SOIL SURVEY OF LIMESTONE COUNTY, ALABAMA.

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DESCRIPTION OF THE AREA.

Limestone County is in the extreme northern part of Alabama. It is bounded on the north by the Tennessee State line, on the east by Madison County, on the south by Morgan and Lawrence Counties, and on the west by Lauderdale County. The Tennessee River forms the southern boundary. Limestone County has an area of 584 square miles, or 373,760 acres. It comprises two general physiographic divisions—the river bottoms, which include the first and second terraces along the rivers and streams, and the uplands, which include the valley slopes and the divides.

FIG. 23.—Sketch map showing location of the Limestone County area, Alabama.

All the larger streams and most of the smaller ones are bordered by first bottoms. Those along the Tennessee River lie from 15 to 20 feet above mean water level, but along the Elk River are rarely over 10 feet above the stream, and along Limestone Creek they are much lower. They vary in width from a few feet along the smaller streams to a mile or more along the Tennessee River. The surface of the narrow strips usually is flat, with a slight incline toward the watercourses. Where the strips are wide, they frequently slope toward the uplands, a slight ridge being developed along the rivers. The first bottoms are subject to frequent overflow and where the areas are narrow they are nearly always wet. They are characterized by depressions and a large number of slight ridges. The bottomlands, where extensive, as along the Tennessee and Elk Rivers, are better drained near the streams than near the uplands, where they are characterized by swampy depressions. Throughout the first bottoms, where most extensive, there are occasional hummocks of second-bottom material, as a rule very small.

The second bottoms or terraces occur along the Elk River and Limestone Creek and its branches and scattered along the Tennessee

River. They are also developed in places along Swan Creek and to a less extent along some of the other large streams. The second bottoms are rarely subject to overflow, though they may be inundated in seasons of unusually heavy rainfall. The surface is generally flat, with a gentle slope toward the watercourses. They vary from one-fourth to three-fourths mile in width.

The uplands may be divided into three general divisions—the Tennessee Valley, the Highlands of Tennessee, and the Elk River watershed. The Tennessee Valley extends north approximately to the line between townships 3 and 4. This division includes what is locally known as the "red lands." The topography is gently rolling, billowy, or undulating. The streams are approached through a series of benches consisting of low, rolling ridges, interrupted more or less by a well-developed drainage system. Small depressions or "sinks" are common. They are much more conspicuous than those of the highlands, and the drainage is effected generally by subterranean streams.

The second division lies north of the line referred to above. It is a continuation of the Highlands of Tennessee and generally has an undulating or gently rolling topography. The descent to the streams of the Tennessee River system is quite gradual, but the slopes toward the Elk River system are much more abrupt and in places steep and precipitous. The boundary between this region and the Tennessee Valley is not marked by any distinct line. There is a gradual ascent from the Tennessee River north toward the State line. Drainage is not so well developed as in the valley region. The streams have not cut very deep channels, and usually head in depressions, which sometimes are extensive. The interstream ridges or divides are much broader than in the valley region and are not as badly eroded, owing to the character of the underlying hard siliceous limestone.

The Elk watershed region is characterized by steep, mountainlike, and in places rough, topography. It is generally called "hill country." The slopes break rather abruptly from the uplands proper to the streams, though they are generally smooth, except where interrupted by the lateral streams, which have effected erosion in such manner as to give the appearance of a semimountainous country. Soil formation has kept pace with erosion and there are comparatively few places where the underlying rock is exposed. This division loses its rough characteristics as the junction of the Tennessee and Elk Rivers is approached.

The drainage of the county is in a general southerly direction through the Elk River, Limestone Creek, and a number of smaller streams into the Tennessee River. The Elk River is the most important watercourse within the county. It drains the northwestern section. Limestone Creek and its tributaries drain the eastern part

of the county, while Swan and Round Island Creeks receive the drainage of the central townships. The water of the rivers is more or less muddy throughout the year, but the contributing streams are nearly always clear, particularly where they traverse the "barrens." The streams generally have fairly swift currents, except as they approach the rivers. The course of the Elk River is quite winding, but it flows in a well-defined channel. The Tennessee River is more direct, but evidences of many changes in its course are the dead rivers, lakes, and cut-offs in the adjoining bottoms. In addition to the streams subterranean drainage is important in places, there being numerous "sinks."

The territory from which Limestone County was formed was acquired by the United States from the Cherokee Indians in 1806. The first permanent settlement was made in 1807. The settlers were from Roane County, Tenn. In 1808 many immigrants settled in the county, mainly along Limestone Creek. Limestone County was organized in 1828 and Athens was made the county seat.

The population of Limestone County as reported in the 1910 census is 26,880. In 1900 it was 22,387. The population of Athens, the largest town and county seat, is 1,715. Elkmont and Mooresville are towns of less than 200 population. The population of the county is mainly native born, although a large number of settlers have come into the county during the last few years, mostly from the States to the north.

Public roads extend into all parts of the county. Nearly all of them are located on land lines, and the few which are not are largely in the rougher parts of the county or in the river bottoms. Some of the public roads have been graded and macadamized. There are a number of good gravel and dirt roads. Others are merely kept passable. These are usually in good condition during dry weather, but are difficult to travel in wet seasons.

