

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS—MILTON WHITNEY, Chief.

SOIL SURVEY OF COFFEE COUNTY,
TENNESSEE.

BY

W. E. McLENDON AND C. R. ZAPPONE, JR.

[Advance Sheets—Field Operations of the Bureau of Soils, 1908.]



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1910.

[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.]

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS—MILTON WHITNEY, Chief.

SOIL SURVEY OF COFFEE COUNTY,
TENNESSEE.

BY

W. E. McLENDON AND C. R. ZAPPONE, JR.

[Advance Sheets—Field Operations of the Bureau of Soils, 1908.]



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1910.

LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,

Washington, D. C., December 3, 1909.

SIR: One of the projects of the field season of 1908 was the survey of Coffee County, Tenn. The selection of this area at this time was urged by the Hon. W. C. Houston, Representative in Congress for the district within which the county lies.

I have the honor to transmit herewith the manuscript report and map covering this work and to request their publication as advance sheets of Field Operations of the Bureau of Soils for 1908, as authorized by law.

Very respectfully,

MILTON WHITNEY,
Chief of Bureau.

Hon. JAMES WILSON,
Secretary of Agriculture.

CONTENTS.

	Page.
SOIL SURVEY OF COFFEE COUNTY, TENNESSEE. By W. E. McLendon and C. R. ZAPPONE, JR.....	5
Description of the area.....	5
Climate.....	8
Agriculture.....	9
Soils.....	15
Clarksville silt loam.....	17
Clarksville stony loam.....	20
Guthrie silt loam.....	21
Hagerstown stony loam.....	22
Hagerstown silt loam.....	23
Hillsboro silt loam.....	25
Decatur clay loam.....	26
Elk loam.....	27
Rough stony land.....	28
Huntington silty clay.....	29
Holly loam.....	30
Summary.....	31

ILLUSTRATIONS.

	FIGURE.	Page.
Fig. 1. Sketch map showing location of the Coffee County area, Tennessee.....		5

MAP.

Soil map, Coffee County sheet, Tennessee.

SOIL SURVEY OF COFFEE COUNTY, TENNESSEE

By W. E. McLENDON and C. R. ZAPPONE, Jr.

DESCRIPTION OF THE AREA.

Coffee County, with an area of 282,240 acres, or 441 square miles, is situated near the center of Tennessee, between parallels $35^{\circ} 15'$ and $35^{\circ} 40'$ north latitude and meridians $85^{\circ} 45'$ and $86^{\circ} 20'$ west longitude. It is in direct line and about halfway between Nashville and Chattanooga. On the north it is bounded by the counties of Cannon and Warren, on the east by Warren and Grundy, on the south by Franklin and Moore, and on the west by Moore and Bedford counties.

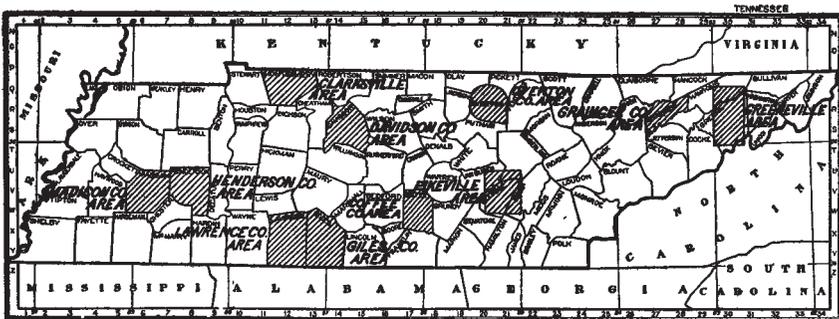


FIG. 1.—Sketch map showing location of the Coffee County area, Tennessee.

Most of the county is in Highland Rim, which is a level to broken narrow plateau, occupying an intermediate position between the Cumberland Plateau on the east and the Central Basin or limestone valley section on the west. The Cumberland Plateau overlooks the Rim in a rough mountainous escarpment from 800 to 1,000 feet high and the Rim in turn becomes very broken in its outer portion and gives way finally to the much lower limestone lands. The narrow strip of the Cumberland escarpment extending along the eastern boundary is very rough and stony and has no value except for the timber it supports. Bordering the mountains is a belt of rolling limestone lands which are highly prized for agricultural purposes. Then comes the extensive level to gently rolling region, known as

the "Barrens," which occupy at least three-fourths of the county, in a continuous belt from the Moore and Franklin county line on the south to the Cannon and Warren line on the north. Throughout this region the streams are few and have only shallow valleys with little or no bottom lands. Vast areas are nearly level, but generally there is enough surface relief to provide good natural drainage. The western edge of the county is mostly very rolling and broken. Streams are numerous and in their rapid descent to the lowlands have carved out an intricate system of deep valleys and tortuous ridges with differences in elevation of 100 to 400 feet. As the streams become larger to the west their valleys gradually widen and the ridges give way more and more to lower rolling lands of the same general character as found beyond the Highland Rim. The upper plain of the Rim has a general elevation of 1,000 to 1,100 feet, while the lower part of the valleys is not more than 500 or 600 feet above sea level.

The drainage of a very large proportion of the county is effected through the Duck River and its tributaries. The extreme southern edge and a part of the eastern edge drain to the south into the Elk River, which does not enter the county, but forms about 7 miles of the southern boundary from the southeastern corner and then turns more to the south. Its principal tributaries in the county are Beans and Bradley creeks, which have their headwaters in the mountainous escarpment. The northeast corner and a strip along the northern boundary farther west are drained by the upper tributaries of Barren Fork of the Cumberland River. The Duck River extends well over into the "Barrens," and rises in two prongs. The larger of these rises near the northern boundary and flows in a southerly direction to near the center of the county, just west of Manchester, where it is joined by Little Duck River from the northeast, thence the course is southwesterly and westerly until beyond the western boundary. The principal tributaries on the south side of the river are Carroll Branch and Crumptions Creek, and on the north side Brewers and Rileys creeks and Noah and Garrison forks. The last three are entirely in the rough section of the Outer Rim, but the others, like the prongs of the Duck River, rise back in the "Barrens" and have not developed any abrupt features along their courses, until they begin to make the descent from the Upper Rim, which they do in a number of rapid cascades and falls. The Duck River especially offers opportunities for developing considerable water power.

The territory now included in Coffee County was settled in the early part of the last century simultaneously with other sections of Tennessee. The limestone lands were the first sought after and are now the most extensively developed. The "Barrens," on the other

hand, which has always been looked upon in an unfavorable light, is still very sparsely settled. The settlers came principally from North Carolina and Virginia, and their descendants constitute the bulk of the present population. Coffee County was organized in 1836 from parts of Franklin, Bedford, and Warren counties. In 1900 its total population was about 16,000.

Tullahoma, the largest town, is situated near the southern edge of the county and has a population of about 3,000. Manchester, the county seat, with about 1,000 inhabitants, is situated in the center of the county near the confluence of the upper prongs of the Duck River. Summitville, $7\frac{1}{2}$ miles northeast of Manchester, has a population of 200 or more. The only other railroad stations are Hickerson and Belmont, between Tullahoma and Manchester. Beechgrove is a small town on the western side, and Hillsboro is another place of about the same size in the east-central part of the county. All of the smaller country post-offices were abandoned after the introduction of the rural free delivery service, which now reaches all parts of the county.

The railroad facilities, though fairly good, are not adequate for the proper development of the county. As the county is bounded on the east by the Cumberland Mountains and on the west by the rough escarpment of the Highland Rim, it is hardly probable, however, that any new railroads will be built. Under the circumstances the best thing to do would be to improve the public roads so that the present stations could be more easily reached. The majority of the roads are in bad repair and receive very little attention. The main line of the Nashville, Chattanooga and St. Louis Railway, which affords quick service to all points north and south, crosses the southwestern corner in a southeast and northwest direction, and in Bedford County it turns more to the north and affords an outlet for the rough areas along the western edge farthest away from Manchester. The Sparta branch runs from Tullahoma and extends out of the county in a northeasterly direction. Decherd, on the main line in Franklin County, is the nearest station to the southeastern corner.

