, ranging from a loose, open sandy loam to a more compact loam. The lighter-textured soil always has a pronounced gray color, while the loamy phase is brown to reddish brown. It is distinguished from the sandy loam member by the rounded gravel scattered over the surface and mixed with the soil. The gravel content is variable, but is seldom sufficient to interfere with cultivation. The sand varies from coarse to fine with the medium texture predominating. The subsoil is consistently a red, friable, sandy clay. The soil is easily cultivated and is rather productive.

The type occupies the upper slopes, where the level, plateaulike elevations of the interstream areas give way to the steep slopes of the valley walls. It differs but little in position from the Ruston gravelly sandy loam and is often found in close relation with this

type. The separation of the two types was based on the color of the subsoil. Isolated areas of the type are found throughout the eastern and western portions of the county, usually associated with the sandy loam of the same series.

The type is an upland sedimentary soil derived from Coastal Plain materials. The beds of gravel associated with the type are often seen in washes and cuts, varying in thickness from 1 to many feet and from 3 to 12 feet below the surface.

The topography varies from gently rolling to hilly and drainage is universally well established. Since the type occupies the upper slopes, the surface relief is likely to be pronounced. The type retains moisture well under cultivation. The same methods of seeding and cropping prevail as over the other soils of the county. No especial attention is given to crop rotation, and commercial fertilizers are depended upon to maintain yields. The general average yield of corn ranges from 12 to 40 bushels and of cotton from one-third to three-fourths bale to the acre. Large yields are obtained by some of the more progressive farmers who employ approved methods of soil management. The type is of limited extent, and by reason of its position is comparatively unimportant for agriculture. Much of the undesirable area could be utilized for fruits and berries.

The land is valued at $8 to $40 an acre, depending upon location and improvements.

GREENVILLE SANDY LOAM.

The Greenville sandy loam consists of a dark reddish brown sandy loam from 5 to 12 inches deep, with an average depth of 7 inches, underlain by a dark reddish brown to red sandy clay which is moderately friable and slightly sticky when wet. The maximum clay content is encountered at a depth of 30 inches. The sand content varies from coarse to fine, with the medium texture predominating. The soil often approaches a loam in structure. Gravel is occasionally encountered, particularly over the higher knolls, and a sprinkling of iron concretions is quite general. The small depressions of the type, receiving a wash material from higher areas, invariably have a darker brown color and a slightly heavier texture than is typical.

This type is one of several which are commonly known as "red lands" and is highly esteemed as a valuable soil for general farming purposes. It is easily handled and an excellent tilth can be maintained under a rather wide range of moisture conditions.

The largest areas of Greenville sandy loam are found in the southwestern corner of the county flanking the terrace soils of the Alabama River and near the Autauga County line.

The Greenville sandy loam is an upland type of sedimentary origin formed from the weathering of sedimentary sands and clays.

The type is of limited extent, occupying but a few square miles of level to undulating table-lands. It suffers but little from erosion. While the natural surface relief appears inadequate for good drainage, the friable character of both the soil and subsoil enables the type to absorb moisture readily and to retain it for the use of growing crops. Under careful methods of tillage crops should never suffer on account of periods of drought of two or three weeks duration in the summer months.

Practically all of the Greenville sandy loam is under cultivation, being devoted largely to cotton and corn. Fairly good yields are secured through the use of commercial fertilizers. Oats, cowpeas, sugar cane, berries, potatoes, and various other vegetables are grown in small quantities.

This type, by reason of its general characteristics and topographic features, should prove an excellent soil, both for general light farming and trucking. In order to maintain the productivity of the soil, deep fall plowing, a careful rotation of crops, green manuring, with frequent shallow cultivation to conserve soil moisture, and the judicious use of commercial fertilizers are recommended. It is likely that crimson clover could be seeded with little difficulty, and this is an excellent forage crop as well as a valuable soil builder. Alfalfa might also be successfully grown where soil conditions are favorable. Land of this type is held at $10 to $30 an acre.

SUSQUEHANNA CLAY.

The Susquehanna clay consists of a brown to reddish-brown clay loam, from 5 to 10 inches deep, underlain by a stiff, plastic, and impervious red clay, mottled with gray and yellow in the lower portion of the soil section. The surface 2 to 4 inches frequently carries a rather high content of medium-textured sand. Such areas present a gray appearance and approach the texture of a sandy loam.

The Susquehanna clay is a sedimentary soil derived from the weathering of clays which probably belong to the Tuscaloosa formation of Cretaceous time. In one or two instances there appears to be a close relation to the Selma chalk formation, but such areas are small and seldom exceed an acre or two in size. The Selma chalk outcrops in the county to the southeast of Wetumpka in several areas, though these are too small to show on the map.

The type is of small extent. Little of it is under cultivation and it plays a very inconspicuous part in the agriculture of the county. Under favorable conditions of moisture the cultivated areas are handled with little difficulty and fair yields of the usual farm crops are secured.