Limestone County is traversed by the Louisville & Nashville Railroad, the Southern Railway, and a spur of the North Carolina & St. Louis Railroad. The Louisville & Nashville main line extends in a north-and-south direction through the central part of the county, with a branch running northeast from Athens. The Southern Railway crosses the southeastern part of the county. The North Carolina & St. Louis extends into the county at Lax.

Churches and schoolhouses are conveniently located throughout the county, and all sections are reached by rural delivery mail routes. Local and long-distance telephones serve all parts of the county.

CLIMATE.

There is no Weather Bureau station within Limestone County, but the records of the station at Decatur, Morgan County, are fairly representative of the local climatic conditions. The weather during the spring, summer, and fall is usually pleasant. During the summer there are short periods of hot weather, but in general there is a constant movement of air from the south, southwest, and west, which renders the high temperatures less oppressive.

The winter weather is more changeable. The winters are characterized by recurrent cold periods from three to six days apart. These are usually followed by a few days of pleasant weather, ending with rain or snow, though the snowfall is generally very light, the greatest depth recorded being 1.5 inches. The rains during the winter are usually accompanied by winds from the northeast, east, or southeast.

During the summer the rains are mainly from the south, southwest, and west, and are usually in the form of thunderstorms. In the fall they are generally from the same direction.

The precipitation is well distributed throughout the year. The total rainfall for the wettest year recorded is about 62 inches and for the driest year 35 inches at Decatur.

The average date of the first killing frost in the fall from records covering a period of 27 years at Decatur is October 15, and of the last in the spring April 5, while the earliest date of killing frost in the fall recorded is October 2, and the latest date recorded in the spring April 15. There is an average growing season of 193 days, which is sufficient for the production of a wide range of crops.

The following table gives the normal monthly, seasonal, and annual temperature and precipitation at Decatur, which is located in Morgan County just across the Tennessee River from the south Limestone County line:

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

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.
	°F.	°F.	°F.	*Inches.*	*Inches.*	*Inches.*
December	43.1	72	0	3.98	4.50	5.47
January	41.5	77	−3	5.33	1.90	5.56
February	42.1	77	−12	5.06	1.25	5.31
Winter	42.2	.....	.....	14.37	7.65	16.34

Normal monthly, seasonal, and annual temperature and precipitation at Decatur, Morgan County—Continued.

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.
	°F.	°F.	°F.	*Inches.*	*Inches.*	*Inches.*
March	54.1	84	4	6.26	7.60	4.17
April	61.9	91	26	4.20	2.78	11.14
May	70.0	99	37	3.75	3.04	2.71
Spring	62.0	.....	.....	14.21	13.42	18.02
June	77.5	106	47	3.36	1.51	2.84
July	79.8	107	56	4.33	5.39	7.50
August	78.6	104	53	3.45	2.91	6.39
Summer	78.6	.....	.....	11.14	9.81	16.73
September	72.7	99	37	2.96	1.60	5.01
October	61.0	93	33	2.41	0.30	0.29
November	50.7	80	15	3.41	1.92	5.60
Fall	61.5	.....	.....	8.78	3.82	10.90
Year	61.1	107	−12	48.50	34.70	61.99

AGRICULTURE.

Limestone County lies within an important agricultural section of Alabama. The topography, soils, and climate are favorable to the development of a highly diversified agriculture, including stock raising and dairying. There is only a small total area of rough and broken land, which is restricted to the slopes of some of the larger streams. The surface features are such that good drainage is provided without danger of destructive erosion, and improved machinery usually can be used throughout the county for the production of crops.

The early settlers gradually acquired large tracts of land, selecting the "red lands" for their greater productiveness, originally indicated by the heavy growth of mixed timber which they supported. They avoided the gray soils, which, supporting an inferior growth of post oak and being considered unproductive, were known as "the barrens." As the county developed the farms, or plantations, were operated by slave labor, and as additional land was cleared the acreage under cultivation steadily increased. The early crops consisted of cotton, corn, wheat, grass, garden truck, and fruit. Cotton was hauled to the river and shipped to New Orleans on flatboats until after the railroad now known as the Southern was extended

to Decatur, when it was hauled to the river and ferried across for shipment by rail. Subsequently this line and that now known as the Louisville & Nashville were extended across the county.

The Civil War left the agriculture of the county in a demoralized state, the greater part of the tilled lands being thrown out of cultivation. After the war there was a gradual reestablishment of agriculture, and up to the present it has developed steadily.

Limestone County is within the "cereal" belt of the State. Corn, cotton, grass, and grain are the most important crops. These are supplemented by garden truck, fruit, and nuts, with a number of special crops, which as yet are grown only in an experimental way. Cotton and corn are the money crops of the county, and a greater acreage is devoted to each of these than to all the other crops combined. Cotton leads. In 1909 it occupied 58,179 acres, a little more than one-third of the improved farm land. The acreage is gradually increasing. The crop in many cases is produced year after year in the same fields. It is reported to have been grown continually in places for upward of 40 years. The usual practice, however, is to alternate cotton and corn. Cotton is grown on all the well-drained upland soils and the higher stream-terrace lands, which are well adapted to it. Yields range from one-third to one bale per acre.