Tullahoma and Manchester are the chief marketing centers, though considerable trade goes to Decherd, in Franklin County, and to Normandy, Wartrace, and Bellbuckle, in Bedford County. Nashville and Chattanooga are the nearest large markets, which from Tullahoma are 69 and 82 miles, respectively. A part of the wheat crop is handled by small mills at Hillsboro, Manchester, and other local towns, the remainder being shipped to Nashville and other points. Cattle and hogs are shipped in carload lots to Nashville and Louisville. Some of the tobacco grown is taken by a factory in Tullahoma. All of the cantaloupes are shipped to outside markets.

CLIMATE.

The high altitude of the Highland Rim and its proximity to the mountains have quite a modifying influence upon the climatic conditions in the county. The summers are long and warm enough to permit the successful growing of a great diversity of crops. Even during the hottest weather the nights are delightfully cool. The winters are short and generally mild, except for recurring cold snaps. The thermometer sometimes registers below zero. The climatic data given in the table below, compiled from records of the Weather Bureau station at Tullahoma, are especially applicable to the leveler parts of the county. In the Outer Rim, where the topography is very broken, the ridges have at least a small sheltering influence, the effects of the cold north winds are less severe, and the growing season is virtually prolonged by the warding off of some of the light frosts of spring and fall. As a whole the climate is mild, pleasant, and very healthful.

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

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.....	39	69	- 5	5.2	2.5	7.2	3.7
January.....	38	74	-14	5.9	7.0	8.4	3.5
February.....	40	72	-20	4.6	1.2	9.2	3.4
Winter.....	39			15.7	10.7	24.8	10.6
March.....	49	81	0	6.5	3.6	9.8	1.9
April.....	57	87	22	4.9	5.6	4.7	Trace.
May.....	67	92	32	2.9	1.6	3.2	0.0
Spring.....	58			14.3	10.8	17.7	1.9
June.....	73	97	40	4.1	2.6	4.6	0.0
July.....	76	100	41	4.9	7.6	10.6	0.0
August.....	75	98	48	3.8	2.4	2.3	0.0
Summer.....	75			12.8	12.6	17.5	0.0
September.....	68	97	27	2.9	3.3	2.2	0.0
October.....	58	91	22	2.5	3.9	2.4	0.0
November.....	47	77	13	3.8	2.6	2.0	0.2
Fall.....	58			9.2	9.8	6.6	0.2
Year.....	57	100	-20	52.0	43.9	66.6	12.7

The mean annual temperature as shown by the table above is 57° F., the absolute maximum 100° F., and the absolute minimum -20°

F. July is the hottest and January the coldest month in the year. The annual precipitation averages about 52 inches, but varies from 43.9 to 66.6 inches. In the driest years the precipitation is sufficient to produce maximum crops were it evenly distributed, but droughts occur occasionally and do much damage, and the same is likewise true when there is too much rainfall. The snowfall averages about 12.7 inches a year.

The average date of the last killing frost in the spring is April 18, and of the first in the fall October 16. The growing season is about six months long, or fully a month shorter than through the main cotton belt. The shorter season, coupled with the cool nights prevailing through the summer months, puts the county practically out of the cotton-producing section. Erratic frosts in the spring make some of the fruit crops uncertain, especially peaches and pears, which bloom early.

AGRICULTURE.

The agricultural development of Coffee County has followed very closely the different soils in the order of their desirability for general crops. The first distinction made was between the soils of chert and limestone origin, which are widely different in productiveness, then between the individual types in each of these groups. The "Barrens," or Clarksville silt loam belt, extending over a very large part of the county, together with the Clarksville stony loam, is very scatteringly and irregularly developed, vast tracts not being occupied at all. The majority of the farmers here operate on a small scale and live in an unpretentious way. There are a few, however, who under the same environment own large, well-kept farms with good residences and outbuildings, showing most conclusively that the absence of a greater degree of prosperity is not due altogether to the unproductiveness of the soil, but fully as much to the farm methods generally employed. A striking contrast to this chert region is afforded by the limestone soils, which are naturally productive. The best and most extensive improvements are found on the Hagerstown silt loam and the Decatur clay loam; an intermediate condition is represented by the Hillsboro silt loam and the Elk loam; and after these are the stony loam areas, which, though very productive, can not be farmed to much advantage because of the rough stony character and the steep topography. The alluvial soils are handled in connection with the adjoining uplands and their desirability depends very largely upon their origin.

The early settlers, having for the most part very limited means, resorted to many crude practices, and the absence of markets made it necessary for them to give chief attention to such crops as could be consumed to advantage at home. What one needed perhaps

another had; so by bartering among themselves it was possible to get along without being in close touch with the outside world. As is often the case in the development of a new section remote from transportation facilities, there was not much attempt at diversification of staple crops, the tendency being to grow the same crops on all of the soils. Corn and wheat were the chief crops. These were supplemented by several other crops grown on a limited scale. In some localities small patches of cotton and flax were grown for the fiber, as most of the clothing and bedding were woven at home. Some kept small herds of sheep, and on nearly every farm were a few cattle and generally enough hogs to provide a supply of meat. The stock had wide range and could be kept at very small cost.

Conditions improved gradually until the beginning of the civil war. While there was no great degree of prosperity, nearly all of the farmers lived free of debt, some being in very comfortable circumstances.

The effects of the war, while less disastrous than in some other sections of the South on account of the comparatively few slaveholders, were severely felt by all classes and brought them face to face with entirely new economic conditions. The crops produced went more and more to market to meet the necessity for ready cash. Otherwise the old system of farming was continued without any radical changes. For many years after the war the farmers found it hard to make ends meet and many went heavily into debt trying to get started again. Within the last fifteen years, however, there have been decided improvements. Nearly all of the mortgage debts have been paid, improved farm machinery is coming more into use every year, and the home surroundings generally indicate more prosperous conditions. Evidences of recent development are seen throughout the "Barrens," where immigrants from the northern States are beginning to settle.

No statistics are available to show the present state of development, but some idea as to the extent and relative importance of the different crops can be had from the figures given in the Twelfth Census. At that time 193,788 acres, or about two-thirds of the total area of the county, were in farms, of which 97,420 acres were improved. Something like one-third of the area reported as improved is used for pasturage. Of the cultivated areas in 1899 there were 31,114 acres in corn, producing 694,110 bushels; 18,848 acres in wheat, producing 156,630 bushels; 1,587 acres in oats, producing 19,650 bushels; and 6,415 acres in grains, grasses, and millets cut for hay, producing 6,513 tons. Besides these crops may be mentioned tobacco, cantaloupes, rye, sorghum, clover, cowpeas, sweet and Irish potatoes, and miscellaneous vegetables. Alfalfa and soy beans have recently been introduced and are beginning to receive

attention. Stock raising is an important industry with many of the farmers on the limestone soils, especially in the western part of the county. Fruit is not grown on a commercial scale, but small apple orchards are found on nearly all of the farms and here and there a few pear and peach trees are seen.

According to the Twelfth Census the total value of the live stock was \$534,835 and of products not fed to live stock \$735,124. The orchard products were valued at \$24,082 and the forest products at \$31,349. The undeveloped areas still support a great deal of merchantable timber, consisting very largely of oak, but this is rapidly being removed for lumber and cross-ties, both of which command good prices. Vehicle and furniture factories take a large part of the best lumber.