A number of small bodies of the type are found in the eastern part of the county, having a gently rolling to rolling topography. The

surface relief is entirely adequate for good natural drainage, but by reason of the impervious character of the soil the movement of soil moisture is slow.

The type is used either as pasture land or for the production of cotton and corn, mainly the former. Yields of cotton range from one-third to one-half bale to the acre. The primary needs of the soil are deep plowing and the incorporation of an abundance of organic matter. The latter practice tends to break down the soil and render it more open and friable. Its moisture-holding capacity is also increased and larger crop yields are obtained. The soil becomes sticky when wet and bakes very hard on drying. This type is held at $5 to $15 an acre.

GUIN SANDY LOAM.

The Guin sandy loam consists of a gray to brownish loamy sand to light, sandy loam, 4 to 12 inches deep, underlain by red to yellowish-brown friable, sandy clay, sometimes mottled and slightly plastic. The surface soil carries varying quantities of rounded gravel, iron concretions, and ferruginous sandstone, or iron crust. The type represents a soil condition rather than a clearly defined differentiation of material. It has little value other than for its forest growth and the scanty pasture it affords.

The topography ranges from hilly to broken, and erosion is generally severe. None of the small areas of the type are cultivated, and it is of little importance in the county.

The soil is of sedimentary origin, representing a mixture of material from a number of formations over a rough and broken surface. It has a very low value.

CAHABA FINE SANDY LOAM.

The Cahaba fine sandy loam consists of a grayish to reddish-brown fine sandy loam, underlain by a reddish-brown to red, fine sandy clay. The sand content is usually of the finer grades, though the medium grades often give small areas the texture of a sandy loam. The surface few inches of the type are usually slightly darker on account of accumulation of organic matter. There is also an appreciable amount of silt in both soil and subsoil. The lower levels and depressions always have a darker gray color and usually a higher silt content.

There are two distinct phases of this type, apparently developed in direct relation to the age of deposition. The most productive phase occupies the higher elevations of the oldest terraces and constitutes some of the strongest soil of the area. The surface soil varies from 5 to 10 inches in depth, is gray or reddish brown in color, and underlain by a red, friable, sandy clay, slightly plastic and sticky when wet.

The gray surface soil always has the greatest depth and occupies the oldest terraces. It closely approaches all the characteristics of the Orangeburg fine sandy loam. The reddish-brown phase occupies the higher elevations of the second terrace lands, where the sandy surface material seldom exceeds 6 inches in depth, and is underlain by a plastic, red, sandy clay subsoil. The more recent terraces are ordinarily covered by a light fine sandy loam surface soil from 8 to 15 inches deep, underlain by a yellowish-red to brownish, heavy, fine sandy loam grading into a dull yellowish-red to brown sandy clay. At lower depths a mottling of red, yellow, and gray often occurs, particularly over the lower areas or in slight depressions, the material in such situations having a lighter texture. Minute mica flakes are generally present in the subsoil.

Cultivation is comparatively easy, except over areas of deficient drainage, and the average yields are good. They could easily be increased by a more consistent incorporation of organic matter with the soil. The heavy phases should be plowed deeply in the fall. As a whole the soil is rather loose and friable, is capable of improvement, responds readily to fertilizers, and can be plowed under a reasonably wide range of moisture conditions.

The type owes its origin to river action. Little of it is subject to overflow at the present time. Its deposition dates from remote times when the rivers carried much larger volumes of water than at present and flowed at considerably higher levels. In the forks of the Coosa and the Alabama Rivers no less than four distinct terraces are found, with a maximum width of over 10 miles. The Cahaba fine sandy loam of the third and fourth terraces has long been subjected to weathering influences, and characteristic evidences that it consists of reworked material are obscure in the soil material itself. Much of the type differs but little from the Orangeburg fine sandy loam. As a terrace formation, however, the lines are conclusively distinct. Over the outer edges of the type where it adjoins the uplands a large amount of wash material from the adjacent elevations is mixed with the old alluvium.

The Cahaba fine sandy loam occurs in large and small bodies at irregular intervals over the entire county, comprising the older terraces of the Tallapoosa, the Coosa, and the Alabama Rivers. As a rule, drainage is well established throughout the type.

The topography ranges from level to undulating or very slightly rolling. Some of the lower-lying areas are deficient in natural drainage, and artificial methods must be employed. Open ditches usually suffice, the soil being sufficiently porous to permit a free percolation of soil moisture. The once level surfaces of the oldest terraces have undergone some changes through erosion, and at present they are the best drained areas of the type.