The most common method of preparing the land consists of bedding on the water furrow of the previous year's plowing, usually in early spring. A few of the more progressive farmers break the land flat in the fall and rebed in the spring. In fertilizing, some of the farmers apply the fertilizer at the time of bedding, and others with the seed, using a one-horse combination drill and fertilizer distributor. When the plants are a few inches high they are thinned out with the hoe, and frequently the beds are harrowed just after the plants appear, either across the beds or along the rows. The cultivation is clean and shallow. The soil is usually worked toward the plants after thinning, then away from the plants and then back. The number of cultivations given depends upon condition of the soil, season, etc., and the plants are left after the last cultivation on slight ridges with shallow intervening furrows. All subsequent work is done with the hoe to keep down weeds and grass between the stalks. The ridges are made higher in fields on slopes to minimize erosion, while on the uplands greater effort is made to keep the surface as nearly flat as possible so as to conserve soil moisture. A few farmers in the county practice the check-row system in planting cotton, as well as corn, with good results.

The low yields of cotton are attributed to the methods used in preparing land, lack of thoroughness of cultivation, failure to maintain the organic content of the soil, and improper fertilization.

There is considerable difference in the values of the different soils of the county for cotton production. The Decatur and Hagerstown soils produce the heaviest yields. The crop does best on the Decatur silty clay loam and the Hagerstown silt loam. The Clarksville and Elk series yield the smallest crops. In very favorable seasons the Abernathy silty clay loam, Colbert silt loam, and Huntington silt loam give better yields than any other of the soils, but the stands on these types are very uncertain.

The total area in corn in 1909 was 49,215 acres, or about 30 per cent of the improved farm land of the county. The average yield is about 17 bushels per acre, and the yields range from 10 to 100 bushels. Most of the corn is grown in the stream bottoms and the proportion of upland corn as compared with upland-grown cotton is very small. However, the acreage of upland corn has steadily increased in recent years.

The methods of preparing the land and cultivating are very similar to those used for cotton. The common practice is to bed on the water furrow of the previous year and plant on top of the ridge. However, proportionately more of the corn land of the uplands is broken flat in the fall and disked and bedded in the spring, though on the more nearly level uplands the corn is usually planted in water furrows. In this case the soil is gradually worked toward the plants, then away from them, and finally back again, and the crop is "laid by" flat or on slight ridges. The corn is cultivated with double-shovel plows and riding and walking cultivators. Cultivation is frequent and shallow, and designed to keep down weeds and grass and to maintain a fair mulch. A few farmers in the more level uplands practice the check-row system. This permits cultivation both ways and to a large extent does away with the necessity of hoeing.

On the alluvial or bottom soils subject to overflow in winter and early spring the preparation of the seed bed is delayed until planting time, and consists of reversing the beds to the water furrow of the preceding year's crop. On such soils corn has been grown continuously in places for many years. The corn crop is sometimes damaged by overflow and suffers in other places from drought.

Corn is produced on all the soils of the county except those which are inadequately drained. It does well on the Abernathy silty clay loam, Huntington silt loam, Hagerstown silt loam and gravelly loam, and the Decatur silty clay loam.

Oats rank next to corn in importance, although, according to the census, in 1909 it was grown on only 2,478 acres. During recent years the acreage in oats has been extended. The crop is generally planted in fields that have been broken flat and harrowed. The grain is usually sowed with a grain drill, but frequently it is

sowed broadcast and then plowed in. Fall sowing usually gives heavier yields than spring sowing. By far the greater part of the crop is cut green for hay. Oats where seeded in the fall make a good cover crop. The crop does best on the heavy soils of the uplands and on the well-drained terrace lands.

The acreage in wheat has steadily declined during the last 25 or 30 years. The 1910 census reports a total of 1,069 acres. It is grown in much the same manner as oats, and is sowed in the fall and harvested in early summer for the grain. Little or no wheat is cut green for hay. Good yields were obtained on the Elk, Hagerstown, and Decatur soils when they were first cleared, but wheat growing is now restricted to a few types, mainly of the Hagerstown and Elk series. The best quality of grain is produced in the more rolling country, particularly on the slopes occupied by the Hagerstown gravelly loam. Wherever red clover is grown successfully wheat does well.

A very small acreage is devoted to rye, although this crop has increased in importance during the last few years. It is grown both for grain and for hay. It does best on the Clarksville soils and the Decatur silt loam.

Tame and cultivated grasses are reported in 1909 on 1,898 acres, with a production of 2,529 tons of hay. The chief varieties are redtop, Bermuda, and Johnson grass. These grasses do best on the Hagerstown gravelly loam and silt loam, Elk silt loam, and Colbert silt loam. The yields range from 1 to 2 tons to the acre. Redtop is the most important of these crops, and is more generally used for hay. It is usually sowed with a nurse crop of oats and wheat in conjunction with clover. Bermuda grass is generally utilized for summer pasturage. It is planted from cuttings, which are set in furrows and covered with soil. It is a valuable pasture grass and is especially desirable where the slopes are steep and subject to erosion. Johnson grass grows in a few places. It is not generally considered a desirable grass, as it is difficult to eradicate, but it makes excellent hay. This grass occurs mainly on the Tennessee bottoms. The yield of hay is very heavy.

