Issued May 29, 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 MARSHALL COUNTY, ALABAMA.

BY

C. S. WALDROP, OF THE U. S. DEPARTMENT OF AGRICULTURE,
AND N. ERIC BELL, 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.

MILTON WHITNEY, *Chief of Bureau.*
ALBERT G. RICE, *Chief Clerk.*

SOIL SURVEY.

C. F. MARBUT, *In Charge.*
G. W. BAUMANN, *Executive Assistant.*

COMMITTEE ON THE CORRELATION AND CLASSIFICATION OF SOILS.

C. F. MARBUT, *Chairman.*
HUGH H. BENNETT, Inspector, Southern Division
J. E. LAPHAM, Inspector, Northern Division.
MACY H. LAPHAM, Inspector, Western Division.
J. W. MCKERICHER, *Secretary.*

Issued May 29, 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 MARSHALL COUNTY, ALABAMA.

BY

C. S. WALDROP, OF THE U. S. DEPARTMENT OF AGRICULTURE,
AND N. ERIC BELL, 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.

LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., October 3, 1912.

SIR: During the field season of 1911 a soil survey was made of Marshall County, Ala. This work was done in cooperation with the Alabama department of agriculture and industries, Reuben F. Kolb, commissioner. The selection of the area was made after conference with the State officials, and was indorsed by the Hon. John L. Burnett, within whose congressional district the county lies.

I have the honor to transmit herewith the manuscript report and map covering this work, and to recommend their publication as advance sheets of Field Operations of the Bureau of Soils for 1911, as authorized by law.

Respectfully,

MILTON WHITNEY,
Chief of Bureau.

Hon. JAMES WILSON,
Secretary of Agriculture.

CONTENTS.

ILLUSTRATIONS.

FIGURE.

MAP.

SOIL SURVEY OF MARSHALL COUNTY, ALABAMA.

By C. S. WALDROP, of the U. S. Department of Agriculture, and N. ERIC BELL, of the Alabama Department of Agriculture and Industries.

DESCRIPTION OF THE AREA.

Marshall County is situated in the northeastern part of the State of Alabama. It is bounded on the north by Madison and Jackson Counties, on the east by Dekalb, on the south by Etowah, and on the southwest and west by Blount, Cullman, and Morgan. The county is irregular in outline, approaching a hexagon in shape, and has an area of 610 square miles, or 390,400 acres.

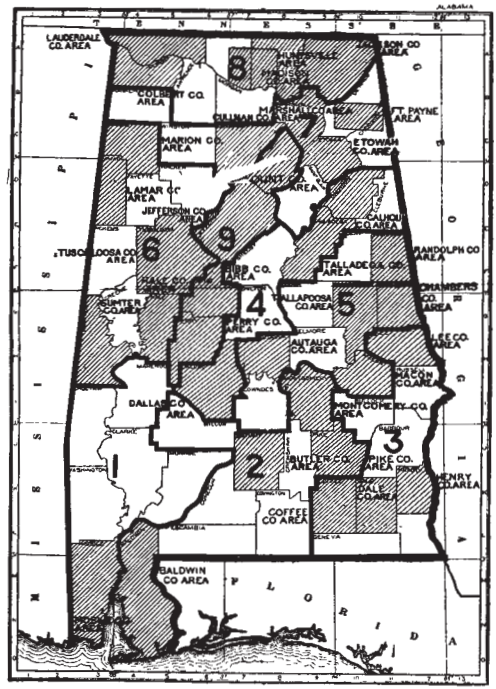

FIG. 1.—Sketch map showing areas surveyed in Alabama.

The topography of the county is marked by high, smooth-topped plateaus, isolated portions of the Cumberland Plateau, limestone valleys and cherty limestone ridges, and stream bottoms. The character of the soil and surface configuration of the plateaus and intervening valleys are closely associated with the character and structure of the underlying rocks. The southern portion of the area is occupied by Sand Mountain, which forms a broad level to gently rolling plateau having an elevation of 1,300 feet or more above sea level. Its northern edge is marked by a bold escarpment which faces the Tennessee River Valley. In the northern part of the area and extending in a southerly direction to about the center of the county is Gunters Mountain. This mountain also exists as a plateau varying from 2 to 4 miles in width and very similar in many respects to Sand Mountain. It has an elevation of 1,300 to 1,400 feet above sea level and forms a bold

escarpment fronting on the Tennessee River Valley on the east and south and Paint Rock River Valley on the west. The continuity of these plateaus has been interrupted in several places by stream action, narrow coves and valleys having been cut back from the edges for some distance.

Browns Valley and Big Spring Valley enter the area from the southwest and extend across it in a northeasterly direction to the Tennessee River Valley near the center of the county. These valleys, ranging in elevation from 600 to 800 feet, vary in width from 1 to 2 miles and are separated and traversed by two lines of chert ridges. The Tennessee River Valley enters the county from the northeast and extends in a southwesterly direction to near the center of the county, where it turns northwest and continues out of the county. This valley has an elevation of 600 to 700 feet and varies from 2 to 4 miles in width. For the most part it is level to gently rolling, there being only a few slightly hilly areas in it. Two lines of low ridges traverse it.

Practically all of the drainage of the county is into the Tennessee River, which flows through the county. The more important of the smaller streams are Paint Rock River, flowing a short distance along the northern boundary of the area, and Browns, Big Spring, and Short Creeks. The extreme southern part of the county is drained by the Locust Fork of Warrior River, which forms a small section of the boundary of this part of the county. This stream receives the waters of Clear, Mud, and Slab Creeks, which flow into it from the Marshall County side. None of these smaller streams of the area are navigable.

Marshall County was settled in the early part of the last century, mainly by immigrants from Georgia, Tennessee, the Carolinas, and Virginia, many of the present inhabitants being descendants of these early settlers. The valley lands were the first to be cleared and for many years were thought to be the only lands worth cultivating. Toward the latter part of the last century settlers from north Georgia located on Sand Mountain and the productivity of these lands began to be recognized. At present this part of the county is the best developed agriculturally and the most thickly populated. Settlers are gradually taking possession of Gunters Mountain, and this section promises to develop rapidly in the near future.

The chief towns of the county are Guntersville, the county seat, with a population of 1,145; Albertville, with a population of 1,544; and Boaz, with a population of 1,010. Arab and Union Grove are villages in the western part of the area, and Grant, Columbus City, North, and Swearengin are crossroads settlements in the northern part of the county. The Seventh Congressional District Agricultural School is located at Albertville and a seminary at Boaz. All of the schools are largely attended by residents of the county and adjoining counties.

There is a cottonseed-oil mill at Albertville and basket and harness factories at Boaz and Guntersville.

The Nashville, Chattanooga & St. Louis Railway traverses the county as far as Guntersville, where a boat line transfers passengers and freight 20 miles down the Tennessee River to Hobbs Island, in the adjoining county, where the same railroad meets the river again.

The Tennessee River furnishes water transportation, boats plying regularly between Chattanooga, Tenn., and Decatur, Ala., practically the entire year. The roads of the county are of dirt and during wet seasons become almost impassable in places, especially in the valleys and on the mountain sides. The roads on the uplands are easily kept in repair and, except after prolonged wet seasons, are usually in fairly good condition. A better system of roads in the county would aid materially in its development.

CLIMATE:

There are no Weather Bureau stations in Marshall County, the nearest being at Valley Head, about 30 miles northeast of Guntersville, and at Decatur, about 30 miles northwest. The following tables have been compiled from records kept at these stations:

Normal monthly, seasonal, and annual temperature and precipitation at Valley Head.