A large proportion of the Cahaba fine sandy loam is in cultivation. It is a light, friable soil, retentive of moisture, responding readily to fertilizers, and highly productive when properly handled. While the type is not as readily exhausted of humus as the more rolling upland, sandy soils, the maintenance of fertility depends in a great measure on a liberal supply of organic matter. Stable manures afford the best means of replenishing this constituent, but in the absence of an adequate supply a leguminous crop, preferably cowpeas, plowed under every year or two is recommended. Deep fall plowing over the heavier phases would also prove beneficial. Cotton and corn constitute the chief crops, averaging about one-half bale of cotton and from 25 to 35 bushels of corn to the acre. Larger yields are usually produced by progressive farmers, particularly over the stronger phases of the type. Maximum yields of 1½ bales of cotton and 75 bushels of corn are recorded. Special crops could unquestionably be grown profitably in addition to the usual farm crops of cotton, corn, oats, rye, peas, etc. The type, in part at least, could be used for sugar cane, truck, peanuts, berries, melons, and probably tobacco. Alfalfa might do well over the better drained, heavier phases under careful methods of seeding and management. Its culture is strongly recommended.

Commercial fertilizers are used, generally with good results. The timber growth consists of gum, oak, pine, persimmon, and elm. The type has a value of $10 to $50 an acre, depending upon location and improvement.

CAHABA LOAM.

The Cahaba loam consists of a grayish to brown loam or silty loam, with an average depth of 7 inches, underlain by a brown to yellowish-red silty clay loam to silty clay, frequently mottled with gray and yellow at lower depths. The surface soil usually carries some sand of the finer grades and varying quantities of silt. The sand content appears to be greater over the higher undulations, while the percentage of silt increases in the slightly depressed areas of the type. The subsoil varies in color according to conditions of drainage, the red being more pronounced over the rises, where aeration is better, while the yellowish and mottled-gray and yellow subsoils are found over the more level and less adequately drained areas. There is a small percentage of minute mica flakes in both soil and subsoil.

The Cahaba loam is of alluvial origin, having been deposited mainly when the streams were flowing at higher levels. A large portion of the type is above overflow, although at times of very high water large areas are inundated. The rapidity of the overflow water is determined by its depth, and the character of the material deposited is similarly controlled, the finer materials being deposited from the slower currents.

This type is found at intervals along the Alabama and the Tallapoosa, being confined largely to the big bends in the rivers. It is a desirable farming soil and responds readily to cultivation. A good tilth is produced under favorable moisture conditions.

The topography ranges from level to undulating. Drainage is inclined to be sluggish, particularly over the more level areas. Open ditches suffice as a ready means of drainage for excess surface water. On account of its close, compact nature, the subsoil absorbs moisture slowly and provision must be made for removing the waters of excessive rainfall. During the heavy spring rains planting is often delayed.

A very large part of the type is under cultivation and devoted mainly to cotton and corn. Oats and hay are grown with good results and the native grasses afford excellent pasturage. Cotton and corn return good yields under proper management, cotton producing from one-half to three-fourths of a bale and corn from 20 to 40 bushels to the acre.

The first requisite in maintaining the productivity of the soil is the establishment of good drainage. This should be supplemented by the incorporation of organic matter in liberal quantities. The land should be deeply plowed and the compact structure of the soil broken up, making a deep, loamy, and mellow seed bed. This condition materially enhances the effect of any fertilizer treatment. Barnyard manures afford the best results in the way of organic matter, but in the absence of an adequate supply green manuring must be resorted to. Cowpeas or clovers to be plowed under are best for this purpose. Some winter cover crops such as oats or rye can be planted, the stubble of which may be turned under in the spring. Applications of lime also tend to build up the soil and overcome any tendency toward acidity. The question of controlling moisture, particularly its conservation, is a vital problem, for crops often suffer in summer during short periods of drought. A deep seed bed, well pulverized, and an abundance of humus would insure safety from short droughts during the growing season, provided the growing crop is given frequent shallow cultivations. The forest growth consists of pine, gum, poplar, and some cypress.

CAHABA SILT LOAM.

The surface soil of the Cahaba silt loam consists of a brownish to pale yellowish-gray friable loam to silty loam with an average depth of 7 inches. The subsoil is a friable, silty clay loam of a slightly reddish-brown to yellowish-brown color, frequently mottled with gray in the lower portion. The surface soil shows wide variations, ranging from reddish brown to gray in color and from a loam to heavy silt loam in texture. The higher rises having an undulating

topography usually present the reddish color and the lightest textures, due to better aeration and oxidation and a washing down of the finer soil particles. The lower depressions show the decided gray color and the heavier phase of the silt loam soil. The better drained areas show the more pronounced coloring in the subsoil, while the level to slightly depressed areas carry the yellowish and mottled yellow and gray at lower depths.

The type is alluvial in origin, having been deposited when the waters of the stream reached higher levels. Inundations of varying depth and velocity have given rise to the range in the character of the material deposited.

The type is easily handled under a moderately wide range of moisture conditions, providing drainage is good. If plowed when too wet the soil has a tendency to become compact and to bake hard upon drying out. The Cahaba silt loam is found over the terrace areas along the Alabama and the Tallapoosa Rivers, and to a limited extent on some of the second terraces or the higher first terraces. It is not subject to inundation except during seasons of exceptionally high water.