Crab grass and broom sedge are abundant, but they are rarely sowed, usually being volunteers in cultivated fields and on abandoned land. The former is restricted to the cultivated fields. It makes its growth usually after crops are "laid by" and often is thick enough to make good hay. It usually occurs in sorghum and cowpea patches, and not only adds to the feeding value of these crops, but aids materially in the curing of the crops where they are grown for hay. Broom sedge usually grows in abandoned fields or pastures. It is a grass of little value.

The total acreage in sorghum and sugar cane, as given by the census of 1910, is 778 acres, sorghum being the most important.

Sorghum is generally grown as a coarse forage, although a small part is used for making sirup for home use. It makes a good hay, but is rather difficult to cure. It usually produces 2 to 5 tons to the acre, depending largely upon the soil. It seems to do best on the Huntington silt loam and Abernathy silty clay loam. The seeding is generally heavy where hay is desired, so that the stand will be thick and the stalks small. The seed is generally sowed broadcast and then plowed in. Where grown for sirup the crop is planted in rows and cultivated like corn. Sugar cane is handled in much the same manner as sorghum except that cuttings or stalks of the previous year's crop are used instead of seed. They are used for the same purpose, but sugar cane does not do so well as sorghum in this region, as it requires a longer season. The 1910 census reports a total of 6,104 acres in all hay and forage crops, with a production of 6,626 tons.

The acreage in Irish and sweet potatoes aggregated only 449 acres in 1909. These vegetables are grown to about an equal extent. They are the most important of the home garden crops, and the surplus is disposed of at local markets. The commercial production of these crops apparently offers good opportunities. They can be produced on all the well-drained soils of the county, although the best results have been attained on the lighter soils, particularly the silt loams.

Tobacco is grown only in an experimental way at present, and is restricted to a few small patches. Burley is the prevailing variety. The crop is grown only for home use, but apparently could be profitably grown on many of the soils of the county commercially.

On practically all the farms there is a garden patch devoted to miscellaneous vegetables, and frequently to strawberries, raspberries, and grapes. Apples, peaches, plums, and cherries, and in some cases such nuts as pecans, black walnuts, and chestnuts are grown in home orchards or near the farmhouses. The soils are too heavy for the production of very early truck crops, and the county can not compete with more southerly areas, but the quality is usually good. The acreage in berries is steadily increasing and the berry fruits promise to become important. They are grown mainly on the Clarksville silt loam. The peach crop is quite uncertain on account of late frosts in the spring, but the yield is usually good in favorable seasons. More success is had with apples, plums, and cherries, which are apparently less likely to be damaged by frost.

The legumes are grown in Limestone County only on a few farms and in an experimental way. They promise, however, to become important in crop systems as their value as soil improvers is more generally recognized. These crops not only have a high feeding value, but supply nitrogen to the soil. The legumes now grown are

cowpeas, soy beans, peanuts, alfalfa, and red clover. Crimson clover and vetch are valuable and might be introduced with profit.

Cowpeas are an important crop, and are generally grown for hay or seed. They are usually sowed broadcast and then plowed in. The hay is difficult to cure, and special supports are sometimes constructed to hasten the curing. Where grown for seed, cowpeas are planted in drills, and when harvested are thrashed with a pea huller. Sometimes this crop is turned under for green-manuring purposes, but more commonly it is grazed down by stock and then turned under. Either method adds to the organic content and nitrogen supply. This crop does particularly well on all the well-drained soils, especially the heavier types. It is one of the most important summer forage crops and is included in the best rotations. It is particularly valuable after early vegetables, oats, wheat, and rye.

Red clover is a very important legume, but its production is limited to a few soil types. It is rarely grown alone, but usually in conjunction with redtop grass and often with a nurse crop of wheat and oats. Some difficulty is experienced in getting a stand on any types other than the Hagerstown silt loam and gravelly loam and the Elk silt loam. This is attributed to the lack of lime and organic matter and the poor physical condition of the soils.

Soy beans are grown only in an experimental way and like cowpeas are produced for hay and seed, although generally not so highly esteemed as cowpeas, as the plant itself is small. The yields of seed, however, are much heavier. The crop has a high feeding value and does best on the lighter soils, such as the gravelly loams.

Only a few small patches of peanuts are grown. This crop constitutes a valuable summer legume, and is highly esteemed on account of its restorative value when grazed down by live stock and turned under. It makes good pasturage for hogs. They not only relish the nuts, but eat the vines as well. It is said they are more cheaply fattened on this crop than on corn, although the pork is more oily. Peanuts do best on the lighter soils, particularly the gravelly loams and silt loams, but are not successful where the soil is in an acid condition.

Alfalfa is grown in a few small patches. This legume is most successful on the Huntington silt loam and Elk silt loam, although good stands are obtained in places on the Decatur clay loam. The Huntington silt loam of the Tennessee bottoms is probably best adapted to it, although there is some danger of the crop being damaged by the deposition of silt by overflow waters.