Corn is by far the most extensive crop on all types of soil, even being grown on areas entirely too stony and rough for cultivation. The low average yield of 20 to 25 bushels per acre is due to the fact that a large proportion of the crop is grown on the Clarksville silt loam. Here the yields are invariably light, unless the land has been put in good condition. By applying sufficient quantities of stable manure or practicing a systematic rotation of crops from 30 to 50 bushels can be produced. Yields of 40 to 50 bushels are not uncommon on the limestone soils, as high as 75 bushels per acre having been reported on some of the best upland and alluvial areas. The yields could be considerably increased simply by better preparation of the land and by proper selection of seed. Poor stands and yields are traceable to inferior seed as often as to any other cause.

The cool climate has prevented cotton from becoming one of the staple crops. The cool nights prevailing through the summer months are very unfavorable to its growth, and the seasons are generally too short to allow a full crop of bolls to mature. At the time of the survey a few small patches were seen in the southeastern part of the county. Despite the low yields it is possible that there will be some increase in the acreage of cotton if the prices continue high.

Wheat is the second most important crop on all of the level and moderately rolling uplands. It is not grown to any extent on the Clarksville stony loam or the Hagerstown stony loam, on account of the difficulty in harvesting. Oats have about the same distribution as wheat, but are usually grown in small patches for home consumption. The yields of both crops vary with the character of the soils, from light on the Clarksville silt loam to very good on the Hagerstown silt loam and the Decatur clay loam. Where they follow corn, as is often the case, one method of preparing the land is simply to go over it once or twice with a disk harrow, then the grain is either sown broadcast or in drills. Better results are obtained where the land is given a deep thorough breaking and harrowed to good tilth before

the planting is done. On the Clarksville silt loam it is getting to be a common practice to drill in with the grain from 100 to 300 pounds of fertilizer to the acre. Not enough care is exercised as to the time of planting. Oats are planted in September and early October and wheat about the 20th of October.

Grass and clover crops are confined very largely to the limestone areas, where they give good results. Cowpeas, while grown in a limited way, have not become an important forage crop with most of the farmers. This crop is adapted to any of the soils and should be grown extensively as a soil improver as well as for hay. On the Clarksville silt loam millet and Hungarian grass are coming into favor as hay crops. The grasses most generally grown are timothy, herd's-grass, and orchard grass, which are excellent for hay, while orchard grass, especially when planted with clover, makes excellent pasturage. Oats and herd's-grass mature very well together and make a good grade of hay. Bermuda grass has not been tried, but would prove a very valuable pasture grass on all of the uplands, including the rough and stony areas. On the Hagerstown silt loam and stony loam good pasturage is afforded by Kentucky bluegrass, which is indigenous to these types.

Rye is grown to only a very limited extent. It should become an important crop on the lighter soils. There is a good demand for all of the grain that can be produced, and the crop will prove valuable as a soil improver and at the same time afford good early spring pasturage. Rye should be planted as a cover crop on all of the areas that would otherwise be left bare during the winter months. It could be pastured until just before time for planting other crops, then plowed under for green manure.

Alfalfa is a very promising crop for the Hagerstown silt loam and the Decatur clay loam and can be grown successfully on some of the lighter types if they are put in the best possible condition. This crop does not thrive on an unproductive or a poorly prepared soil; it requires a deep, rich, loamy and well-drained soil, whether of light or heavy texture. If the land is not already very rich, make a heavy application of stable manure, and generally at least a small application of lime will prove beneficial. Plow deep and harrow until all of the clods are crushed, then drill the seed in at the rate of 15 pounds per acre. The planting should be done in August or early September, so that the plants will have time to become well established before the beginning of winter. In case weeds become very bad by early spring, mow as often as is necessary to subdue them. There should not be much trouble from this source after the first cutting, if the stand is good.

Within the last three years the production of dark export tobacco has assumed commercial proportions on the Clarksville silt loam,

and the acreage is increasing. The results have not been uniformly satisfactory, due largely to the lack of appreciation as to the requirements of the crop. Inferior seed is one cause of light yields or inferior quality. In some cases the soil is not properly prepared and the cultivation is not as thorough as it should be. Some farmers do not use any fertilizers, while others make light applications, without much thought as to whether the kind used is suited to the crop or not. The average yield is about 500 pounds per acre. From 700 to 900 pounds per acre should be secured to make the crop very profitable. The process of curing consists in first thoroughly wilting in the sun, then transferring to sheds and barns to remain without further care until thoroughly cured out.

Growing cantaloupes for market has been started within the last two years and bids fair to become an important industry on the Clarksville silt loam. While the returns have not been altogether satisfactory, the trouble is not inherent in the soil. Light yields and a low-grade melon usually can be traced to one of two causes or to both—poor seed and improper attention. Most of the seed are bought, and some are not even the variety they are supposed to be. A common mistake is not to fertilize the soil well enough; another is in not selecting areas that are in a high state of cultivation. A good application of stable manure, in connection with 400 to 800 pounds of a high-grade fertilizer per acre, will prove very profitable, other conditions being favorable.

A variety of fruits can be grown successfully on a commercial scale in this county. Apples, peaches, pears, cherries, and nearly all of the domestic berry crops do well, yet only apples receive any attention, and these are grown mostly for home use. The varieties of apples most generally grown are the Arkansas Black, Winesap, Limbertwig, Ben Davis, Kinard's Choice, and Smoky Twig. Peaches are rather uncertain on account of late spring frosts. A small nursery just outside of Tullahoma makes a specialty of apple and peach trees. No vegetables are grown for the market except in a small way for the Tullahoma trade. Trucking should become an important industry on the Clarksville silt loam.

The live-stock industry is confined very largely to the raising of hogs and cattle, the latter being mostly of nondescript breeds which do not command the highest market price. The raising of sheep, horses, and mules, which now receives very little attention, should prove profitable wherever good pasturage can be had. While only a few have made the poultry industry a special feature, chickens and eggs in large quantities are shipped during the spring, summer, and fall months, a fast-freight service, generally on Friday of each week, being maintained for this purpose.

The present system of agriculture, although based largely upon practices extending over a long period of years, has been evolved without much reference to the special adaptation of certain soils to particular crops, the tendency being to grow the same crops on all soils in so far as their productiveness and surface features will permit. There is some evidence, however, that the need of specialization and a greater diversity of crops is beginning to be recognized. The growing of tobacco and cantaloupes, which has been recently started, is confined almost entirely to the Clarksville silt loam. Both of these crops could be extended to the Hillsboro silt loam with equally as good success, and in case of the cantaloupes satisfactory results probably could be obtained on the Elk loam. The heavier limestone soils are peculiarly adapted to grasses and stock raising and are used extensively for this purpose.

No systematic rotation of crops is practiced by a majority of the farmers. A proper rotation affords the easiest and most efficient means of keeping the soils in a productive state and at the same time increases the resources of the farm. As it is, corn is often planted on the same land continuously for several years or alternated with other crops in an irregular rotation. A common practice is to follow corn with wheat or oats. After the grain crop is removed the land is left bare until the following spring, when corn is planted again. A better rotation, covering the same period of time, would be to plant corn the first year and also a crop of cowpeas, which should be plowed under after the corn is harvested; then wheat or oats in the fall and again to cowpeas after the grain is removed, following with corn the next spring. If the pea vines after the grain crop make a heavy growth, they should be mowed for hay; otherwise plow the entire crop under. A rotation that has proved very satisfactory on the lighter soils is to plant to cowpeas the first spring, following with wheat or oats in the fall, again to cowpeas the next summer, then to grass in the fall, which should be allowed to stand for two or three years. If preferred, clover can be substituted for the grass, or if neither of these is to be included, corn the third year, planting rye as a cover crop the previous winter. Light applications of lime will prove beneficial after heavy crops of cowpeas or rye are plowed under. Areas for tobacco should be in a good state of cultivation, but it is rarely advisable to plant this crop after a heavy growth of cowpeas, as it will have a tendency to grow too long and not to ripen properly.