The topography is gently rolling to undulating and drainage is in many instances poor. During seasons of heavy rainfall the lower areas of the type are rather swampy, making artificial drainage necessary for any continuous successful cultivation. Water percolates slowly through the silty material, and open ditches would furnish a ready means of run-off for excess moisture.

The type is utilized chiefly for cotton. Corn is cultivated to some extent, though this crop does better on the first bottoms. Yields range from fair to good, cotton producing one-half bale and corn from 15 to 30 bushels to the acre. Commercial fertilizers are generally used, acreage applications of 200 pounds being made at planting time. It is becoming the practice to apply a top-dressing of 100 to 200 pounds during the growing season, and such treatment usually results in increased production.

When well drained the type constitutes a valuable farm soil. Deep fall plowing and the incorporation of organic matter are essential, however, to its continued productivity. The application of barnyard manures and the growing of leguminous cover crops to be plowed under would furnish sufficient organic matter to check the present tendency to puddle and bake. Lime in moderate quantities would prevent any undue compactness and render the soil mellow and friable. A system of crop rotation, to include a leguminous crop of cowpeas, vetch, or clover, at least every two or three years should be introduced. Oats or rye should be sown as a winter cover crop, to be plowed under in the spring to supply the humus so badly needed. The type has a value of $8 to $15 an acre.

KALMIA SANDY LOAM.

The Kalmia sandy loam consists of a gray sandy loam from 6 to 15 inches deep, underlain by a yellow sandy clay, rather open and friable and decidedly plastic when wet. Gray and white mottlings are frequent in the lower portions of the soil section, particularly where drainage is deficient. The higher slopes and better drained portions of the type have a bright yellow color, with an occasional tinge of red, resembling the typical Norfolk soils in this respect.

The sand content ranges from coarse to fine, with the medium textures predominating. An occasional trace of rounded gravel is encountered. Uncleared areas usually present a darker-colored surface soil, due to a high humus content. Under the prevailing systems of cultivation this is invariably leached out within a year or two, leaving the soil light gray to pale yellowish in color. The surface material varies in depth from 6 to 20 inches, the average being 10 or 12 inches. The structure is extremely loose and open, and the soil is easily handled in cultivation. Drainage conditions and the possibilities of aeration and oxidation determine the coloring of the subsoil, which ranges through various shades of yellow to a very pale yellowish. The mottling is controlled by moisture conditions, being more pronounced over the poorly drained areas.

In origin the type appears to be similar to the Cahaba fine sandy loam, with which it is associated. It represents the lowest portions of the older terraces, which were the last to dry out. Much of the type now under cultivation was in a condition approaching marsh within the memory of some of the older inhabitants. It occupies an old river terrace, clearly outlined, but of such ancient formation that much of the soil retains little evidence of its alluvial origin. Much of it shows typical Norfolk characteristics.

The type is found extensively in the vicinity of Elmore and over the broad terrace area west of the Coosa River. The topography ranges from flat to undulating, and drainage is poor, except over the higher situations. Artificial methods must be resorted to, which in many cases are impossible except as a community proposition, because of the extent and high cost of the work required. The subsoil is fairly open, permitting the percolation of soil moisture, and in most cases open ditches suffice for lowering the water table. Under favorable drainage conditions the soil absorbs and retains moisture well, and is fairly productive.

The type is utilized largely for the production of cotton and corn. Cotton yields from one-third to two-thirds of a bale, and corn from 20 to 35 bushels to the acre over the better areas of the type. The lower-lying areas afford excellent pasturage, Bermuda grass growing abundantly. The better drained areas are well adapted to truck,

although not so suitable for these crops as the lighter and warmer types of the Norfolk series. Peanuts, melons, sugar cane, and probably tobacco should do well.

The native forest growth consists of gum, water oak, pine, and other deciduous trees and shrubs. The type is held at prices ranging from $5 to $30 an acre.

KALMIA SILT LOAM.

The Kalmia silt loam consists of a grayish to pale-yellowish silt loam from 5 to 10 inches deep, underlain by a yellowish, silty clay loam to clay, mottled with gray and white in the lower portion of the soil section. Appreciable amounts of fine and very fine sand give a considerably darker gray tint to the surface soil, owing to a high content of organic matter. The cultivated areas are soon exhausted of their supply of this constituent, the soil assuming a light-gray to pale-yellowish color. The subsoil varies in color from a slightly reddish yellow to a very pale yellow, or mottled yellow and gray, according to existing drainage conditions. The lower flat and depressed areas usually show the highest percentage of silt in the surface soil and the greatest amount of gray mottling in the subsoil.

The type represents old alluvium deposited mainly in former stages of valley developments.

Very little of the type is under cultivation as it remains in a semimarshy condition for many months of the year. The better drained areas can be cultivated if worked under proper moisture conditions.