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	42	78	1	4.4	3.8	9.4	0.4
January	39	74	− 7	5.2	5.4	5.0	0.3
February	43	89	−17	5.0	4.6	3.1	1.4
Winter	41	.....	.....	14.6	13.8	17.5	2.1
March	50	82	4	6.6	5.9	9.2	0.1
April	59	88	26	4.9	3.4	5.0	0.0
May	67	96	33	4.1	2.4	9.3	0.0
Spring	59	.....	.....	15.6	11.7	23.5	0.1
June	74	102	39	5.0	2.1	3.3	0.0
July	76	109	53	5.1	2.0	8.9	0.0
August	76	102	51	4.8	2.2	13.8	0.0
Summer	75	.....	.....	14.9	6.3	26.0	.....
September	71	97	34	3.3	2.5	3.6	0.0
October	58	91	22	2.8	4.0	0.6	T.
November	49	79	12	3.2	3.4	2.4	T.
Fall	59	.....	.....	9.3	9.9	6.6	.....
Year	59	102	−17	54.4	41.7	73.6	6.5

Normal monthly, seasonal, and annual temperature and precipitation at Decatur.

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	42	72	0	3.8	2.0	5.5	T.
January	42	77	− 3	5.9	6.5	5.6	0.2
February	44	77	−12	5.4	1.1	5.3	1.5
Winter	43			15.1	9.6	16.4	1.7
March	53	84	4	6.4	3.9	4.2	0.5
April	62	92	26	4.6	3.6	11.1	0.0
May	69	98	37	3.5	1.3	2.7	0.0
Spring	61			14.5	8.8	18.0	0.5
June	78	106	47	3.4	1.6	2.8	0.0
July	81	107	56	4.5	5.2	7.5	0.0
August	80	104	53	3.4	3.2	6 4	0 0
Summer	80			11.3	10.0	16.7	0.0
September	72	99	37	2.8	3.6	5.0	0.0
October	61	98	33	2.1	4.7	0.3	0.0
November	50	80	15	3.7	3.4	5.6	T.
Fall	61			8.6	11.7	10.9	T.
Year	61	107	−12	49.5	40.1	62.0	2.2

The climate is generally equable and mild, the summers being long and pleasant, particularly in the mountainous region, where the heat is tempered by the elevation. The winter temperature varies widely, cold spells being usually of short duration. The ground occasionally freezes to a depth of several inches and light snowfalls are not uncommon, the snow, however, seldom remaining on the ground for more than a few days. Most of the precipitation during the winter season is in the form of light rains which last for a period of several days. Between these periods the weather is usually mild and pleasant.

The average date of the last killing frost in the spring falls in the first half of April and of the first killing frost in the fall in the latter part of October. The growing season for most crops may be said to extend from March to November. Rye, oats, vetch, and some of the grasses remain green most of the winter, their growth being suspended only for the brief periods in which severe weather prevails.

The early warm days of spring and the erratic occurrence of killing frosts cause the fruit crops to be uncertain, unless care is

exercised in selecting orchard sites. On the higher elevations fruit trees in bloom very often escape injury from frosts when serious damage is done in the valleys.

AGRICULTURE.

The agricultural development of Marshall County began in the early part of the last century, the principal crops being corn, oats, wheat, and vegetables for home consumption. On some plantations having slave labor considerable quantities of corn, wheat, and cotton were grown and shipped down the Tennessee River to outside markets.

The valley lands were the first to be cleared and put in cultivation, and until the latter part of the nineteenth century were the only lands cultivated to any extent. However, with the advent of the Nashville, Chattanooga & St. Louis Railway about 1888, settlers from the northern part of Georgia began to locate on Sand Mountain, and the productivity of these soils began to be recognized. At present this section is one of the best developed agriculturally of any in the county.

Soil conditions on Gunters Mountain in the northern part of the area are practically the same as those on Sand Mountain, but owing to its remote location it has not kept pace in agricultural development with other sections of the county. However, this part of the area is gradually being settled and promises to develop rapidly in the near future.

Cotton and corn are the most important crops and have been since the early days. In the valley region, in addition to cotton, corn is extensively grown for market, but in the mountainous sections cotton is the chief money crop. Practically all of the corn grown in this part of the area is consumed on the farms.

In the valleys the native forest growth, consisting of oak, hickory, walnut, and poplar, has nearly all been removed. This is also true of the more populous sections of the mountainous region, where the native timber growth consisted of shortleaf pine, oak, and hickory. However, on that part of Sand Mountain out of reach of the railroad and on Gunters Mountain there is considerable timber still standing. On some of the rough mountain sides there is some cedar left, but this is being removed rapidly.

In the early days the raising of cattle, hogs, and sheep was the main industry of the people living in the sparsely settled mountainous sections. Toward the end of the last century, however, most of the lands on Sand Mountain which had been used for this purpose had been taken up by settlers. Later the stock law was passed and since that time stock raising in this part of the county has declined. In the northern part of the area where the stock law has not yet been

put into effect the raising of cattle, hogs, sheep, and goats is still an important industry.

According to the census of 1910, in Marshall County there were 52,010 acres in corn, producing 611,020 bushels; 48,391 acres in cotton, producing 17,604 bales; 5,178 acres in oats, producing 51,300 bushels; and 105 acres in wheat, producing 675 bushels. In addition to these crops, sorghum, peas, tobacco, sweet and Irish potatoes, and miscellaneous vegetables are grown for home consumption.

Corn is the most important crop,[1] the acreage being almost as much as that of all other crops combined. It is grown on all of the soils, but does best along the rivers and some of their tributaries and on the loam and clay loam limestone soils. Yields of 20 to 75 bushels per acre are obtained on these soils without the use of fertilizer. These yields could be materially increased merely by deeper and more thorough preparation of the seed bed, thorough subsequent cultivation, and the proper selection of seed. The general yield for the county ranges from 12 to 80 bushels per acre and averages, according to the last census, about 15 bushels per acre. Any of the soils of the area are capable of producing a higher average than this, the low average yield being due largely to poor cultural methods. To remedy this defect thorough preparation and cultivation and a good system of rotation, with judicious applications of manure and fertilizers to keep the soil in a high state of productivity, are necessary. Corn requires more nitrogen than cotton, and as this is the highest priced ingredient in commercial fertilizers it is more profitable to precede a corn crop with a legume, such as cowpeas, vetch, soy beans, or clovers, all of which accumulate nitrogen from the air. When such methods are practiced a much smaller amount of nitrogen in the form of commercial fertilizers is required. Corn also requires abundant moisture for its proper development, and for this reason the retention of moisture by deep fall or winter plowing and frequent shallow cultivation should be practiced.

Cotton ranks next in importance to corn and is grown on all of the soils except those of alluvial origin along the larger streams. The yields vary from one-third bale to 1 bale per acre, depending more on fertilization and cultural methods employed than on the natural fertility of the soil. Cotton is very susceptible to good tillage methods, such as a deep and carefully prepared seed bed, thorough cultivation, a comprehensive system of rotation, and manuring. Improved varieties adapted to both soil and climatic conditions have been found to be much more profitable than the common varieties generally grown. Doubtless an early-maturing variety of cotton suited to the soil conditions in the county would prove much more

[1] See Farmers' Bul. No. 414, Corn Cultivation.

profitable than those generally grown, as the seasons are often too short to allow a full crop of bolls to mature. A few of the farmers realize this, but in the majority of cases the same production could be secured on a much less acreage.

Oats [1] are not grown extensively at present, but are coming into favor. This crop is usually planted in the spring, owing to the fact that fall-sown oats are often killed by winter freezes. This could be largely overcome by planting the seed in open furrows.