There has been a marked increase in the number and value of domestic animals during the last decade, with possibly a slight decrease during the last year or two. In the 1910 census the value

of domestic animals in Limestone County is reported as $1,194,466. The total number of cattle is given as 13,050. These are mainly dairy cows. Although there are some Holstein and Holstein grades, most of the cattle are Jersey and Jersey grades. The total number of mules is reported as 4,799 and of horses 3,686. Totals of 19,990 hogs, 2,140 sheep, and 1,776 goats are reported. Most of the hogs are Poland China, Berkshire, Jersey Red, and their grades.

The general conditions in Limestone County are particularly favorable to the profitable development of the live-stock and dairy industries. With the present tendency toward a greater diversity of crops and more systematic rotations, increased attention is given to the raising of live stock. It is recognized that under more intensive methods of farming some of the crops can be more profitably grown for use in the production of beef and pork than for direct sale.

There is an increasing tendency on the part of the farmers to utilize labor-saving machinery. The surface features of the greater part of the county admit of the use of improved farm machinery, and the number of disk plows, riding deep-tillage implements, tractors, walking and riding cultivators, harvesters, binders, thrashing machines, mowers, weeders, harrows, and drills is increasing. In general, the soils are heavy and require a heavy equipment.

The expenditures for fertilizer in Limestone County have increased rapidly during recent years. The census reports an expenditure of $49,599 in 1909. A great many chemical and mineral mixtures are used that vary considerably in the percentage of phosphoric acid, nitrogen, and potash. One mixture commonly used is a 10–2–2 preparation; other popular formulas are 8–2–2, 10–3–3, 9–3–3, 9–2–3, 9–3–4, and 10–3–4. In addition, some use is made of 14 or 16 per cent acid phosphate, kainit, cotton seed, cottonseed meal, manure, and nitrate of soda, and in a few cases blood and bone, fish scrap, etc. Nearly all of the cotton is fertilized except on low stream terraces. Comparatively little of the corn is fertilized and then almost solely on the upland soils. The general custom is to apply the fertilizer at the time of planting, but there is a tendency to use the material at different stages of crop growth and to use better and more readily available mixtures. Two applications are quite common with cotton and corn, while a few farmers make three, using nitrate of soda as the last. With the exception of the Hagerstown gravelly loam and silt loam, the Elk silt loam, and the bottom soils, all the types are deficient in lime, while nearly all the soils of the county lack a proper supply of organic matter.

The systematic rotation of crops is not generally practiced in Limestone County. Cotton and corn are usually grown continuously on the same land for a number of years. Many fields have produced

cotton for 15 years or more, while most of the bottom-land fields have been utilized exclusively for corn since they have been cleared. Some of the farmers grow cotton for three or four years and then corn for about the same length of time, while others alternate these crops year after year. A less common practice where cotton and corn are alternated is to follow corn with oats or wheat, sowing redtop and red clover with these crops, which are cut for hay or shocked and subsequently thrashed. The following year the redtop and clover are cut for hay, and the fields are used as pastures until they become too thickly infested with broom sedge and weeds, when they are put back in cotton or corn. Where trouble is experienced in getting stands of red clover and wheat the wheat is generally eliminated, and oats follow corn. The following year, after the oats are removed, cowpeas are sowed. These are grazed down by live stock or cut for hay, and the next year the land is returned to cotton.

Very little attention is paid to the adaptation of the various soils of the county to particular crops. It is generally recognized that wheat and red clover are dependable crops on the Hagerstown silt loam and gravelly loam and the Elk silt loam; that cotton yields best on the Decatur silt loam but has the best quality and cleanest lint on the Clarksville soils; that rye does best on the Clarksville and Hagerstown gravelly loams; that redtop and oats are successfully grown on the heavier soils such as the Decatur and Abernathy silty clay loams and the Decatur silt loam; and that sugar cane does best on the Abernathy silty clay loam and the Huntington silty clay loam and silt loam. The best fruit is produced on the well-drained gravelly slopes and market-garden produce on the well-drained silt loams of the upland. Yet crops in general are grown indiscriminately on all the soils without any attention being given to their particular requirements. Practically no attention is given to selection of the most promising crop varieties or to improvement of strains by seed selection.

The 1910 census reports a total of 298,393 acres in farms in Limestone County, which is about 78 per cent of the total area. Of the farm land, about 55 per cent is improved. The average size of the farms is given as 63.4 acres, each tenancy being enumerated by the census as a farm. The prices paid for farm land range from $15 to $100 per acre, depending upon location, quality, and improvements. The average value of all farm land in the county is given in the census as $15.75 per acre, almost double the price reported in 1900. Sixty-five per cent of the farms are operated by tenants. Many of the landowners leasing their farm lands live in the towns, although some live on the plantations and farm a small acreage, leasing the remainder.