The type is found in small areas along the entire stretch of terrace soils, usually as a second bottom type, but occasionally as a first bottom, where there is no clearly defined second terrace formation. It is subject to overflow only in times of high water. The larger portion of the type is found along the smaller streams at the outer edge of the river terraces.

The topography ranges from flat to very gently undulating, and drainage is usually poor. There is generally sufficient elevation above the stream channels to insure a lowering of the water table by means of open ditches, and the type may be brought into a condition suitable for cultivation by their use. The greater part of the type is utilized as pasturage and timber lands.

When cultivated, the usual crops of cotton and corn are grown. Yields are fairly good when the land is treated with commercial fertilizers. Deep plowing and the addition of organic matter would reduce the compactness of structure and increase the yields of crops. The native forest growth consists chiefly of pine and gum.

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

Mechanical analyses of Kalmia silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
413716	Soil	0.3	0.4	0.3	1.8	35.2	48.4	13.6
413717	Subsoil	.1	.7	.4	2.2	24.5	48.5	23.7

KALMIA SAND.

The Kalmia sand consists of a gray to slightly brownish medium-textured sand to loamy sand, from 10 to 20 inches deep, grading into a loose and incoherent yellowish to mottled yellow and gray, loamy sand or light sandy loam, which extends to a depth of 36 inches. The surface few inches are somewhat darker and slightly more loamy than the underlying material, owing to the presence of a large amount of organic matter. The type is easily handled under a wide range of moisture conditions.

The type owes its origin to deposits from rapidly moving waters during times when the river level was considerably higher than at present. Along Chubbehatchee Creek it appears to be derived from deposits from the overflow waters at a former time when considerably more water moved down the stream valleys than at present, and modified by a material more recently deposited or derived from adjacent uplands.

The Kalmia sand is of limited extent and is associated with the older terrace soils, the larger areas appearing near Coosada, in the southwestern part of the county, along Chubbehatchee Creek, and near Tysonville Ferry, in the southeastern portion of the county. It is an unimportant soil type, occupying second bottoms.

The larger part of the type is under cultivation, being devoted to cotton and corn, with oats, hay, and peas as small supplementary crops. Fair yields are obtained with the use of commercial fertilizers. Cotton produces an average yield of one-third of a bale to the acre, and corn from 10 to 20 bushels. The type is not suited to general farming. Oats, peas, and peanuts should do well. An excellent grade of cane sirup should be produced, though yields would probably be lower than on some of the heavier soils. The type is well adapted to the production of truck, and with proper fertilizer treatment potatoes, melons, cantaloupes, peas, berries, etc., should make large yields.

The topography is level to very slightly undulating, and drainage, as a rule, is poor. The loose, open structure of the soil permits a ready downward movement of soil moisture, and artificial drainage for the removal of excessive rainfall is easily established. Under present conditions crops suffer more from an excess of moisture than

from drought, the soil apparently furnishing moisture during the growing season, even during periods of little or no rainfall.

The Kalmia sand is very deficient in humus. It responds readily to fertilizers and systems of soil improvement. The application of stable manures or the plowing under of green leguminous crops would be of great benefit in increasing its productiveness. The soil is very leachy, and the maintenance of an adequate supply of humus is an essential factor in its continued fertility.

Land of this type can be purchased at prices ranging from $5 to $15 an acre.

HUNTINGTON SANDY LOAM.

The Huntington sandy loam consists of a dark-gray, light sandy loam from 7 to 12 inches deep, underlain by a dark-gray to brownish loam or silt loam, becoming heavier with depth. Both soil and subsoil carry finely divided mica flakes. There is no clear line of separation between the soil and the subsoil, the one grading into the other. This type of soil is light, of open structure, and easily cultivated.

Its texture indicates a deposit from rapidly moving currents, the heavier sand grains being laid down where the current was slightly checked.

The type is of limited extent and is found in a few small areas along the banks of the Alabama and Tallapoosa Rivers, where it occupies the higher edge of the overflow lands immediately fronting the stream channel.

The soil is of alluvial origin, having been deposited by the river waters in times of overflow.

Cotton and corn are the principal crops. Little of the type is subject to overflow, except during times of very high water. For a light, sandy soil the type is very productive, and crops grown on it make good yields. It is an excellent soil for peanuts, potatoes, and sugar cane.

Land values are steady at about $15 an acre.

HUNTINGTON SILT LOAM.

The Huntington silt loam consists of a dark-gray to brown silt loam from 8 to 15 inches deep, underlain by a material of the same mineralogical character, but slightly lighter in color, heavier in texture, and more compact in structure. There are slight variations in the texture of the surface material, which ranges from a very light silt loam to a very heavy silt loam, the lighter phases being generally confined to the higher positions where a greater quantity of fine and very fine sand is present. The heavier phases are encoun-

tered in the lower depressions and have a slightly darker color and a texture often approaching that of a silty clay loam. Large quantities of finely divided mica are present in both the soil and subsoil. Occasionally the color of the soil profile takes on a decided tinge of red.