Commercial fertilizers are used extensively on the soils of chert and siliceous limestone origin, where the yields are generally unsatisfactory. In 1900 the expenditures for this purpose amounted to \$20,060, and now considerably more is being used in connection with the tobacco and cantaloupe crops. The soils respond to a greater or

less degree to any fertilizer, but their manurial requirements for the different crops have not been determined. As a result the increased returns by the use of fertilizers often do not always justify the extra expense, this being especially true with reference to wheat, oats, and corn.

Labor is scarce. The small number of negroes live mostly in or near Tullahoma and Manchester, where they find other employment than on the farms. The scarcity of labor does not affect the farmers operating on a small scale, as they depend upon their families for the necessary help, but on the large farms it is quite different. Day laborers receive from 60 to 75 cents a day and regular help from \$13 to \$18 a month, with a house, but without board.

According to the Twelfth Census the average size of farms is about 100 acres. Some of the tenant farms are less than 50 acres, while some of the larger estates have over 1,000 acres. About 56 per cent of the farms are operated by the owners, a few by managers or overseers, and the remainder by tenants.

The general plan of renting is for a certain portion of the crop. If the owner furnishes the work stock, tools, and seed, in addition to the land, he usually gets two-thirds of the crop; if he furnishes only the land and house he gets one-third; by paying one-half of the fertilizer bill, as is sometimes done, he receives one-half of the crop. Very little land is rented for cash.

Taken as a whole, land values in the county are still rather low. The best uplands around Beechgrove range from \$40 to \$60 an acre, and some of the choicest bottom lands through this section can not be bought for less than \$75 an acre. The red limestone lands around Hillsboro range from \$30 to \$60 an acre. Through the "Barrens" the price ranges from \$5 to \$20 an acre, depending upon the amount of timber standing, the surface features, improvements, and nearness to town or shipping point.

SOILS.

The soils of Coffee County are representative of the Highland Rim, and have extensive development elsewhere through the central and western divisions of the great Appalachian province extending from Pennsylvania to Alabama. They fall naturally into two general groups, namely, residual and alluvial. The residual or upland soils have been formed in place by the decay and disintegration of the underlying rocks, which consist of the Fort Payne chert and the Chickamauga and Bangor limestones; they vary directly with the different formations and conditions in the topography, as well as with different phases of the rock formation. The alluvial soils, which are very limited in extent, consist of material transported from the uplands by the streams and laid down in their flood plains.

The formations underlying the county occur almost horizontally as originally laid down. As a result, only a few of them reach the surface, and these at different elevations. The Fort Payne chert areas and the term "Barrens" are almost synonymous. Besides extending almost uninterruptedly over all of the leveler sections of the county, the Fort Payne chert caps all of the ridges and higher outlying knolls along the western boundary. In all of the deeper valleys of the Outer Rim a thin band of the Chattanooga black shale reaches the surface immediately below the Fort Payne chert, but it is of no agricultural consequence. Below this is the Chickamauga limestone, which extends on down the slopes and across the lower lying areas, even reaching to the top of some of the lower ridges. The northwestern corner of the county is practically in the central basin, where the Chickamauga limestone is about the only surface formation. Along the inner portion of the Rim the chert is overlain by the Bangor limestone, the two in many places grading almost imperceptibly into each other. The rough, mountainous escarpment projecting into the county is also of the Bangor limestone and small, detached areas are found farther west through the "Barrens" proper. At Summitville is quite a pronounced knob of it which is being used for ballasting purposes and for making lime and cement.

The Fort Payne chert formation consists of very siliceous limestones and fossiliferous and flinty cherts more or less closely interbedded. The calcareous layers give way more and more to chert with depth. The Chickamauga limestone is a blue, massive to flaggy limestone carrying a rather large proportion of argillaceous material. The Bangor limestone is the most variable of the formations. Although consisting very largely of a blue massive limestone, the lower layers are chiefly of a siliceous character and carry a considerable percentage of fossiliferous chert.

The Chickamauga limestone gives rise to two types of soil, members of the Hagerstown series, and to small areas of Rough stony land. The leveler areas, with little or no stone in the soil, constitute the Hagerstown silt loam. The rougher areas, which are quite stony, but can be cultivated or developed into good pasture lands, were mapped as the Hagerstown stony loam. The Hillsboro silt loam is from the siliceous phases of the Bangor limestone. The massive phase out of the mountains gives the Decatur clay loam. The mountainous areas were mapped as Rough stony land. Two members of the Clarksville series are derived from the Fort Payne chert, the silt loam, including all of the leveler areas with medium to good drainage, and the stony loam, including the rolling and rough areas, where both the soil and subsoil are very stony. The poorly drained areas through the Clarksville silt loam were mapped as the Guthrie silt loam. The only other upland type is found in the

eastern part of the county, occupying what appears to be old terraces or abandoned valleys. Their position and general characteristics are such as to lead to the belief that the soils are partly residual from phases of the Bangor limestone and partly old alluvial deposits. Being of the same general character they were mapped as one type—the Elk loam.

The alluvial lands vary locally and also in a general way with the different geological formations through which the streams flow. The bottom lands through the limestone areas were mapped as the Huntington silty clay, and those where the drainage is entirely from the Fort Payne chert were mapped as the Holly loam.

Including Rough stony land, eleven types of soil were recognized and mapped. Their names and extent are given in the following table:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Clarksville silt loam.....	182,784	64.8	Elk loam.....	6,144	2.2
Clarksville stony loam.....	28,416	10.1	Holly loam.....	5,952	2.1
Hagerstown stony loam.....	16,640	5.9	Hagerstown silt loam.....	3,200	1.1
Decatur clay loam.....	13,888	4.9	Guthrie silt loam.....	1,600	.6
Hillsboro silt loam.....	9,216	3.2			
Rough stony land.....	7,296	2.6	Total.....	282,240
Huntington silty clay.....	7,104	2.5			

CLARKSVILLE SILT LOAM.

The soil of the Clarksville silt loam, 7 to 9 inches deep, is a light yellowish to brownish-gray silt loam of a highly siliceous character and containing very little organic matter. At the surface the soil has a light-gray color, but becomes yellower or browner with depth. The subsoil is a yellowish-brown, more compact silt loam or friable silt clay extending to a depth of several feet. Fragments of angular chert are found in both the soil and subsoil, but generally in negligible amounts, being almost entirely absent in all of the leveler areas. The amount increases, however, as the topography becomes more rolling until the stony loam type is reached. In rolling areas, where the drainage is perfect, the subsoil becomes more clayey in its properties and assumes a reddish cast at a depth of 30 to 40 inches. The other extreme is found in the small, flat areas which have a light-gray soil and a brownish-gray or gray and brown mottled subsoil as a result of poor drainage. Even in the timbered areas the soil is deficient in humus, a condition due in part no doubt to frequent forest fires which burn off all of the leaf mold. Under cultivation it tends to run together, and as a result it bakes and clods a great deal

worse than a soil of its texture should. These properties also cause much of the rainfall to run off the surface and facilitate the loss by evaporation of that which is absorbed. On the other hand if sufficient organic matter is incorporated in the soil its properties are materially changed; it becomes quite mellow and darker colored, and absorbs and retains moisture well—characteristics very essential to a productive soil. The type, although considered naturally unproductive, responds readily to good treatment and can be improved to a point where it will produce very remunerative crops.

The type occurs over a very large part of the county in the broad belt generally referred to as the "Barrens." To the north, south, and southwest it continues into the adjoining counties, but along the eastern and western edges it gives way to other types. Through all of the leveler sections it is almost continuous, but only caps the main ridges in the rough topography of the Outer Rim. The surface features range from level to moderately rolling. Over extensive areas there is only enough surface relief to afford good drainage. Local spots occur that on account of their level topography are not properly drained. There being but few streams of any consequence, the greater part of the drainage is effected through a system of shallow swales which contain running water only during wet seasons. The largest level areas occur along the divide between the tributaries of the Duck and Elk rivers, extending from near the southwestern corner of the county around to the west and north of Tullahoma, thence to the east of Manchester and continuing to near Summitville. Other extensive level areas are found to the north and northwest of Manchester.