The methods of renting land vary widely. The share system is the most popular. The landlord receives one-third of the cotton and one-fourth of the corn produced where the tenant supplies work stock, implements, etc., and one-half of all crops where the landlord supplies the stock, tools, etc. Where commercial fertilizers are used the landlord pays for a proportionate share. Cash renting is less common. The rent paid varies with the productiveness of the land and ranges from about $3 to $8 per acre. Under present conditions the lands in general are becoming less productive because of the lack of incentive toward permanent improvement created by the existing systems of farm tenure.

The farm laborers in the county are largely negroes. Where employed for the season and boarded on the farm the laborers are paid $18 to $25 a month. Where employed for short periods they receive $1 to $1.50 a day. The more general use of labor-saving machinery is doing much to reduce the demand for labor.

SOILS.

The soils of Limestone County may be classed in two general groups, the upland and the lowland soils. The upland group comprises all the country locally known as the "red lands," "the barrens," and the "hill country," while the lowland group includes the bottom lands of the rivers and streams and the upland "sinks." These classes and their subdivisions have a marked difference in surface features, although they merge gradually in places.

The materials which make up the soils of these divisions have the same origin, but the manner in which the soils were developed is quite different, the upland soils being residual and the lowland soils alluvial in origin. The former are derived in place from the disintegration and decomposition of the underlying rocks, while the latter consist of material derived from the same source, washed from upland regions and deposited by the rivers and smaller streams.

Under the mantle of soil or alluvium at various depths or exposed in local outcrops are the rocks of the different geologic formations which have contributed directly or indirectly to the formation of the soils. In general, the soils of the county have an intimate relation to the geology.

The strata of the lower sub-Carboniferous, consisting of the Lauderdale or Keokuk chert and the St. Louis or Tuscumbia limestones, constitute the most important formations. The Lauderdale or Keokuk formation occurs in the northern part of the county, in the section locally known as "the barrens," and at points south of these areas toward the Tennessee River, in the beds of the creeks and

streams. It is made up of limestones, chert, and shales. The chert occurs in beds 1 to 18 inches thick throughout the limestone formations, while the shales occur in the lower part of the formation in thick beds, some seams of chert being present. The color of the limestones and chert varies from gray to bluish gray or blue. The resistance offered to weathering by the chert and cherty limestones of this formation is responsible for the smooth topography of "the barrens."

The St. Louis or Tuscumbia limestone is largely restricted to the southern and southeastern parts of the county. This formation is made up of limestone and chert and chert-free limestone, in some cases interstratified. It gives rise to the soils of the "red lands."

In addition to these geologic formations but occurring below the St. Louis limestone are the black shales of the Devonian, the Clinton, or Niagara formation, of the upper Silurian, and the Trenton, or Nashville, of the lower Silurian period. These formations occur in the northern and northwestern part of the county along the Elk River and its tributaries and to some extent along Limestone Creek. The black shales and the Clinton are unimportant on account of their thinness, although they modify the contiguous soils in places. The Nashville, however, is quite important. It consists of bluish, fossiliferous, siliceous limestone containing some beds of bluish shale. The soils of the county are derived mainly from limestones, interstratified chert and limestones, or nodular chert and limestones. The reduction of the limestones to soil has been accomplished chiefly by the removal of the calcium carbonate through solution, the less soluble components being left to form soil. In the case of the purer limestone the present soil mantle represents a very small part of the original rock, the larger part being carried away in solution by gravitational or stream waters. Many feet of the original rock are thus required to form a thin layer of soil. The chert yields less readily to the agencies of weathering, and not infrequently the layers or nodules remain intact within the soil mass. Where they do break down as a result of decomposition or disintegration they lose very little from solution processes and form a white, siliceous, flourlike material.

The ease with which the limestones have yielded to weathering and the resistance offered by the chert are to a large extent responsible for the variation in the surface features of this section.

In the formation of the upland soils by decomposition and disintegration of the parent rock, the residuary product has been subjected to the modifying influences of erosion, the growth and decay of vegetation, rainfall, and oxidation, which have transformed it into productive soil. As a result of excessive leaching or more thorough oxidation, the color of the well-drained upland soils varies through

yellow and brown to red. In the poorly drained lands or where the soils are in a saturated condition and aeration has been less thorough the colors of the soil are usually lighter and frequently mottled.

Vegetation not only affects the color of the soil, but has a modifying influence on its structure. The difference in the texture of the surface soil and the subsoil is attributed to the continual percolation of rain water through the soil, carrying clay and silt to lower levels. The influence of rain water on the topography is seen in the formation of gullies and the washing of the soil from higher to lower levels.

Owing to pronounced differences in origin, color, topography, drainage, and crop value, the soils are separated into series, the members of each being similar in origin, color, topography, etc. The salient difference between the types, or the members of the series, is in texture.

The soils of the upland division, or residual soils, vary from gravelly loams through silt loams to silty clay loams and clay loams, and with the exception of a few types they are well drained. The upland soils are classed with the Clarksville, Decatur, Hagerstown, Guthrie, and Colbert series.

The lowland, or alluvial, soils are restricted in distribution to the first bottoms and higher terraces of the rivers and streams. These terraces and bottoms represent different stages in the history of the watercourses, the higher terraces being the older flood plains and the present overflow bottoms the more recent in development. The main streams in times past were much larger and more active than at present. They carved out the valleys and deposited the overload of gravel, sand, silt, and clay upon the floors of what was then the first flood plain. The material deposited was largely derived from the uplands through which the streams flowed as a result of local outwash or direct erosion of the bluffs.