The type is a recent alluvial soil which is still in process of formation, being subject to frequent overflow. It represents a deposit of fine-textured alluvial material derived from a number of geological formations, taken into suspension by the river waters and deposited during periods of overflow.

The Huntington silt loam occurs extensively as first bottom land along the three large drainage lines of the county, occupying the lower positions of all the immediate overflow area. The higher bodies that are subject to inundation only by exceptionally high water have a slightly brighter color than the more frequently flooded areas.

The topography ranges from level to undulating or hummocky, with many small knolls, ridges, and gentle depressions and sloughs. Drainage is fairly well established over some of the type, although the soil absorbs much water and holds it for long periods. Percolation is slow, but the natural relief is usually sufficient to dispose of excess rainfall without washing. Ditching of the lower areas to the low level of the river will relieve excess moisture conditions in such areas.

The Huntington silt loam is probably the strongest soil of the area, and is valuable for the production of corn, a large acreage being devoted to that crop. Yields range from 30 to 75 bushels to the acre without fertilizers. Cotton also does well, but is late and runs too much to stalk. Sugar-cane makes heavy yields, but the sirup is not of the best grade. The type is extremely productive, fertility being maintained by annual additions of rich sediments. The natural fertility is attested by the dense growth of cane where the soil is not cultivated. These canebrakes afford excellent winter pasturage for cattle. The late spring rains and floods often delay planting over the lower areas, but the delay is never long enough to prohibit the planting of corn. Occasionally a fall flood destroys some mature corn over the readily overflowed sections.

To insure the best results on this valuable soil it is necessary to plow the land deep and reduce it to a mellow, well-pulverized seed bed before planting the crops. This renders it loose and warm when well drained. It is probable that alfalfa would do well on this soil if areas free from serious overflow were selected. The uncertainty of damaging overflow is the only objectionable feature in farming this soil. The type ranges in value from $20 to $50 an acre.

SWAMP.

The land classified as Swamp is developed in small areas, occupying the lowest depressions of the bottom lands. In some instances the classification may include an old river slough, or simply an exceptionally low depression in the first bottom. The distinctive characteristic of Swamp is that it remains wet the greater part of the year and is subject to heavy overflows. Water stands over the type for months and cultivation is entirely impossible. Its utilization depends on the possibilities of drainage. Usually there is a growth of cypress over the smaller areas and a growth of cane about the edges. The Swamp land has a very low value.

MEADOW (OCKLOCKNEE MATERIAL).

The term Meadow is used to designate first-bottom material along the smaller streams of the Coastal Plain region, composed largely of wash from surrounding types, some of it being of alluvial origin. Because of irregularity in texture and structure, due to the successive deposition of different materials, it was impossible to separate this classification into types. Generally the surface soil is a gray to brownish, sandy loam, and the subsoil a yellowish-brown or mottled, sandy clay loam. The type is so variable that borings but a few feet apart will show entirely different characteristics. Layers of sand may alternate with layers of silt, gravel, or clay, or sand may alternate in layers of different color.

The type occurs as marginal strips along practically all the smaller streams of the sedimentary region. The component material consists largely of wash from the Coastal Plain soils. It is a low, moist soil of strong producing capacity when properly drained. Ordinarily drainage is not well established, but this condition can be relieved in most instances by the construction of open ditches leading into the stream channels. Meadow supports a vigorous growth of native grasses and affords excellent pasturage. Cotton and corn are the principal crops grown, cotton producing from one-half to three-fourths of a bale and corn from 30 to 50 bushels to the acre. It makes an excellent soil for sugar cane, melons, and cantaloupes. Cowpeas and hay do well. The type has a value of $8 to $25 an acre.

MEADOW (CONGAREE MATERIAL).

This phase of Meadow includes the narrow marginal strip of water reworked material found along the sides of the small streams flowing through the region of crystalline rocks. It is of alluvial origin, derived chiefly from the Piedmont soils. While there can be no textural classification of this undifferentiated material, the predominating characteristics are those of a brown sandy loam underlain by a

yellowish-brown to reddish-brown sandy clay. Like other small areas of wash material subject to numerous modifying influences, no definite features can be ascribed to any extensive area. Frequent overflows, with their consequent deposition of alluvium of different kinds, necessarily render such areas impossible of classification into types.

The surface of Meadow is comparatively level, and drainage is usually poor. In some instances the stream channel is sufficiently deep to afford a ready outlet for underground waters, and such areas are utilized chiefly for the production of cotton and corn. Good yields are obtained. Open ditches, when the material is firm enough to permit them, offer a satisfactory means of reclaiming Meadow for cultivation. The soil ordinarily carries a good supply of moisture and is well adapted to the production of corn and hay. A luxuriant growth of native grasses furnishes excellent pasturage. The better drained areas are well suited to the production of a very desirable quality of sugar cane sirup. A fair condition of fertility is maintained by annual deposits of rich sediments. The soil in its virgin state carries a high content of organic matter, but under the customary methods of cropping and cultivation the humus content is soon exhausted. This soil has a value of $5 to $20 an acre.