Wheat at one time was grown rather extensively, but at present the acreage planted to this crop is rather small. The production of both wheat and oats should be greatly increased, since they not only furnish forage in the spring, but if sown in the fall serve as a winter cover crop as well.

Cowpeas [2] are generally grown, especially in the mountainous sections, where they are planted in rows or sown among the corn. Soy beans [3] are also coming into favor, and since this crop and cowpeas are not only good soil renovators but furnish excellent forage as well, the acreage planted to them should be greatly increased. Vetch would also prove profitable for this purpose. This crop could be sown in the fall and removed early enough in the spring to allow other crops to be grown.

The yields of clover, owing to the poor condition of the soil, have been unsatisfactory in recent years. Ordinarily the soil can be brought to the proper condition for clover with applications of 1 to 2 tons of burnt lime per acre or twice this amount of ground limestone and inoculation with the proper bacteria.[4] Inoculation is necessary only where clover has not been grown previously. By following the same method alfalfa could be grown successfully, especially on the loam and clay loam limestone soils. Native grasses do well, especially Johnson and Bermuda grass. The former would doubtless prove profitable as a hay crop on the limestone and better-drained alluvial soils in the valleys. Bermuda grass and Japan clover (lespedeza) [5] grow wild over the entire area and these crops will establish themselves on lands that have been cultivated for some time if given an opportunity to do so. These plants furnish excellent pasturage during the summer and early fall, and if bur clover be sown with them will furnish winter pasturage as well.

Stock raising [6] is carried on in a limited way, but does not receive the attention that it should. In the northern part of the area, where there is no stock law, common breeds of cattle, hogs, and some sheep

[1] See Farmers' Bul. No. 436, Winter Oats for the South.
[2] See Farmers' Bul. No. 318, Cowpeas.
[3] See Farmers' Bul. No. 372, Soy Beans.
[4] See Farmers' Bul. No. 455, Red Clover.
[5] See Farmers' Bul. No. 441, Lespedeza, or Japan Clover.
[6] See Buls. Nos. 150, 151, and 154, Ala. Agr. Expt. Sta., and Circulars Nos. 97, 110, 258, and 378, Bureau of Animal Industry, U. S. Dept. of Agr.

are raised for market, but in the remainder of the county the number raised is not sufficient to supply the local demand. Some few farmers have improved breeds, but this is the exception rather than the rule.

The valley section of the county, being well watered and particularly adapted to grasses, clover, grain, and hay, is well suited to this form of agriculture, and doubtless if this industry received the attention that it should it would prove more profitable than the system of farming which now prevails.

A variety of fruits [1] can be grown in the county, but as a rule they are cultivated only in a limited way. The area supports a number of small orchards, especially apples and pears,[2] but for the most part they are only grown for home consumption. The peaches grown on the Dekalb soils of the mountainous section have an excellent flavor, but as this crop is often killed by frosts in the spring it is not grown to any extent. This could be largely avoided by care in the selection of locations. Since early spring freezes are the chief cause of crop failure, it would seem that the highest ridges and northern slopes in the mountainous section offer locations less exposed to damage from this source, as the air drainage is better and the trees bloom somewhat later in the spring.

The sandy Dekalb soils have almost all the physical properties requisite to trucking and are well adapted to such truck crops as strawberries, Irish and sweet potatoes, beans, and cabbage. In quality these crops rank second to none. Watermelons also do well and have an excellent flavor. In the adjoining county of Cullman the farmers cooperate in the growing and marketing of truck crops and find it very profitable. This system might be advantageously introduced into the area, especially that portion of it near the railroads.

Commercial fertilizers are generally used on all except the Huntington soils along the Tennessee River and some of its tributaries. The practice has been to use a complete fertilizer of phosphoric acid, nitrogen, and potash in the ratio of 10–2–2, regardless of the fertilizer requirements of the different soils and crops. The limestone soils in the valleys generally contain a large store of potash and doubtless much, if not all, of this element could be omitted from the formula used on these soils. The Dekalb soils are deficient in all of the elements contained in the commercial fertilizers and it has been found that a complete fertilizer pays well even when used in large quantities and that of the different elements contained in the fertilizer nitrogen gives the best returns on the investment. Systematic crop rotation is not as yet practiced to any great extent in the

[1] See Farmers' Bul. No. 243, Fungicides and Their Use in Preventing the Diseases of Fruit.
[2] See Farmers' Bul. No. 482, The Pear and How to Grow It.

county. All of the soils, with the possible exception of the Huntington types, are deficient in humus, and some system of crop rotation is necessary to supply this much needed element. By this means plant food is supplied to the soil and its physical condition improved. It has also been found that commercial fertilizers give better results where this element is present. The maintenance of the organic-matter content of the soil is very important and can not be accomplished with the scanty supply of barnyard manure available on most farms in the area. The legumes can be grown advantageously for supplying nitrogen, and wheat, oats, and rye, grown as winter cover crops, also furnish forage in the spring.

All of the Dekalb types and many of the limestone soils are deficient in lime. Liberal applications of this soil constituent should be added with manure or when green crops are plowed under. This not only tends to correct soil acidity but also improves the physical condition, making the dense soils more porous, and causing the particles to flocculate where the structure is open.

A rotation, suggested by the State experiment station, is first year corn, with cowpeas, either broadcast or drilled between the rows; second year, oats (fall sown), followed by cowpeas or soy beans; third year, cotton with crimson clover, oats or rye sown between the rows in the fall. Other crops could be substituted if preferred, but no rotation is complete which does not include the legumes, since these crops furnish nitrogen as well as organic matter.

According to the census of 1910 the average size of farms in the county is 67.5 acres. This is somewhat misleading as each tenancy is reported as a separate farm and the average holding is therefore much greater than the figures show. There are a great many farms containing several thousand acres, while the majority of holdings range from 40 to 500 acres.

According to the same census 53.4 per cent of the farms in Marshall County are operated by owners and 46.5 per cent by tenants on the basis of cash rental or division of crops. Where lands are rented on shares the owner usually receives one-third of the corn and one-fourth of the cotton if the renter furnishes tools and work stock, but when these are furnished by the owner he receives half the crop. Cash rentals vary from $2 to $5 per acre, depending on the fertility of the land.

Labor conditions in the county are not altogether satisfactory. With the exception of a few families at Albertville and Boaz, there are no negroes in the mountainous sections of the county. Here the farmers operate on a small scale and depend on their families for the necessary help. In the valleys most of the laborers employed on the farms are negroes. Where labor is hired by the day the wage varies from 50 cents to $1. From $15 to $20 per month and board is

paid during the crop season. The wage for picking cotton varies from 50 cents to $1 per hundred pounds of seed cotton.

According to the last census the value of all lands in the area, including improvements, is $6,752,843. Near the larger towns and villages improved farms have more than doubled within the last five years. In the valleys the value of farm lands ranges from $10 to $50 an acre, according to the location and kind of soil, the river bottoms being the most valuable. In the mountainous sections the land values range from $5 to $50 an acre, depending on the location and improvements.

SOILS.

Marshall County embraces three broad soil divisions: (1) The sandstone and shale soils of the Mountain or Cumberland Plateau section; (2) the limestone soils of the limestone valleys and ridges; and (3) the stream-deposited or alluvial soils along the drainage ways.

Of the mountain soils two series are represented—the Dekalb and Hanceville. The Dekalb soils are derived from the sandstones, shales, and conglomerates of the Coal Measures,[1] and are characterized by the gray color of the surface material and the yellow color of the subsoils. Three members—the fine sandy loam, silt loam, and stony sandy loam—are developed in the area. The fine sandy loam and silt loam occur over the comparatively smooth plateaus of the mountains, the former being the most extensive type in the county. The silt loam is derived from shales and fine-grained sandstone.