The reexcavation of the first flood plain attended by recurrent overflows developed the next flood plain. Only two well-defined terraces are recognized in this county. The soils of the second bottoms, or the higher terraces, are classed with the Elk and Cumberland series, and those of the first bottoms with the Huntington, Holly, and Abernathy.

In many places the soils merge so gradually that it is difficult to establish distinct boundary lines between the types, and some of the types include spots of other types too small to be shown separately on a map with the scale 1 inch to 1 mile. Such areas as are not shown on the map can be recognized by the description of the main types in the report.

The following table gives the name and actual and relative extent of each soil type mapped in Limestone County:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Clarksville silt loam	82,368	31.3	Abernathy silty clay loam	8,384	2.2
Red-subsoil phase	34,432		Decatur silty clay loam	8,000	2.1
Decatur clay loam	57,984	15.5	Guthrie silt loam	7,168	1.9
Decatur silt loam	44,224	11.8	Colbert silt loam	7,104	1.9
Hagerstown gravelly loam	3,136	8.1	Huntington silty clay loam	4,480	1.2
Steep phase	27,072		Huntington clay	3,520	1.0
Huntington silt loam	28,096	7.5	Holly silt loam	2,176	.6
Elk silt loam	26,432	7.1	Cumberland silt loam	1,024	.3
Clarksville gravelly loam	19,072	5.1			
Hagerstown silt loam	9,088	2.4	Total	373,760	

CLARKSVILLE SERIES.

The surface soils of the Clarksville series are gray, with yellow subsoils and red substrata. The soils are gravelly as a rule, the gravel consisting of chert fragments. They are derived from cherty limestones. The Clarksville soils occupy both level and undulating uplands and rough hilly country with steep slopes. The series is extensively developed in northern Alabama, Tennessee, and Kentucky. In Limestone County it is represented by two types, the gravelly loam and silt loam.

CLARKSVILLE GRAVELLY LOAM.

The Clarksville gravelly loam is a grayish cherty loam underlain at shallow depths by a yellowish very cherty silty clay loam, the lower part of which is frequently reddish. The subsoil usually extends to a depth of 3 feet or more, but in places the underlying rock is nearer the surface. Frequently where the subsoil material is deeper the color occasionally changes through reddish yellow to dull red. Small fragments of flaggy limestone and chert are scattered over the surface and mixed with the soil and subsoil. The stones present in this type are generally larger than those in the Hagerstown gravelly loam.

The Clarksville gravelly loam occupies the brows of the slopes bordering the Elk River and other streams. As the distance from the Elk River system increases, the rock fragments become smaller. Very little of this type is under cultivation; the greater part of it supports a growth of chestnut, hickory, and oak. Where it occurs on the steeper slopes it is not used for crops, but where associated with the Clarksville silt loam most of it is under cultivation, devoted to corn, cotton, and occasionally rye and oats, with a few apple and peach trees. Corn yields 10 to 30 bushels, oats 15 to 30 bushels, rye

15 to 25 bushels, and cotton one-third to one-half bale per acre. Crops can not be produced as cheaply on this type as on more nearly level types, as considerable hand work is required, and improved farm machinery can not be used. Fruit does well on this type, and it seems best adapted to orcharding.

CLARKSVILLE SILT LOAM.

The Clarksville silt loam is prevailingly a pale-yellow, friable silt loam, which grades at an average depth of about 5 inches into a friable silty clay loam of a little deeper yellow color. This silty clay loam is generally uniform throughout the 3-foot section, except that it has a strong yellow color below a depth of about 1 foot, is often noticeably compact at about 2 feet, and sometimes shows grayish mottlings in the lower subsoil, particularly in the flatter and less well drained areas. The lower subsoil often consists of a yellow, friable silty clay which has a greenish tinge in some places. Small, angular fragments of chert are of rather common occurrence in the subsoil and substratum of the slopes and of the higher positions in the more undulating areas. Such fragments are occasionally found in the level areas or at the heads of draws, and in places the type contains sufficiently large quantities to be classed as the Clarksville gravelly loam if such areas were large enough to be indicated on the soil map.

The surface is characteristically level to gently undulating, and the drainage as a rule is adequate for most crops. In some of the more nearly level situations the drainage is not thorough and the soil is rather grayish in the surface section and mottled with gray in the subsoil. This imperfectly drained land represents a transition soil between the typical Clarksville silt loam and the Guthrie silt loam. The immediate surface dries out to a decidedly grayish color and the soil is compact except where a good supply of organic matter is maintained.

In the northeastern part of the county and bordering the Madison County line in many places the type occupies more rolling country. It is here well drained, and the surface soil is more yellowish. It resembles the Clarksville clay loam, but is quite typical, except that it is shallower. Such areas are more productive than most of the type largely because of better general drainage and more efficient methods of farming.