SUMMARY.

Elmore County is situated a little east of the geographical center of the State of Alabama, and embraces an area of 656 square miles, or 419,840 acres.

The topography ranges from rolling to undulating or comparatively level. The county embraces portions of the Coastal Plain and Piedmont Plateau. The principal drainage lines are the Coosa, Tallapoosa, and Alabama Rivers, the latter being formed from the confluence of the first two a few miles south of Wetumpka. Drainage is ample over all of the uplands of the county and over a greater part of the alluvial territory.

The county is fairly well settled, the population being densest over the more productive soils and in the vicinity of towns and railroads. A large part of the county is under cultivation, yields ranging from fair to good. Commercial fertilizers are in general use. The more hilly, timbered areas of the Piedmont and the poorly drained portions of the alluvial soils constitute the lands of lowest agricultural values.

Wetumpka, in the south-central part of the county on the Coosa River, with 1,103 inhabitants, is the county seat and principal town of the western part of the county, while Tallassee, an important manufacturing center of 1,347 inhabitants, situated on the Tallapoosa River, is an important town in the east. Deatsville, Speigner, and Elmore are small towns on the Louisville & Nashville Railroad.

Two systems of railroads operate in the county—the Louisville & Nashville in the western part, with a branch from Elmore to Wetumpka, and the Tallassee & Montgomery Railway in the east. A large part of the county is without transportation facilities. Rural mail delivery routes and rural telephones are universal. Churches and schools are located in all districts and improved roads are under construction.

The climate favors a diversified agriculture. The winters are short and mild and the summers long and comparatively hot. The annual mean precipitation is 50.8 inches, well distributed throughout the year, the heaviest rains occurring during the winter and early spring months.

Cotton and corn are the principal staple crops grown, with oats, wheat, rye, peas, beans, potatoes, sugar cane, peanuts, grasses, fruits, and various vegetables as supplementary crops to meet local needs. No general systems of crop rotation are practiced, and little attention is given to the matter of crop adaptation to soils. Farm labor is obtained at an average wage of $15 a month and is largely colored. No especial difficulty is experienced in securing an adequate supply of labor.

Twenty-seven types of soil, including Swamp and Meadow, were encountered in the county, varying in texture from a heavy silt loam to a sand. A large part of all of the types is uncultivated. The timber growth consists chiefly of pine, with a sprinkling of hardwood.

The Norfolk sandy loam is a desirable soil for light general farming and special crops, but capable of much improvement. Cotton and corn are the chief crops grown, yields ranging from one-fourth to 1 bale to the acre for cotton and from 15 to 50 bushels for corn. Oats, peas, beans, sugar cane, peanuts, potatoes, melons, cantaloupes, and various truck crops should do well. Probably tobacco and clover could be made profitable crops. The soil is valued at $5 to $40 an acre.

The Ruston sandy loam is capable of producing a wide range of crops of the lighter variety and is a fairly productive soil. Cotton and corn are the principal crops, yields being fair to good under the existing system of fertilizer treatment. Oats, sugar cane, vegetables, peanuts, and various truck crops also do well. This type is held at prices ranging from $8 to $30 an acre.

The Ruston gravelly sandy loam is a less desirable type for farming purposes by reason of its higher content of gravel and stronger surface relief. A large part of the type is in forests of pine. The more level areas are utilized for the ordinary farm crops, of which good yields are obtained. The type might be utilized successfully for growing berries and fruits.

The Ruston sand is a light, warm soil not well suited to general farming purposes, though fair yields of cotton and corn are obtained with the liberal use of commercial fertilizers. Peanuts, fruits, and vegetables do well. The topography is rolling and the areas under cultivation are soon exhausted of their virgin fertility.

The Orangeburg sandy loam is one of the best of the upland soils for general farming. It is fairly productive and adapted to a wide range of crops. The soil is capable of improvement and responds readily to any systems of soil management. It is more or less subject to erosion. Cotton yields from one-third to 1 bale per acre and corn from 20 to 50 bushels. The type is valued at $10 to $40 an acre.

The Orangeburg fine sandy loam, found over a gently rolling country, is adapted to a wide range of crops. It gives good yields of the ordinary farm crops and is susceptible of improvement. It is a good fruit soil. Tobacco should do well, also several grades of berries. Drainage is well established.

The Orangeburg gravelly sandy loam is a less desirable soil by reason of the strong surface relief and high gravel content. It occupies the upper slopes of the stream valleys and is largely in forest. It has a value of $5 to $40 an acre, the higher prices prevailing over the areas situated near towns and capable of being highly cultivated.

The Greenville sandy loam is the strongest of the upland soils and is an excellent type for general farming and special crops. Cotton and corn are the principal crops and give good yields, particularly when liberally supplied with commercial fertilizers. Oats, wheat, peas, peanuts, tobacco, and various truck crops do well. Alfalfa could probably be grown successfully where local conditions are favorable.