Rough stony land is closely associated with both the sandstone and limestone soils, the stone present being largely limestone in the valleys and sandstone in the mountainous areas. This is quite an extensive soil, but one of little or no agricultural value, its rough and stony surface features precluding any extensive cultivation.

The Hanceville fine sandy loam is also derived from sandstone of the Coal Measures. It differs from the Dekalb fine sandy loam in having a red subsoil. This color is probably due to an advanced condition of weathering and more complete oxidation of the material, which under other conditions is of a yellow color. It has also been suggested that the material may be derived from rocks containing more iron-bearing minerals than those giving rise to the Dekalb. The evidence, however, inclines more strongly toward difference in weathering as the cause of difference in color.

The residual soils of the valleys and valley ridges are derived largely from limestone, although some areas have been influenced by material from sandstone associated with the limestone, and to some little extent by material from the shales of the Clinton formation.

[1] The geological references in this report are based upon the work of the Alabama Geological Survey. See reports on "The Plateau Region of Alabama" and the "Tennessee Valley Region" of the Alabama Geological Survey.

The Hagerstown loam and Hagerstown clay loam are brown soils derived largely from chert-free limestone, belonging probably to the Pelham (Trenton), Bangor, and Tuscumbia (St. Louis) formations. These are the "mulatto" soils of the valleys, the undulating to gently rolling lands with a brown surface soil and yellowish-brown to dull-red subsoil.

Another important valley series is the Decatur. These are the "red limestone soils," characterized by the dark-red or dark reddish brown color of the surface soils and by the dark-red color of the subsoils. Chert-free limestone, probably of several formations, has been the main source of the Decatur soils, although some areas have been sufficiently influenced by cherty limestone to be conspicuously cherty. The larger of these were mapped as the cherty phase of the Decatur clay loam.

A third series of limestone soils having characteristically a smooth or nearly flat surface, gray surface soils, and heavy plastic clay subsoils of a yellow or mottled yellow and gray color is developed in the limestone valleys. Both surface and under drainage are poorly established over the most typical flat bodies, the wet condition giving rise to the local name of "crawfish land." These are the Colbert soils. They are not so productive as the Hagerstown and Decatur, but with the establishment of good drainage, such as can readily be accomplished by ditching or tiling, good yields of a number of crops can be secured.

The Clarksville gravelly loam comprises the valley ridges and hills. This is a gray silty soil with a yellowish friable silty clay loam to silty clay subsoil, the color of which often varies to red at lower depths. Angular chert fragments from the parent cherty limestone are present on the surface and throughout the soil mass in quantity sufficient to interfere somewhat with cultivation. This type of soil is locally styled "gravelly limestone land."

In the overflowed stream bottoms two series of alluvial soils are developed—the Huntington and Holly. The former include the brown, better drained, mellow soils of high agricultural value, and the latter the gray, poorly drained lands of only ordinary value. They are all subject to overflow and to consequent successive additions of water-deposited material washed from the various soils of the drainage basins. There is little change in the character of the Huntington soils from the surface downward to a depth of several feet, for the reason that there has not been any opportunity for downward translocation or washing out of the finer material of the surface stratum, as in the case of the upland soils. The light color of the Holly is the result of poor drainage and restricted oxidation.

The narrow strips of bottom land mapped as Meadow along some of the smaller streams include very wet alluvial soil, embracing such

a range of soil texture and such variation in color and character of material as to make type differentiation difficult. In places much material has been washed down to these strips from the adjacent slopes, making the soil of such areas essentially colluvial in origin.

The Elk fine sandy loam is a stream terrace soil, the material of which was deposited from overflow water when the streams were flowing at a higher level than at present. These terraces stand above present-day overflows, and the soil has consequently undergone a much more thorough weathering than any of the poorer drained first-bottom types.

In the following chapters the character and agricultural worth of the several types of soil mapped are treated in detail.

The following table gives the names and extent of the various types of soil mapped in the county:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Dekalb fine sandy loam	142,784	36.6	Clarksville gravelly loam	9,216	2.4
Dekalb silt loam	43,328	11.1	Colbert silty clay loam	8,064	2.1
Rough stony land	43,264	11.1	Holly silt loam	7,744	2.0
Dekalb stony sandy loam	39,168	10.0	Hanceville fine sandy loam	5,760	1.5
Meadow	23,296	6.0	Huntington silt loam	5,376	1.4
Decatur clay loam	8,256	4.8	Decatur loam	4,480	1.1
Cherty phase	10,688		Elk fine sandy loam	3,008	.8
Huntington silty clay loam	16,192	4.1	Colbert stony clay	960	.2
Hagerstown loam	9,536	2.4			
Hagerstown clay loam	9,280	2.4	Total	390,400	

HAGERSTOWN LOAM.

The Hagerstown loam has a surface soil of yellowish-brown, brown, or reddish-brown mellow loam from 8 to 10 inches deep, underlain by a reddish-yellow loam grading at a depth of less than 2 feet into a reddish-yellow to dull-red clay loam or clay.

The soil is residual in origin, being derived from limestone, probably from the Bangor and Pelham (Trenton) formations. Colluvial wash from the plateaus and sides of the mountains has been mixed with or spread over the soil of some narrow areas along the foot of the slopes.

The type is strictly a valley soil and occurs in nearly all of the coves and valleys associated with the Hagerstown clay loam. Of the limestone soils this type is second in importance in point of area, covering about 14 square miles.

The topography of the Hagerstown loam varies from level to gently rolling or undulating. For the most part the drainage is fairly well established, but there are some depressed areas where artificial

drainage is needed to put the soil in the best condition for crops. This may be easily effected by digging open ditches to the near-by natural drainage ways.

Though the type is adapted to a wide variety of crops and is one of the most productive soils in the area, it is planted almost entirely to cotton and corn. Cotton yields from one-half to 1 bale per acre and corn from 20 to 50 bushels per acre. Clover does well, but in recent years this crop has not always been successful. This is probably due to an unfavorable soil condition, which can be corrected by an application of lime and by the incorporation of vegetable matter in the surface soil. By plowing under green crops and applying from 1 to 2 tons of burnt lime or 2 to 4 tons of finely powdered limestone per acre clover would do very well. With such treatment it is believed that alfalfa would succeed.

This soil is almost ideal for stock raising, as it is well watered and well adapted to grain, hay, and pasturage. The timber growth consists of oak, hickory, walnut, chestnut, and some cedar.

This land is valued at $20 to $50 an acre, depending on location and improvements.

HAGERSTOWN CLAY LOAM.

The surface soil of the Hagerstown clay loam consists of a brown or yellowish-brown clay loam, varying in depth from 8 to 10 inches. This is underlain by a silty clay of the same color, usually grading into clay within a depth of 3 feet. In places the surface soil contains considerable sand, where materials from the mountain slope have entered in part into its composition. The soil is inclined to puddle when wet and if plowed in this condition clods badly. Applications of lime or finely ground limestone and the plowing under of cowpeas, clover, or other green crops would be of great benefit in overcoming this difficulty.

The type is a residual soil and owes its origin to the weathering of limestone belonging largely to the Bangor and Tuscumbia (St. Louis) formations. It has been added to slightly by colluvial material from the mountain slopes.

The Hagerstown clay loam is found in practically all of the coves and valleys, the type occurring most extensively of any of the limestone soils. The largest areas are encountered in the Tennessee River Valley in the northeastern part of the county and along Green Brier Cove in the western part of the area.