The Clarksville silt loam is a residual soil formed by the weathering of the upper layers of the Fort Payne chert formation, which consists of very siliceous limestones and chert more or less closely interbedded, some of the latter being of a porous fossiliferous character. The fact that the formation gets more cherty with depth accounts for the greater amount of chert on the slopes. Along the eastern edge of the formation where it dips under the Bangor limestone are some areas recognized as the Clarksville silt loam, which are slightly more sandy than the typical soil, and they are generally preferred for agricultural purposes. It is possible that they are derived in part at least from a very siliceous phase of the Bangor limestone. Other areas of this character, though somewhat more broken and cherty, are found in an irregular ridge extending from Summitville to Sainville. The timber growth, while not altogether characteristic of the type, is noticeably less thrifty than on any other upland type of the county, except in the rolling areas approaching the character of the Clarksville stony loam. The growth originally consisted of red and Spanish oak of

small and medium size, intermixed with a scattering growth of hickory, post oak, and a few other hardwood trees. In some of the cut-over lands black-jack oak has sprung up in abundance, and it is also found in places forming a part of the original growth. A noticeable feature is that the black-jack oak is confined very largely to the more level areas. The small, poorly drained spots support a mixed growth of water-loving oaks, gum, and maple.

The Clarksville silt loam is very irregularly developed, and taken as a whole only a small percentage is under cultivation, vast tracts not being settled at all. Most of the farms are small and usually not very well kept. Corn, the chief crop, yields on an average from 10 to 20 bushels per acre, and wheat, the next in importance, from 8 to 20 bushels per acre. A few of the best farmers more than double these yields as a result of better tillage and the proper rotation of crops. Oats, cowpeas, sorghum, millets, and grasses are grown in a limited way, and give indifferent to fairly good yields. Tobacco and cantaloupes are two promising crops that have been grown on a commercial scale only within the last few years. The results have not always been satisfactory, but generally the fault lies in the methods rather than in the soil. Practically no fruit or vegetables are grown for the market, although this is a very promising line of farming. Strawberries, raspberries, and blackberries, and a great variety of vegetables do well.

To improve this type a good supply of humus in the soil is very necessary. This can best be done by applying stable manure and practicing a systematic rotation of crops in which cowpeas should play an important part. A rotation that has given very satisfactory results is to plant to cowpeas in the spring, oats and wheat in the fall, cowpeas again the next spring, then to grass and clover for two years. The land should have a good deep plowing in the fall and again in the spring, planting to peas, either cutting the hay or turning tops under for green manure. In case the cowpea crop is light the whole, tops and all, should be turned under. A small application of lime would help. After the cowpea crop, the land should be broken deep and harrowed to good tilth. When the oats or wheat is planted an application of 200 to 300 pounds of a high-grade potash and phosphate fertilizer would prove profitable. Following the grain in the spring should be another cowpea crop to be turned under, after which grass and clover should be sown, or, if preferred, corn might follow the cowpeas. Tobacco should not follow cowpeas, but would be all right after corn. The soil should be made as productive as possible for cantaloupes. As this soil is not unduly acid it does not need heavy applications of lime.

The average results of mechanical analyses of fine-earth samples of the soil and subsoil of this type are given in the following table:

Mechanical analyses of Clarksville silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
19453, 19455.....	Soil.....	0.0	0.9	0.8	5.2	6.5	71.6	14.7
19454, 19456.....	Subsoil.....	.3	.7	.6	3.8	4.4	70.5	19.6

CLARKSVILLE STONY LOAM.

The Clarksville stony loam, to a depth of 6 to 9 inches, is a light brownish-gray stony silt loam, underlain by a light-yellowish heavier silt loam or a yellowish-brown silt clay, depending upon the topography. As a rule the subsoil is heaviest in the less broken areas, while in the rougher areas there is usually not much difference in the color or texture of the soil and subsoil. The surface is very thickly strewn with angular fragments of chert, and anywhere from 20 to 50 per cent of the same material occurs through the soil mass, the quantity generally increasing with depth until bed rock is encountered. Layers of chert are of frequent occurrence in the subsoil, even within a few feet of the surface, but very few of these occur as ledges except on some of the precipitous slopes. The soil is rather difficult to till on account of the rough topography and stony character. Otherwise its properties are favorable to plant growth, and by many it is preferred to the Clarksville silt loam which is practically free of stones and is level enough to permit the use of all kinds of improved machinery.

The Clarksville stony loam is confined to the rolling and broken areas of the Fort Payne chert formation. It occurs principally in the western half of the county, where the streams in their rapid descent to the lower lands of the central basin have cut numerous narrow and deep valleys in the edge of the Highland Rim. Most of the streams here have cut entirely through the chert and far down into the underlying Chickamauga limestone, which gives rise to entirely different soils. The Clarksville stony loam caps all of the higher outlying peaks and broken ridges of the Highland Rim and extends down the slopes to the edge of the limestone. It extends all the way across the small valleys where the limestone has not been exposed. A number of small areas are scattered here and there through the main body of the Clarksville silt loam.

The drainage of the type is perfect, and were it not for the large quantity of stones on the surface erosion would be excessive. The stony mulch not only prevents erosion to a large extent, but by retarding the flow of the water a much greater proportion of the rainfall soaks into the soil than would be the case in a less stony type of

soil. In dry weather this mulch is just as effectual in preventing excessive evaporation from the surface. The drainage is so thorough that very large quantities of organic matter can be incorporated in the soil without any danger of developing acidity or other properties inimical to plant growth. The type was originally timbered with a rather heavy growth of red, Spanish, and white oak, hickory, tulip, chestnut, etc., many of the trees reaching an enormous size. In the areas still forested nearly all of the best timber has been cut for lumber.

A relatively larger proportion of this type is under cultivation than of the Clarksville silt loam. On the slopes, where it is the only type, it is farmed quite extensively, but with the more productive limestone soils only small, scattering areas are cleared. Corn is the principal crop. The yields range anywhere from 10 to 30 bushels, averaging possibly not more than 15 bushels per acre. Wheat and oats are grown in a very limited way and give quite variable yields. Sorghum is grown in small patches by nearly all of the farmers, and as a rule it does well. Millets and some of the grasses give good crops of hay if properly cared for. Some farmers have tried tobacco on a small scale, and occasionally good results are obtained. The soil, however, is too rough and stony for a crop like tobacco, which requires a good seed bed and careful, thorough cultivation.

The present system of farming gives only a meager income and does not justify the expense of the labor and time involved. Fruit growing is possibly the most promising industry for the type; yet no fruit is being grown on a commercial scale. Peaches should do exceptionally well, also pears, apples, and some of the berry crops. Only the best areas should be used for corn, hay, and such other crops as can be consumed to advantage at home. Instead of selling the corn it would be much better to feed it to hogs and thus convert it into a more marketable product. For the same reason every farmer should keep at least a few cattle of the improved breeds. Many of the rough areas could be converted into good pasture lands. The very broken areas should remain forested, or if cleared should be replanted with forest trees.

GUTHRIE SILT LOAM.

The Guthrie silt loam or "Gray lands," as it is called, consists of 7 to 9 inches of light-gray silt loam of a close, compact nature, underlain by a light-gray, compact silt clay mottled with yellowish and rusty-brown iron stains. The mottling begins near the surface and grows more intense with depth to about 30 inches, from which point it continues the same for several feet. The soil is deficient in humus and does not work up at all well under the plow. It bakes and clods badly and is not easily reduced to a good tilth.