The Susquehanna clay is an unimportant soil and but little used for crops. The impervious nature of the heavy clay subsoil renders it very refractory, and it is utilized principally as forest land and for pastures. It supports a good growth of native grasses.

The Guin sandy loam occurs in a few very small areas. It occupies a broken to hilly country and is valuable only for the forest growth. It is an unimportant type.

The Louisa sandy loam is a good general farming soil and is capable of producing a wide range of crops. The nature of the subsoil renders the type well adapted to heavy general farming. It occupies a rolling country and is at all times well drained. Cotton and corn are the chief crops grown, with yields ranging from one-third to three-fourths bale per acre of cotton and from 20 to 40 bushels of corn. Tobacco, clovers, and fruits should do well. The soil is valued at $8 to $25 an acre.

The Louisa gravelly sandy loam is a less desirable soil than the sandy loam type by reason of the higher content of rock fragments. It is utilized for general farming and yields are usually fair to good when commercial fertilizers are used. The type is capable of improvement and, when carrying a low percentage of rock fragments, constitutes a desirable soil for all staple farm crops.

The York sandy loam has about the same value as the Louisa sandy loam type, although slightly less productive. A reasonably high state of productivity can be maintained by a comprehensive system of soil management, including crop rotation, the incorporation of organic matter, and fertilizer treatment. It is valued at $5 to $15 an acre.

The Chesterfield gravelly sandy loam is found as a gradation type between the residual and sedimentary soils, usually occupying slopes and distinguished by a conspicuous content of gravel. It has a rather low agricultural value, being utilized as pastures for hogs and cattle.

The Bradley gravelly sandy loam is practically the same in value and adaptation as the Chesterfield gravelly sandy loam.

The Cahaba fine sandy loam represents the higher and better drained terraces of the river bottoms. It is cultivated largely to cotton with good results. Commercial fertilizers are generally used. Truck, peanuts, potatoes, oats, and corn do well. It has a value of $10 to $50 an acre.

The Cahaba silt loam is one of the desirable terrace soils for general farming, being especially adapted to cotton and corn. It shows a natural fertility that results in good yields when well drained. Hay does well, and the type affords excellent pasturage. It has a value of $8 to $15 an acre.

The Cahaba loam occurs on the second bottoms or terraces. It lies mainly above overflow and is almost entirely under cultivation. It is a strong soil for cotton and corn, yields ranging from one-half to three-fourths bale per acre for cotton and from 20 to 40 bushels for corn. Sugar cane can be produced with good results.

The Kalmia sandy loam is a second terrace soil of level to slightly undulating topography. Drainage is rather poor. The better drained areas are usually cultivated to cotton and corn, and fair to good yields are produced with the aid of commercial fertilizers. It is a good hay soil.

The Kalmia silt loam occupies rather low depressions in the second bottoms, and is usually too wet for any wide range of crops. Corn does well, also forage crops and sugar cane. The type is not of much importance.

The Kalmia sand is a light, warm soil when well drained, and is better suited to trucking than to general farming. It produces good

crops of both cotton and corn under favorable seasonal conditions. It is well adapted to peanuts, melons, and sugar cane.

The Huntington silt loam is a first-bottom soil found along the Alabama and Tallapoosa Rivers. It is especially adapted to corn and is largely devoted to the production of that crop. Yields range from 25 to 80 bushels to the acre, according to moisture conditions. Occasional overflows damage the crops. Spring planting is delayed occasionally by the late rains.

The Huntington sandy loam occurs in connection with the predominating silt loam type as a first-bottom soil. It is developed in small areas near the stream channels. It is suited to cotton, cowpeas, peanuts, melons, and sugar cane.

Meadow, either Ocklocknee material or Congaree material, includes the first-bottom areas of the smaller streams of the county. Where cultivable it is a very productive soil. Corn is the chief crop.

The Rough stony land classification represents small areas that are unfit for cultivation by reason of its rough topography and high rock content.

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[PUBLIC RESOLUTION—No. 9.]

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

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, be amended by striking out all after the resolving clause and inserting in lieu thereof the following:

That there shall be printed ten thousand five hundred copies of the report on field operations of the Division of Soils, Department of Agriculture, of which one thousand five hundred copies shall be for the use of the Senate, three thousand copies for the use of the House of Representatives, and six thousand copies for the use of the Department of Agriculture: *Provided*, That in addition to the number of copies above provided for there shall be printed, as soon as the manuscript can be prepared, with the necessary maps and illustrations to accompany it, a report on each area surveyed, in the form of advance sheets, bound in paper covers, of which five hundred copies shall be for the use of each Senator from the State, two thousand copies for the use of each Representative for the Congressional district or districts in which the survey is made, and one thousand copies for the use of the Department of Agriculture.

Approved, March 14, 1904.

[On July 1, 1901, the Division of Soils was reorganized as the Bureau of Soils.]

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