The topography, as a rule, is rolling to slightly hilly, the type occupying slightly higher elevations than the associated Hagerstown loam. Drainage is inclined to be excessive and erosion has been

active, especially on the steeper slopes. Contour cultivation, deeper fall plowing, and the growing of winter cover crops would tend to minimize danger from this source.

Cotton and corn are the only crops grown on this type to any extent. Cotton yields from one-third to 1 bale per acre and corn from 15 to 40 bushels. The soil is well adapted to clover, alfalfa, oats, and grasses. Stock raising should also prove profitable on this soil. It is well adapted to apples, and this form of agriculture should receive more attention than it does.

The timber growth consists mainly of oak, hickory, beech, and chestnut.

The value of this type ranges from $15 to $40 an acre, depending upon location and improvements.

DECATUR LOAM.

The Decatur loam consists of a dark-red to reddish-brown mellow loam, varying in depth from 8 to 15 inches, underlain by a dark-red silty clay, becoming heavier in texture and in places somewhat lighter in color with increased depth.

The type is limited in extent, the few small areas found in the county not exceeding in the aggregate more than 7 square miles.

The Decatur loam is residual in origin and owes its formation to the disintegration and decomposition of limestone rock. It is found associated with the Decatur clay loam and occurs in the Paint Rock and Tennessee River Valleys and in Browns Valley in the southwestern part of the county.

In surface features the Decatur loam varies from level to gently rolling, and for the most part is well drained. In a few instances some of the more level areas would be benefited by the use of tile or ditches. Owing to the loamy nature of the soil it is retentive of moisture, and crops suffer very little from drought.

The type is very productive and is well suited to all of the staple crops. Cotton yields from one-half to 1 bale per acre and corn from 20 to 40 bushels, with only moderate applications of fertilizer. Oats yield from 30 to 40 bushels per acre without fertilizer. Clover, alfalfa, and grasses could be grown with but little trouble and would doubtless prove very profitable.

The timber growth consists of oak, hickory, chestnut, persimmon and shortleaf pine.

Land values range from $35 to $50 an acre, the type being highly prized as an agricultural soil.

The table following gives the average results of mechanical analyses of samples of the soil and subsoil of the Decatur loam.

Mechanical analyses of Decatur 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.*
413921, 413923.....	Soil.....	1.4	4.6	9.5	19.9	9.4	35.6	19.4
413922, 413924.....	Subsoil.....	1.0	3.9	7.7	15.8	8.7	36.3	26.5

DECATUR CLAY LOAM.

The surface soil of the Decatur clay loam consists of a dark-red to reddish-brown heavy loam to clay loam, ranging in depth from 4 to 8 inches. The subsoil is more uniform in color and texture than the surface soil. Considerable sand is noticeable throughout the surface soil where material from the mountains or associated sandstone soils have entered into the composition of the type.

The Decatur clay loam is strictly a valley soil and is residual in origin. It seems to be derived from Pelham (Trenton) limestone and probably to a less extent from the Fort Payne chert. The limestone consists of the purer strata and contains very little chert.

The type occurs mainly in the Tennessee River Valley and in Browns and Big Spring Valleys. Less extensive areas occur in some of the smaller valleys and coves. The aggregate of the typical soil is limited, not exceeding 13 square miles.

As a rule this type has a gently rolling surface and can be cultivated easily. Occasional small areas are rough, but this is the exception rather than the rule. Drainage is good and thorough. The surface soil is inclined to erode on the steeper slopes; deeper plowing will easily hold this in check. In a few instances where the surface is rather flat artificial drainage by ditching is desirable during the wet season.

The type is used mainly for cotton and corn. Cotton yields from one-half to 1 bale per acre and corn from 15 to 40 bushels, depending on the quantity of fertilizing used and the cultural methods employed. The soil is well adapted to oats, wheat, clover, alfalfa, and the grasses.

Clover and alfalfa require inoculation and the application of 2 to 5 tons of lime per acre. Better cultural methods might also be employed in order to secure the best results with these crops. The soil is badly in need of organic matter, and a systematic rotation of crops should be practiced, including legumes, to supply this much-needed constituent. This practice should precede clover and alfalfa, since these crops can be grown more successfully when the soil is well supplied with vegetable matter.

The timber growth consists of oak, hickory, chestnut, dogwood, persimmon, and shortleaf pine.

Land values vary from $20 to $50 an acre, depending on the location and improvements.

Decatur clay loam, cherty phase.—The cherty phase of the Decatur clay loam corresponds in most respects to the main type as regards soil and subsoil. Fragments of limestone and chert of varying sizes from small gravel to stones from 2 to 4 inches in diameter are found scattered over the surface and throughout the subsoil of the phase. In many places these fragments are sufficiently numerous to interfere with cultivation.

In point of area the phase is slightly more extensive than the main type, the aggregate being slightly over 16 square miles.

In other respects the phase differs but little from the main type, the remarks as to crop yields and conditions generally being equally applicable to it.

The following table gives the results of mechanical analyses of typical samples of the soil and subsoil of the Decatur clay loam and its cherty phase:

Mechanical analyses of Decatur clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
Typical:		*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent*	*Per cent*	*Per cent*
413917	Soil	0.5	3.5	6.4	9.3	6.8	48.0	25.5
413918	Subsoil	1.2	3.6	4.4	6.8	5.3	44.9	33.8
Cherty phase:								
413913	Soil	1.2	4.1	7.4	17.1	5.8	44.0	20.5
413914	Subsoil	5.3	7.4	8.4	13.1	6.4	28.5	31.0

CLARKSVILLE GRAVELLY LOAM.

The surface soil of the Clarksville gravelly loam consists of a gray to yellowish-gray silt loam from 6 to 10 inches deep. The subsoil is a yellow to reddish-yellow silty clay grading into dull red in the lower portion. Angular chert fragments and gravel are abundant on the surface and throughout the soil section. Where these make cultivation slightly more difficult, they tend to check soil erosion and make the soil more open and porous.

The type occurs rather extensively in the area, occupying two lines of hills and ridges which extend across the county on the south side of the Tennessee River. They follow the course of the river to nearly the center of the county and then along Browns and Big Spring Valleys to the county line.

The topography varies from rolling to hilly, in some places being too rough for cultivation. However, with proper care most of the type can be cultivated. The steeper portions are inclined to erode,

but the chert fragments prevent erosion to any great extent. In places contour cultivation and deeper plowing would prove beneficial.

The Clarksville gravelly loam is derived from the Fort Payne chert and the Knox dolomite formations. The more soluble portions of these rocks have weathered extensively, the residue representing the hard flinty material remaining as fragments.

The more hilly areas of the Clarksville gravelly loam are still in forest, but for the most part the type has been cleared and put in cultivation. It is a good soil for cotton and corn, cotton yielding from one-third to 1 bale per acre and corn from 20 to 40 bushels. Clover and grasses also do well. It is well adapted to peaches and truck crops, especially strawberries and potatoes. Cantaloupes should also prove profitable. Peaches can be planted high up on northern exposures, where the trees bloom late and the damage from early spring frosts is reduced to a minimum.

The timber growth consists of oak, hickory, walnut, chestnut, and some shortleaf pine.

Land values range from $10 to $30 an acre, depending on location and improvements.

COLBERT STONY CLAY.

The Colbert stony clay consists of a yellowish-brown to brown clay loam from 4 to 8 inches deep, underlain by a brownish-yellow to yellow stiff, plastic heavy clay. Large fragments and outcrops of a light-gray limestone are common to the type.

This soil occupies slightly elevated knolls and ridges and is for the most part associated with the Colbert silty clay loam, though small detached areas occasionally occur. The topography is rough and the surface flow-off is usually rapid enough to cause erosion except where the soil is protected by rocks and timber.