This type, the least extensive of all the soils, has been formed by the weathering of the Fort Payne chert formation in slightly depressed, poorly drained areas, which are often found throughout the leveler bodies of the Clarksville silt loam. Some areas occur as long, narrow strips along the shallow drainage swales, and others as irregular bodies with one or more outlets. The majority of the areas were too small to be shown on the accompanying soil map, but whatever their size they are all of the same general character. The soil is kept soggy, except during the driest seasons, and even then the water table is only a few feet below the surface.

A part of the largest area on the road between Manchester and Hillsboro seems never to have been timbered, for which reason it is referred to as "the Prairie." The soil here contains enough humus to give it a darker color than in the general run of the type, the subsoil being about the same as elsewhere. With the exception of this small area, the type supports a heavy growth of white, willow, and water oak, maple, and gum.

On account of its low-lying position, wet character, and unproductiveness, this type is considered of little agricultural value. None of it has been drained and little effort has been made to cultivate it. Corn gives very light and uncertain yields. If cleared and provided with surface drainage, Japan clover and grasses would spring up and afford fairly good pasturage.

The results of mechanical analyses of the soil and subsoil are shown in the following table:

Mechanical analyses of Guthrie silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
19461.....	Soil.....	0.2	0.8	0.6	5.0	11.7	62.7	18.8
19462.....	Subsoil.....	.0	.6	.4	3.3	6.6	59.7	29.4

HAGERSTOWN STONY LOAM.

The Hagerstown stony loam consists of 9 to 12 inches of a dark-brown friable, silty clay loam or heavy silt loam, underlain by a yellowish-brown silty clay. Except in local spots, limestone fragments are abundant in the soil and subsoil and the surface is strewn with the same material, as well as being frequently broken by outcrops of massive limestone. Nearly all of the upper slopes are also strewn with chert worked down from the Clarksville stony loam areas. The depth to bed rock ranges from nothing where it outcrops to 6 feet or more below the surface. In areas where rock is encountered within 3 feet of the surface the soil and subsoil are

usually more claylike in their properties than where the depth is greater. In many places along the lower slopes where the shading has been dense and there is at least a small amount of seepage the soil and upper subsoil are very dark colored and quite loamy. Throughout the type the soil is well supplied with humus and has good loamy properties.

The Hagerstown stony loam is confined to the very rolling and broken areas in the western part of the county. It begins at elevations just below the Clarksville stony loam and extends all the way down to the streams, or, if in the wider valleys, to the edge of the Hagerstown silt loam areas, which occupy still lower positions. Local areas are moderately rolling, but most of the slopes are very steep and rugged, and areas left bare are subject to destructive erosion.

The Hagerstown stony loam is derived from the Chickamauga limestone. Immediately above the limestone formation is a narrow band of the Chattanooga black shale which could not be outlined on the soil map. The soil here varies with the topography. On the steep slopes the shale is buried by cherty material, while in other areas it partakes more of the nature of the limestone soil, being very dark in color. The Hagerstown stony loam represents an intermediate condition between the Hagerstown silt loam on the one hand and Rough stony land on the other. As on the Hagerstown silt loam, the original timber growth consists very largely of beech and oak.

This type is very productive, but on account of its steep topography and stony character only a small percentage is under cultivation. The best areas, while rather difficult to handle, produce good crops of corn, oats, or wheat. The rougher areas are nearly all cleared and used as pastures.

The results of mechanical analyses of fine-earth samples of soil and subsoil are given in the following table:

Mechanical analyses of Hagerstown stony loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
19471.....	Soil.....	1.4	3.0	1.1	1.7	2.5	63.8	26.5
19472.....	Subsoil.....	1.4	3.0	1.0	1.5	1.4	59.6	31.9

HAGERSTOWN SILT LOAM.

The Hagerstown silt loam consists of 6 to 9 inches of a brown friable, silty clay loam or heavy silt loam, underlain to a depth of about 30 inches by a yellowish-brown silty clay loam to clay, beneath which for

several feet is a yellowish-brown silty clay streaked to some extent by rusty-brown iron stains. Small fragments of partially weathered limestone are scattered over the surface and to a less extent through the soil. In some areas approaching the character of the Hagerstown stony loam the surface is broken here and there by outcrops of massive and flaggy limestone, but except in such areas the bed rock is not encountered within 5 to 8 feet of the surface. The soil, though rather heavy in texture, contains enough organic matter to make it loamy and easy to keep in good tilth.

The Hagerstown silt loam is a residual soil derived from the Chickamauga limestone, occurring along the western edge of the county as rolling valley lands. Its principal development is in the vicinity of Beechgrove, where the high, broken ridges give way largely to lower rolling lands. Other areas occur farther south along Noah Fork and the Duck River. The topography is generally of a rolling character, except in a few small areas skirting the streams as old terraces or bench lands, which range from nearly level to undulating. Parts of these old terraces no doubt were originally covered with alluvial deposits, which have been long since removed, and the soil now is as truly residual as that of the higher lying areas. The only semblance of any alluvial material is a small amount of subangular gravel strewn over the surface. The natural drainage is very good.

Being naturally very productive and comparatively easy to handle, practically all of the type has been brought under cultivation. Corn, wheat, oats, and grasses are the chief crop. Considerable attention is also given to the raising of cattle and hogs, especially where the type is farmed in conjunction with the Hagerstown stony loam.

Under the prevailing system of farming corn produces from 30 to 40 bushels, wheat 15 to 25 bushels, oats 40 to 60 bushels, and grasses from 1 to 1½ tons of hay per acre. Bluegrass is indigenous to this soil and grows luxuriantly wherever it is given a chance. Clover does well without any special care. Alfalfa is not grown, but should give excellent results. In the line of fruits apples do best.

The average results of mechanical analyses of samples of soil and subsoil of this type are given in the following table:

Mechanical analyses of Hagerstown silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
19467, 19469.....	Soil.....	1.4	3.8	1.7	3.1	3.7	62.3	24.1
19468, 19470.....	Subsoil.....	1.4	3.6	1.4	3.1	3.8	49.1	37.7

HILLSBORO SILT LOAM.

The soil of the Hillsboro silt loam, 6 to 9 inches deep, is a yellowish-brown to brown silt loam, containing little or no stone except in local areas, where there may be quite a sprinkling of porous chert and rotten siliceous limestone fragments. The soil has a low humus content, but works up well under the plow and does not bake badly after rains. When plowed dry the surface soil has a brownish-gray cast, being lighter in some places than others, depending upon the depth to the subsoil. The soil grades rapidly into a yellowish-brown silty clay loam, which in turn gives way within a few inches to a friable silty clay of about the same color. At a depth of 27 to 36 inches the clay usually becomes more compact and plastic and changes from yellowish brown to a pronounced red. In many areas a reddish cast is found within a short distance of the surface. The type in productiveness is intermediate between the Clarksville silt loam and the Decatur clay loam.

The Hillsboro silt loam is not an extensive type, but occurs in a number of areas, the largest of which are in the eastern part of the county. Some of the small areas occur farther west through the main body of the Clarksville silt loam. The surface features are just rolling enough to provide good drainage without any serious damage from erosion.

Except in a few areas, where it seems to be from the more calcareous layers of the Fort Payne chert formation, the type is derived from a siliceous phase of the Bangor limestone.

The Hillsboro silt loam supports a good growth of hardwood trees, including red, Spanish, and post oak, hickory, chestnut, and dogwood. A large percentage of the type is cultivated to the general crops, of which corn, wheat, and oats are the most important. The average yield of corn is not more than 20 to 25 bushels per acre, although on the best farms 40 to 50 bushels per acre is not considered an unusual yield. Wheat yields from 8 to 20 bushels, and oats from 30 to 50 bushels per acre. Grasses, sorghum, and millets, which are grown in a limited way, give fair yields. The type can not be considered especially adapted to clover, but if the soil is properly prepared good crops are produced. Very little attention is given to stock raising, an industry that should receive more consideration by all of the farmers. Tobacco and cantaloupes, neither of which is now grown, would do well.

The average productiveness of this type is not half what it should be, owing to improper methods of tillage. The first object in any system of improvement should be to get a good supply of humus in the soil. Then a number of crops not now considered as adapted to the

type could be profitably grown. The system of improvement suggested for the Clarksville silt loam applies equally as well to this type.

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

Mechanical analyses of Hillsboro silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
19463, 19465.....	Soil.....	0.8	1.9	2.5	11.9	11.2	58.6	13.0
19464, 19466.....	Subsoil.....	.6	1.1	1.8	8.0	7.9	53.8	26.7

DECATUR CLAY LOAM.

The Decatur clay loam consists of 4 to 5 inches of a reddish-brown silty loam or brownish-red clay loam, underlain to a depth of several feet by a red heavy clay. In the levellest areas the soil generally is a good friable loam of a dark reddish brown color, but as the surface gets more rolling the soil is correspondingly shallower, redder, and more claylike in its properties until the knolls and steeper slopes are reached. Here practically all of the loamy material has been washed off and the soil is not much different from the subsoil. These differences occur quite locally and give a newly plowed field a somewhat spotted appearance. The type for the most part is devoid of stone in either the soil or the upper subsoil, but areas here and there have scattering fragments of limestone strewn over the surface and on some of the steeper slopes there may be occasional outcrops of limestone. The organic content of the soil is entirely too low to get the best results except in the more loamy areas. However, the type as a whole is naturally productive and responds well to proper cultural methods.

The largest areas of Decatur clay loam are found in the southeastern part of the county, following out areas of the massive Bangor limestone. Several small areas of the same origin occur around Hickerson. A number of other areas are found northeast of Summitville, and near Mud and Little Hickory creeks. The topography is of a general rolling character and the natural drainage is very good.

The type being highly prized is nearly all under cultivation. Corn, wheat, and oats are the chief crops. A smaller acreage is devoted to grasses, clover, millet, and cowpeas for hay, sorghum for forage and sirup, and several other crops of minor importance. Some areas are sown to grass for pasturage. Corn yields 25 to 50 bushels, wheat 12 to 25 bushels, and oats 30 to 60 bushels per acre. The wide range in yields is not due so much to any inherent differences in the soil, but to the different methods of cultivation. Alfalfa would prove a promising crop if introduced.

The present system of farming should be changed for one in which cattle and hog raising play a more important part. This would not only increase the resources of the farm, but serve as a means of keeping the soil in a highly productive state. As it is now, the revenues of the farm are derived very largely from the sale of the grain crops. Hay crops which are not now grown to any extent for the market would prove more remunerative. The areas badly washed and inclined to be broken should be plowed thoroughly and planted to cowpeas a few times, then sown to grass for pasturage.

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

Mechanical analyses of Decatur clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
19459.....	Soil.....	0.2	1.2	1.9	12.7	7.9	55.7	20.4
19460.....	Subsoil.....	.0	.8	1.4	8.2	6.8	42.1	40.8

ELK LOAM.

The soil of the Elk loam, 6 to 8 inches deep, is a brownish-gray loam, with the sand content principally of the finer grades. The subsoil in the typical areas is a yellowish-brown heavy, fine sandy loam or fine sandy clay usually somewhat mottled below a depth of 2 to 3 feet. A minor phase near the mountains has a heavier yellowish-brown clay subsoil, and some areas have a limited amount of small, partially rounded quartz gravel in the soil and a somewhat larger amount in the subsoil at a depth of 3 or more feet. The soil is not so well supplied with organic matter as it should be to give the best results, but it is fairly mellow and can be easily brought to a good tilth.

The Elk loam occurs in the eastern part of the county as second terraces and as colluvial upland intermediate in elevation between the present overflow bottoms and the Decatur clay loam areas. The areas south of Hillsboro along Beans and Bradley creeks are true terraces or second bottoms, also most of the large area in the southeastern corner of the county and the strip extending up by Glen to Womacks store. Another terrace strip skirts Bradley Creek from near Hillsboro to the edge of the mountains. The narrow strip east of Hillsboro extending across from Bradley Creek to Beans Creek occupies a slight depression, having the appearance of an old abandoned drainage way. Other areas at and near the base of the mountains have the appearance of being in part true uplands, although rather low and flat. All but the lowest level areas have fairly good natural drainage.

The type is derived very largely from old alluvial deposits of local limestone origin except in the heavier phase or colluvial upland which is of residual origin from a fossiliferous phase of the Bangor limestone. This soil material has been carried down by the force of gravity and deposited at the foot of the slopes where it occurs. This phase is so limited in extent that it was not deemed desirable to separate it as a different type. The quartz gravel and some of the coarser sand in the soil have been brought down from conglomerates and sandstone far back in the mountains.

The original timber consists of a heavy growth of red, Spanish, white, and other varieties of oak, intermixed with scattering hickory, etc.

More than one-half of the type is under cultivation, being used principally for corn, wheat, oats, and grasses. Many other crops are grown in a limited way, and a considerable acreage is devoted to pasturage. Corn yields 25 to 40 bushels, wheat 10 to 20 bushels, and oats from 30 to 50 bushels per acre. Of the grasses, redtop, or herd's-grass, and timothy give the best results. Clover is not grown to any extent, but good stands can be had if the land is put in proper condition. Some of the best areas, if properly prepared, would grow good alfalfa.

A greater diversity of crops should be grown and more attention given to crop rotation, with the idea of keeping the soil in a highly productive state. Cowpeas should always be planted with the corn crop. This would give two crops at once and at the same time put the soil in much better condition for the grain in the fall. Follow the grain with cowpeas in the spring and the latter with grasses or clover in the fall, or wait until the next spring and plant again to corn.

The following table gives the results of mechanical analyses of fine-earth samples of soil and subsoil of this type:

Mechanical analyses of Elk loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
19473.....	Soil.....	1.3	6.5	12.1	26.9	9.5	33.4	10.2
19474.....	Subsoil.....	1.0	4.9	9.5	19.6	6.6	36.4	22.0

ROUGH STONY LAND.

Rough stony land comprises any rough and broken areas where rock outcrop occurs over the surface to such an extent as to render them unfit for any cultivated crops, although supporting a growth of timber or some grass for pasturage. By cutting off the timber and allowing native grasses to take possession all but the roughest stony areas can be developed into fairly good pasture lands.

The largest areas mapped include the mountainous strip along the eastern edge of the county. Here the surface is very rough and the Bangor limestone outcrops extensively, besides occurring over the surface in numerous loose fragments. The soil for the most part is a yellowish-brown to brown clay loam or clay 4 to 8 inches deep, underlain by a yellowish-brown stiff clay. A few small areas were mapped in the western part of the county from the Chickamauga limestone. The soil of these areas varies from a brown stony clay to a stony clay loam, as found in the Hagerstown stony loam areas.

Parts of the small areas have been cleared for pasturage but the mountains are still timbered with oak and other hardwood trees.

HUNTINGTON SILTY CLAY.

The Huntington silty clay being of alluvial origin and confined to very narrow bottoms, is quite variable, but may be described in general as a dark-brown or brownish-gray fine loam, to silty clay 9 to 15 inches deep, underlain by a dark-brown to black silty clay.

Following out the broader differences in the source of the material, the type is divided into two important phases. One of these is represented in the areas along the Duck River and its tributaries, where the drainage is mainly from the Chickamauga limestone formation. Here the soil is a dark-brown, rather heavy fine loam or silt loam 12 to 15 inches deep. The subsoil is a dark-brown heavy silty loam to loamy silty clay, giving way at a depth of 3 or more feet to beds of gravel, or extending down to the bed rock. In many places the surface is strewn with subangular gravel, especially immediately along the streams. Except in very local spots, however, there is not enough gravel in the soil seriously to interfere with agricultural operations.