The Colbert stony clay is residual in origin, being formed by the disintegration of the light-gray limestone found throughout the soil mass. The rocks are present in sufficient quantities to make it largely unfit for cultivation, and the type is for the most part in forest.

The timber growth consists of oak, hickory, beech, and cedar. By cutting off the timber and allowing native grasses to take possession the type can be developed into fairly good pasture lands.

As this type of soil occurs only in small areas it is usually sold with adjoining valley lands, which largely regulate the price. When sold separately its value ranges from $5 to $10 an acre.

COLBERT SILTY CLAY LOAM.

The Colbert silty clay loam consists of 4 to 8 inches of yellowish-gray to gray silty clay loam, underlain by a stiff plastic sticky clay loam yellow to mottled gray and yellow in color. The lower depths

frequently contain iron concretions. On slightly elevated areas a silty phase of this type occurs but these areas were too small to be shown on the map.

The type is derived principally from limestone, the parent rock, which is a gray limestone, frequently outcropping in the area. In places it shows evidence of having received wash from the higher lying types surrounding it.

The largest area of the Colbert silty clay loam occurs on the north side of the Tennessee River between the bottom lands of the Tennessee River and Gunters Mountain. Smaller areas occur throughout the valley region occupying positions between the higher lying limestone soils and the bottom lands along the streams.

The surface features of the type vary from flat to undulating. As the areas are surrounded by higher lying types the natural drainage is very poor. Artificial drainage will be necessary before the type can be cultivated extensively. This could be accomplished by means of open ditches and lateral tile or open drains, leading to the natural drainage channels.

Owing to its compact structure and the fact that it is poorly drained, the Colbert silty clay loam is not cultivated very extensively, the greater part of it being in forest and old fields. Where well drained and properly cultivated it is fairly productive and is well adapted to cotton, corn, and forage crops. Cotton yields from one-fourth to one-half bale per acre and corn from 10 to 30 bushels. Oats and wheat yield from 10 to 30 bushels per acre and natural grasses do well. Many of the undrained areas, owing to the high cost of drainage systems, are better left in forest or used for pasturage.

The value of this type of soil ranges from $5 to $20 an acre.

The following table gives the average results of mechanical analyses of samples of the soil and subsoil of the Colbert silty clay loam:

Mechanical analyses of Colbert silty clay 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.*
413933, 413935.....	Soil.....	5.8	8.1	3.9	8.1	10.4	47.6	16.0
413934, 413936.....	Subsoil.....	2.9	4.7	2.5	5.1	7.4	42.8	34.5

DEKALB FINE SANDY LOAM.

The Dekalb fine sandy loam consists of a gray to yellowish-gray fine sandy loam extending to a depth of 8 to 12 inches, underlain by a yellow, friable, fine, sandy clay. In places, several feet below the surface, the subsoil is sometimes red. Occasionally this occurs

within the 3-foot profile, but such spots were too small to be shown on the map. These areas represent either patches of Hanceville fine sandy loam or a gradational soil between this type and the Dekalb fine sandy loam.

The Dekalb fine sandy loam is residual in origin and derived from the underlying sandstone of the Coal Measures.

The type occurs on the plateaus of Sand Mountain in the southern half of the area, and on Gunters Mountain, including about one-fourth of the area north of the Tennessee River. A large area is also found in the western part of the county. It is the dominant type of the plateau region and one of the most extensively developed soils in the county.

In surface features the Dekalb fine sandy loam varies from level to gently rolling and slightly hilly, there being a few steep slopes near the larger streams. Both surface and underdrainage are good.

The greater part of the type is under cultivation, but, owing to its calcareous sandstone origin, it is not naturally very productive. Its loose structure makes cultivation easy and it readily absorbs rainfall. The soil responds readily to fertilizer applications. Nitrogen is the most needed constituent where cultivation has been continued for any considerable time.

The Dekalb fine sandy loam is adapted to a wide range of crops, but cotton and corn are the only ones grown extensively. Cotton ordinarily yields one-third to 1 bale per acre and corn from 10 to 50 bushels, depending on the methods of tillage and the amount of fertilizer used. Owing to the high elevation cotton sometimes suffers from early frosts before reaching maturity. With the late-maturing varieties phosphatic fertilizers would probably hasten growth and lessen danger from this source. The soil is admirably adapted to truck crops and fruits, such as potatoes, beans, cabbage, apples, peaches, cherries and plums. In quality these products are unsurpassed. They are not grown to any extent, the supply being but little more than enough for home consumption.

The principal requisite in soil management under present conditions is vegetable matter, which can only be supplied through a proper system of crop rotation in which some legume, such as cowpeas or soy beans, is included for the purpose of turning under. Lime is also needed to correct the acid condition of the soil prevailing generally throughout the county.

The timber growth consists mainly of white, red, blackjack, and post oak, hickory, dogwood, and shortleaf pine.

Land of this type varies in value from $5 to $50 an acre, depending on improvements and location.

DEKALB SILT LOAM.

The Dekalb silt loam consists of a gray to yellowish-gray silty loam to light silt loam from 8 to 12 inches deep, underlain by a yellow friable or brittle silty clay.

The soil is residual in origin, being derived from a fine-grained sandstone and shale. In places fragments of these rocks are found scattered over the surface.

The type occurs associated with the Dekalb fine sandy loam and is confined to the mountain plateaus. The topography varies from level to gently rolling and the drainage is excellent. Near stream courses small areas of this type are slightly hilly and inclined to erode, but this is the exception rather than the rule.

The type is well adapted to all of the staple crops of the area, including cotton, corn, oats, and cowpeas. Owing to its more level topography, it is considered more desirable than the associated Dekalb fine sandy loam. Under good treatment cotton yields from one-half to 1 bale per acre and corn from 15 to 50 bushels. Fruit and vegetables find this soil congenial to their growth and give good yields. Owing to the distance of most of the type from market points and railroads these crops could hardly be grown except for home consumption.

The timber growth consists of shortleaf pine, oak, hickory, dogwood, walnut, and persimmon.

The value of this soil ranges from $10 to $40 an acre, depending on location and improvement.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Dekalb silt loam:

Mechanical analyses of Dekalb 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.*
413905	Soil	0.4	2.7	9.8	21.7	10.1	41.6	13.9
413906	Subsoil	.0	2.5	8.3	19.9	8.1	44.3	16.8

DEKALB STONY SANDY LOAM.

The Dekalb stony sandy loam consists of a gray to yellowish-gray light to medium sandy loam varying in depth from 8 to 10 inches and underlain by a yellow sandy clay. Fragments of sandstone ranging in size from small stones to large bowlders occur strewn over the surface of the type and throughout the soil profile.

The type is residual in origin, being derived from the underlying sandstone which occurs throughout its extent. It has also been influenced somewhat by colluvial material.

The Dekalb stony sandy loam occurs on the mountain slopes between plateaus and valleys and on the sides of hills leading down to streams. Drainage is excessive and the soil erodes badly, except where protected by rocks and vegetation.

Except for occasional small scattered areas the type is too rough to cultivate, and it is probably best suited for pasturage or should be left in forest. Where locations are favorable for orchards this industry would prove profitable. The northern exposures afford good locations for peaches.

The timber growth consists of oak, hickory, chestnut, poplar, walnut, and shortleaf pine.

The type is usually sold with included patches of adjacent and associated soils, the value of the latter determining the price. Where sold separately values range from $1 to $5 an acre, depending largely on the timber growth.

HANCEVILLE FINE SANDY LOAM.

The Hanceville fine sandy loam consists of a gray to reddish-brown fine sandy loam from 6 to 12 inches deep, underlain by a friable red fine sandy clay which extends to a depth of 3 feet or more. This soil is very similar to the Dekalb fine sandy loam, with which it is associated, the main point of difference being in the color of the subsoil.

The soil is residual in origin, being derived from the underlying fine-grained sandstone. This formation is sometimes encountered within a depth of 3 feet, and occasionally outcrops within the county.

The type is rather limited in extent, an area of a few square miles occurring on Sand Mountain in the western part of the area and another on Gunters Mountain in the northern part of the area. Small detached areas occur throughout the mountain plateaus, but many of them were too small to be shown on the map.

The topography of the type varies from level to gently rolling, there being only a few steep slopes near the streams. The surface features admit of ample drainage with but little erosion. Artificial drainage is unnecessary.

A large part of the Hanceville fine sandy loam is under cultivation and is well adapted to all the staple crops of the area, including cotton, corn, oats, and cowpeas. Fruits and truck crops do well. Cotton yields from one-third to 1 bale per acre and corn from 12 to 40 bushels. Although the type produces excellent fruit and truck crops, the distance from market points and transportation makes such crops impracticable except for home consumption.

The soil responds readily to commercial fertilizers, is easily cultivated, and if the humus content is kept up good returns are obtained.

Like its associated type the Dekalb fine sandy loam, vegetable matter is the main requisite for this soil. This can only be supplied through a systematic rotation of crops in which a legume is included to be plowed under as a green manure.

The timber growth consists chiefly of white, red, and blackjack oak, walnut, hickory, chestnut, and shortleaf pine.

The value of this land varies from $10 to $30 an acre, depending on location and improvements.

ROUGH STONY LAND.

Rough stony land comprises areas of blufflike mountain slopes between plateau and valley lands where ledges and outcrops of rock, largely limestone, occur in quantities sufficient to preclude any kind of agricultural utilization except for pasturage and timber. The usual soil material consists of 4 to 6 inches of yellow or yellowish-brown clay loam, underlain by a yellowish-brown tenacious and plastic clay.

The type occurs for the most part on the bluffs of Sand and Gunters Mountains overlooking the Tennessee River Valley. The area is rather limited, as the type occurs only in narrow strips near the base of these mountains. The topography is very rough, being broken by bowlders, ledges, and outcrops of rock, mainly Bangor limestone.

The most of the Rough stony land is still in forest, very little of it having been cleared for pasturage or cultivation. Owing to the tendency of the soil to erode it would be better to leave it in forest, as this prevents erosion. The timber also proves the most profitable utilization of the type. This growth consists of oak, hickory, poplar, beech, chestnut, and cedar. The latter grows luxuriantly and is very profitable, as there is a great demand for this timber for pencil stock, fence posts, and piling.

Land of this character is usually sold with adjacent valley lands and where this is the case the proportion of valley lands largely determines its value. When sold separately it ranges in value from $5 to $10 an acre, depending on the timber growth.

HUNTINGTON SILTY CLAY LOAM.

The Huntington silty clay loam consists of a dark-brown to light-brown silty clay loam from 10 to 15 inches deep, underlain by a light-brown silty clay loam often grading rapidly into a silty clay. Areas occur along the banks of streams, occupying a position a few feet higher than the remainder of the type, which contain more silt and sometimes a small amount of sand. Such spots were too small to be shown on the map.

The type is the main bottom land soil of the area. It is alluvial in origin and variable as to color, texture, and structure. Small

depressed areas occur throughout the type, where a darker surface soil indicates accumulations of organic matter.

Where well drained the type is comparatively easy to cultivate, but it bakes and clods badly if plowed when too wet.

This type occurs as first bottoms along the Tennessee River. It is subject to overflow, but the water seldom remains on the land long enough during the growing season seriously to affect crops. The topography varies from level to undulating, and over the greater part of the area the drainage is adequate. Occasional depressions occur, where tile or open ditches are necessary.

The Huntington silty clay loam is alluvial in origin, representing an intermixture of silt, clay, and fine sand, transported long distances and deposited by floods or washed in from adjacent uplands.

The Huntington silty clay loam is admirably adapted to corn and cowpeas, the former yielding from 20 to 75 bushels an acre without fertilizers. When properly drained the type produces good yields of wheat and oats ranging from 40 to 60 bushels per acre without the use of fertilizers. These crops should be included in a definite rotation, a feature to which not enough attention is given at present. In most cases the type is cropped exclusively to corn. Where this system is followed cowpeas should always be sown between the rows.

This type is also well suited to grasses and makes good pasture lands. Yields of from 2 to 4 tons per acre of Johnson grass are frequently obtained. Cotton inclines to run to weed on this soil and is too late in maturing. The use of acid phosphate would tend to hasten maturity.

The timber growth consists of pine, ash, willow, sycamore, hackberry, and elm.

Very little of the Huntington silty clay loam is for sale. It is valued at $25 to $100 an acre.

Below are given the average results of mechanical analyses of samples of the soil and subsoil of this type:

Mechanical analyses of Huntington silty clay loam.

Number.	Descripton.	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.*
413941, 413943.....	Soil.....	0.1	0.1	0.2	0.9	5.3	10.2	43.2
413942, 413944.....	Subsoil.....	.1	.1	.3	1.3	6.5	45.9	45.8

HUNTINGTON SILT LOAM.

The Huntington silt loam consists of a dark-brown to light-brown loam to silt loam ranging from 6 to 10 inches in depth, underlain by a heavy loam to silty clay loam, slightly darker than the surface soil.

Lighter colored areas containing more sand and silt are found next the stream banks. Over depressed areas the soil is usually darker in color and more plastic. Such spots were usually too small to be shown on the map. Owing to its open structure, the type is easily cultivated and readily works into a good tilth.

The type occurs as first bottom land along Paint Rock River and many of the smaller streams in the northern part of the area. It is also encountered along Browns and Big Spring Creeks, in the southwestern part of the county. The areas vary from a few rods to one-half mile or more in width. The type is subject to occasional overflow, but for the most part drainage is fairly good. Some few depressed areas would be improved by ditching or the use of tile.

The Huntington silt loam is of alluvial origin and represents an intermixture of sand, silt, and clay washed from the adjacent uplands. The soil is being constantly built up by each successive overflow, which brings in fresh materials from the uplands.

Practically all of the Huntington silt loam is under cultivation almost exclusively to corn, which yields from 20 to 40 bushels per acre without fertilizers. Oats yield from 30 to 40 bushels per acre on the better drained portions. Cotton makes too rank a growth of stalk and is too late in maturing. Maturity could probably be hastened by using acid phosphate.

This type is also well suited to grasses and furnishes the best pasture land of any soil in the area. Crab grass and Johnson grass cut from 2 to 3 tons of hay per acre. Millet also does well, yielding from 1 to 2 tons per acre.

The Huntington silt loam, like the silty clay loam, is highly prized and very little of it is for sale. It ranges in value from $20 to $50 an acre, depending on location and improvements.

HOLLY SILT LOAM.

The Holly silt loam is an alluvial soil occurring along many of the smaller streams in the valley region of the county. It consists of a gray to yellowish-gray silt loam 6 to 12 inches deep, underlain by a gray to nearly white silty clay or silty clay loam, mottled slightly with yellow or reddish yellow. In places a layer of black or brownish material 1 or 2 inches deep is found on the surface.

The type is of limited extent, occurring in narrow strips of first bottom land along small streams in the valleys. The areas are flat, low, and subject to overflow. The water table is sufficiently close to the surface to keep the soil wet and clammy.