The other phase is confined to the eastern part of the county, where the drainage is from the Bangor limestone areas. The soil, 8 to 12 inches deep, is a dark-gray to black loam, underlain by a dark-gray or black compact clay loam. Both the soil and subsoil contain a noticeable amount of medium and fine sand and scattering fragments of quartz or quartzose sandstone brought down during floods from the Lookout sandstone formation back in the mountains. Except for these small quartz fragments the soil and upper subsoil are free of gravel.

The surface of the type is level or nearly so. Wherever the bottoms have much width there are generally two terraces, the first being immediately along the streams and subject to overflow during every wet spell, and the second extending back to the edge of the highlands and reached only by the highest floods. As a whole the areas in the western part of the county are better drained than those

in the eastern part, and mainly for that reason are more highly prized for agricultural purposes.

The behavior of the soil under cultivation varies directly with the character of the drainage. In areas subject to frequent overflow or for any other reason not properly drained the soil clods badly and can not be reduced to a good tilth, while in the higher, better drained areas it works up as well as a soil of similar grade in the highlands.

A very large percentage of the type is under cultivation. The uncleared areas are confined mainly to low, wet, or stony strips immediately along the streams, these being heavily timbered with beech, oak, sycamore, elm, and birch. The cultivated areas are devoted mostly to corn and grasses. When the seasons are good corn yields from 30 to 60 bushels, and grasses from 1 to 2 tons of hay per acre. The best drained areas produce heavy crops of oats. Sorghum, millets, and many other crops do well. Some areas are used as pasture lands.

The results of mechanical analyses of soil and subsoil of the Huntington silty clay are given in the following table:

Mechanical analyses of Huntington silty clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
19475.....	Soil.....	0.0	0.3	0.3	4.5	7.2	61.9	25.6
19476.....	Subsoil.....	.0	.1	.0	1.4	4.9	61.2	32.4

HOLLY LOAM.

The Holly loam is an alluvial type including the bottom lands where the drainage is entirely from the Fort Payne chert formation. The soil 8 to 12 inches deep is a gray or brownish loam, varying from very silty to rather sandy, according to the size of the areas and their position with reference to the streams. The sandiest areas are found immediately along the streams where the water flows swiftest during overflows, the soil becoming gradually finer and more compact back toward the slopes. The subsoil varies in color and texture directly with the soil. Where the soil is of a fine silty nature, as is the case in a very large proportion of the type, the subsoil is a gray mottled compact silt loam or silty clay loam, usually extending to considerable depth, though in some places there is a change to a lighter gray mottled silty clay at a depth of about 27 inches. The sandiest phase of the soil is underlain by a brownish fine loam or clay loam carrying small amounts of chert gravel. The soil clods badly under cultivation and is not near as productive as the Huntington silty clay.

This type is not extensive, but occurs along all of the streams of any size through the "Barrens" or Clarksville silt loam belt. The largest areas are found north of Manchester along the Duck River. Others occur along Little Duck River, Barren Fork of the Cumberland River, Mud and West Fork Hickory creeks, and a few small streams farther south. The natural drainage is poor except in local terraces of a semiupland character. In all of the lower areas overflows are frequent and the water table stands near enough the surface to keep the soil wet and clammy. The timber growth consists of water-loving oaks, maple, birch, and gum.

Small areas here and there are cultivated principally to corn, which gives light and uncertain yields. Instead of trying to cultivate this soil a better plan would be to clear it for pasture lands. Japan clover and several native grasses flourish and are relished by stock.

SUMMARY.

Coffee County, with an area of 282,240 acres, or 441 square miles, is situated in the Highland Rim, near the center of Tennessee, being in direct line and about halfway between Nashville and Chattanooga. A very large part of the county, locally termed the "Barrens," is level to gently rolling, but the western edge is mostly of a rough and broken character, and a narrow strip along the eastern edge is in the mountains. The range in elevation is from 600 feet in the deep valleys along the western boundary to 2,000 feet in the mountains, the intervening section being about 1,100 feet above sea level. The drainage is mainly to the south and west through the Elk and Duck rivers.

The limestone sections are very well settled, but the "Barrens" is only sparsely settled, and vast tracts are not occupied at all. There is only a small negro population in the county.

Fairly good transportation facilities are afforded by the main line and the Sparta branch of the Nashville, Chattanooga and St. Louis Railway. The rural delivery service reaches all sections of the county.

Manchester and Tullahoma, with a population of about 1,000 and 3,000, respectively, are the chief towns and local marketing centers.

The climate is cool and healthful and adapted to a variety of crops. The growing season is about six months long. The prevalence of cool nights through the summer months keeps cotton from becoming one of the staple crops. Late spring frosts make the peach crop rather uncertain, but generally there is a good crop of apples and other fruits.

The system of cropping has not undergone any radical changes since the early settlement of the county. Corn and wheat are the

main crops. Of the live stock, cattle and hogs receive chief attention and are important industries with many of the farmers on the limestone soils.

No systematic rotation of crops is practiced except by a few of the most progressive farmers. Commercial fertilizers are used extensively on the light soils where the yields are generally unsatisfactory. The tendency has been to grow the same kind of crops on all types of soil, but the farmers are gradually getting away from this practice and are giving more attention to the adaptation of certain soils to certain crops.

The farms generally contain from 100 to 300 acres; the tenant holdings are about 100 acres or less. About 56 per cent of the farms are operated by the owners, a few by overseers, and the remainder mainly by white tenants.

Land values as a whole are quite moderate. The best limestone lands range from \$40 to \$75 an acre; while through the "Barrens" the price ranges from \$5 to \$20 an acre.

Day laborers get from 60 to 75 cents a day and regular help from \$13 to \$18 a month.

The soils of the county are representative of the Highland Rim and some of them have extensive development in other sections of Tennessee. They bear a direct relation to the underlying geological formations. Including the Rough stony land, 11 types of soil were mapped.

The Clarksville silt loam, a very extensive type, is used principally for corn and wheat, though tobacco and cantaloupes have become promising crops within the last few years. For the successful growing of general crops it is necessary to practice a systematic rotation. This is not naturally a strong, productive soil, but by incorporating organic matter and using proper tillage methods good yields can be secured.

The Clarksville stony loam occupies very rolling to rough areas. It is cultivated quite extensively to corn, and a few other crops are grown in a more limited way. It is best adapted to fruits, especially apples and peaches. All of the rougher areas should be pastured or left timbered.

The Guthrie silt loam is a poorly drained soil of limited extent and is not farmed. It can be cultivated if properly drained. If cleared of timber growth it would be good pasture land. Japan clover grows luxuriantly without any care.

The Hagerstown stony loam is naturally a very productive limestone soil, used mostly for pasture land. Small areas are cultivated to corn and other crops and the yields generally are good.

The Hagerstown silt loam is the most desirable of the upland types, being naturally very productive. Corn, wheat, oats, grasses, and

clover are the crops grown, and good yields are secured. Alfalfa would do well.

The Hillsboro silt loam, while not as productive as the Hagerstown silt loam, is a good soil for general farm crops, and would produce good tobacco and cantaloupes. To get the best results the soil should have more humus.

The Decatur clay loam is a red soil of limestone origin. Corn, wheat, oats, and forage crops all do well. Alfalfa would be a promising crop on this soil.

The Elk loam is used principally for corn, wheat, oats, and grasses. Some areas would grow good alfalfa.

The Huntington silty clay is an alluvial type of limestone origin. It is naturally very productive and is highly prized for corn and forage crops.

The Holly loam is an alluvial type occurring through the "Barrens." It is not very productive and is poorly drained in most places. Small areas are devoted to corn and grasses. Its best use is for pasturage.

The Rough stony land is practically all timbered, and should remain so.

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, audiotope, 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.