The greater part of the type is still in forest, consisting of oak, beech, maple, and gum. Small areas here and there have been cleared and put in cultivation. When the season is favorable fairly

good yields of corn and grasses are obtained, but owing to the frequent overflows crops are uncertain. The type affords fairly good pasturage and in most cases this would constitute its best utilization. Lespedeza and a number of wild grasses do well on it.

Land of this type ranges in value from $10 to $25 an acre.

ELK FINE SANDY LOAM.

The Elk fine sandy loam consists of yellowish-brown to grayish-brown fine sandy loam, 6 to 10 inches deep, underlain by a yellow to yellowish-brown, fine, heavy sandy loam which grades into a fine sandy clay at a depth of 15 to 20 inches. In many places water-rounded quartz gravel are present in both soil and subsoil. The soil is deficient in organic matter, but it has a fairly loose structure and can easily be brought into good tilth.

The type occurs in Browns Valley and Paint Rock River Valley, occupying positions of second bottom lands lying between the Holly silt loam and the limestone soils. It has a small area, the various bodies aggregating only about 4 square miles.

A moderately rolling topography affords ample drainage, without serious damage from erosion. The type is of alluvial origin, but has been added to by colluvial material from the adjacent limestone soils and from the soils on the mountain sides lying at higher elevations. The quartz gravel and sand in the soil have been brought down from the mountain plateaus.

Nearly all of the Elk fine sandy loam is under cultivation, the type being well adapted to all of the staple crops. Cotton yields from one-third to three-fourths bale per acre and corn from 20 to 30 bushels. Oats and wheat also produce well. All of these crops should be included in a definite crop rotation, a feature to which not enough attention is given under present conditions. The soil is deficient in vegetable matter and cowpeas should always be sown in the corn and after oats and wheat. This soil is also well suited to truck crops, especially strawberries and potatoes. Apples also appear to be suited to this soil type.

The value of this type ranges from $10 to $25 an acre, depending on location and improvements.

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

Mechanical analyses of Elk fine sandy 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.*
413953	Soil	0.8	1.0	3.6	24.1	11.5	42.8	16.5
413954	Subsoil	.1	.9	3.3	21.7	12.1	37.8	23.9

MEADOW.

The type mapped as Meadow includes the alluvial areas along the streams in the mountainous sections of the county. The soil is very variable in color, texture, and structure, ranging from a light-gray to brown fine sandy loam to a light-gray fine sand. The subsoil varies from a mottled gray and yellow fine sandy loam to sandy clay.

Areas of this type are usually flat and subject to overflow, except during the dry season; but water seldom remains on the land long enough seriously to affect growing crops.

This soil is of alluvial origin, being composed of materials washed in from adjacent uplands. The type is for the most part in forest or used for pasturage, very little of it being planted to crops. Artificial drainage, which could be secured by straightening some of the stream channels and cutting ditches to provide for seepage water, would improve the type to a marked degree. Where well drained, it produces from 20 to 40 bushels of corn per acre and one-half to two-thirds bale of cotton. It is well adapted to the staple crops and the more sandy areas to many of the vegetables.

SUMMARY.

Marshall County lies in the northeastern part of Alabama and comprises an area of 610 square miles, or 390,400 acres. Elevations within the county vary from 600 to 1,400 feet. The topography is marked by broad, level plateaus and valleys. The county is drained by the Tennessee River and its tributaries in the north and central parts and by the Locust Fork of Warrior River and its tributaries to the south.

The climate is mild and equable, the county being favored with a long growing season and short, mild winters. The rainfall is abundant and fairly well distributed throughout the year.

Corn and cotton are the most important crops. Wheat, oats, sorghum, peas, peanuts, hay, vegetables, and fruit are grown for home consumption. Stock raising is being carried on in a small way mainly in the northern sections. Commercial fertilizers are used generally on all except the Huntington soils.

Almost all of the soils are deficient in humus. To restore this constituent and maintain the fertility of the soils a systematic crop rotation in which the legumes are included should be practiced. The heavy limestone soils of the valleys are especially suited to stock raising, and in the mountain sections the production of truck crops and fruits, especially apples and peaches, on a larger commercial scale would prove remunerative.

Most of the farms in the mountainous section are cultivated by the owners, while in the valleys much of the labor is done by negroes.

Prices paid for land vary from $5 to $75 an acre, depending on the kind of soil and the location of the farm.

All except the alluvial soils, which represent a mixture of materials from several formations, are residual in origin, being derived from the disintegration and decay of the rocks on which they lie.

Seventeen soil types were mapped in the county, varying from heavy clay loams to sandy loams.

The Dekalb soils cover practically the entire mountainous section of the county. The silt loam and fine sandy loam are the farming lands of this district.

The Dekalb silt loam, the most extensive type, is best adapted to general farming.

The Dekalb fine sandy loam ranks next in importance to the silt loam. The soil needs organic matter and lime. It is easily cultivated and responds readily to fertilizers. Cotton and corn, the principal crops grown, give good yields. The type is well adapted to fruit, melons, potatoes, and most all truck crops.

The Dekalb stony sandy loam is similar to the Dekalb fine sandy loam, but owing to its rough topography and stony character it is unfit for general farming. It affords fairly good pasturage and is a good fruit soil.

The Hanceville fine sandy loam is one of the most fertile mountain soils, though it is not extensively developed. It is well adapted to general farming, and as it occupies the highest elevations the northern exposures afford good locations for peach orchards.

Of the valley soils the members of the Decatur and Hagerstown series are the most important.

The Decatur clay loam (cherty phase) is a rolling to slightly hilly soil containing chert and limestone fragments. It is well drained. Good yields of cotton and corn are grown on this type, and it is also a good truck and fruit soil.

The Decatur clay loam and Decatur loam occupy level to moderately rolling valley lands. They are well suited to corn, cotton, oats, cowpeas, clover, alfalfa and to stock raising.

The Hagerstown clay loam and Hagerstown loam occur extensively and have a level to gently rolling topography. The types are well adapted to general farming and to clover and alfalfa. They are also well suited to stock raising.

The Colbert silty clay loam usually occurs near the base of the foothills of the mountainous sections. Its surface is flat to slightly rolling and the drainage is poor. It is not well suited to farming in its present condition. This type supports a fairly good timber growth and affords fairly good pasturage.

The Colbert stony clay is very limited in extent. Owing to its stony character and rough topography it is unfit for general farming. It affords scanty pasturage.

The Clarksville gravelly loam occurs on the ridges in the valley section. The chert gravel and fragments interfere somewhat with cultivation, but prevent erosion and make the soil more retentive of moisture. The type is well adapted to the staple crops. Fruit and truck crops, especially strawberries and Irish potatoes, do well.

The Huntington silty clay loam and Huntington silt loam occupy first bottom lands along the Tennessee River and some of its tributaries and are subject to overflow. These types are cultivated mainly to corn, to which they are well adapted. They are also well suited to cowpeas, grasses and oats. They afford good pasturage and are well suited to stock raising.

The Holly silt loam is an alluvial type found along some of the smaller streams in the valley section. It is poorly drained and not very productive. Its best use is for pasturage.

The Elk fine sandy loam is limited in area. It is well drained and adapted to cotton, corn, wheat, oats, and grasses.

Rough stony land includes areas of broken stony land on the mountain sides which are of no value except for the timber and sparse pasturage.

Meadow is an alluvial type which includes first bottom lands along the streams in the mountainous section. It is subject to overflow, but the water seldom remains on the land long enough seriously to affect growing crops. When drained it is well suited to the staple crops and many of the vegetables.

O

[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.]

NRCS Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.