The Clarksville silt loam is the most extensive soil in the county. It occurs chiefly in the northern section, and is the predominant type in a belt extending through the central part of the county. It is particularly well developed northeast of Athens along the new line of the Louisville & Nashville Railroad, northeast of Union

School, on the uplands between Little Shoal and Sugar Creeks, and along the Lauderdale County line in the same position.

In the well-drained areas the forest growth consists mainly of scrub oak and hickory. The timber is usually small, with oaks predominating. Post oak is the most conspicuous. In low situations white oak, sweet gum, and black gum are common, with some dogwood and poplar.

The soil is compact, owing to the lack of organic matter. Even in low situations or virgin timberland the dark color rarely extends to a depth of an inch. For many years this type was considered unproductive and was locally known as the "barrens," but it has been demonstrated that it can be developed to a high state of productiveness.

At present only a small part of it is under cultivation. It is used principally for the production of cotton and corn, supplemented occasionally by oats, wheat, rye, redtop, and clover, and less commonly by sorghum, cowpeas, and millet. Most of the farmers grow garden vegetables and fruit for home use. Bermuda grass, broom sedge, and redtop are grown in pastures. The yields of cotton range from one-third to three-fourths bale, corn 10 to 40 bushels, oats 20 to 50 bushels, wheat 10 to 20 bushels, mixed hay, millet, or cowpea hay, 1 ton to 1½ tons, and sorghum sirup 100 to 150 gallons per acre.

The yields of crops depend upon the methods of farming and fertilizing. Cotton is nearly always fertilized with mixtures containing a high percentage of phosphoric acid, which is said to give good results on this soil. Manure is commonly used on corn land, but the supply is far from adequate and recourse is had to cotton seed and cottonseed meal. The continuous production of corn and cotton in the same fields for many years has reduced the productiveness of the soils to such an extent in many places that it is very difficult to obtain good stands of red clover, and the usual method of improvement is to permit the land to grow up in weeds for a few years. The productiveness may be increased by the use of stable manure or the growing and turning under of green-manuring crops. Where clover can be successfully grown, it is usually sowed with redtop in a nurse crop of oats or wheat. The summer after the grain is removed the clover is cut for hay, and the lands are pastured for some time before being returned to corn or cotton. A thorough preparation of the seed bed and the maintenance of a good supply of organic matter are needed on this type, together with the systematic rotation of crops, providing for the more frequent production of winter cover crops and summer forage.

Land of this type is valued at $20 to $70 an acre, depending upon its location with respect to towns and improvements.

Clarksville silt loam, red-subsoil phase.—The soil of the red-subsoil phase differs from the typical Clarksville silt loam in having a red, brittle silty clay subsoil. The phase consists of a pale-yellow to yellowish-brown silt loam underlain at about 6 inches by a yellow or brownish-yellow, friable silty clay loam which grades within the 3-foot section into a yellowish-red or dull-red silty clay, usually containing some small fragments of chert.

The red-subsoil phase occupies well-drained slopes, slight ridges, and low hillocks in the more uneven areas of the Clarksville silt loam. It is derived from the more calcareous layers of the Lauderdale or Keokuk chert formation. The phase is more productive than the main type, and this is so generally recognized that it is usually the first land to be put in cultivation when the Clarksville silt loam is cleared. It has better general drainage than the main type, but the texture is such that crops rarely suffer in dry seasons.

Decatur Series.

The surface soils of the Decatur series are characteristically reddish brown to deep red, and the subsoils red or blood red. These soils are derived mainly from pure limestone, although some areas show traces of chert. They occur in nearly level to gently rolling valley areas, and to some extent in the uplands. In Limestone County this series comprises three types—the silt loam, silty clay loam, and clay loam.

Decatur silt loam.

The Decatur silt loam is a brown to reddish-brown, mellow silt loam, which at depths varying from 6 to 10 inches is underlain by a dull-red, friable clay, grading below into a deep-red, compact clay. Frequently the surface silt loam is directly underlain by the deep-red, compact clay. The surface soil of much of this type has more of a brown color than is typical of the Decatur series, and frequently the upper subsoil is lighter red.

Included with this type are small areas of a soil closely resembling the Hagerstown silt loam. This soil usually occurs in slight depressions in the uplands, and is derived largely from wash from adjoining soils. It consists of a brown, mellow silt loam underlain at 15 to 30 inches by brown, reddish-brown, sometimes mottled loam or silty clay loam. Patches of the Decatur clay or clay loam also occur throughout this type, on slopes where erosion is most active and has washed away the surface soil. These variations, on account of their small extent, can not be shown on the soil map. In a few depressions in the southern part of the county the subsoil is yellow, and consists of residual material, probably Colbert. The surface soil is a reddish-

brown to red mellow silt loam. The bodies of this variation are too small to warrant recognition as a distinct soil.

The Decatur silt loam is one of the most important soils in the county, and occupies broad and extensive areas in all sections. It is particularly well developed about Elkmont and on the uplands northeast of the junction of the Elk and Tennessee Rivers. This type has a gently rolling or billowy topography, and is generally well drained, although in spots the drainage is inadequate.

The forest growth consists of white, black, and red oaks, hickory, walnut, and poplar, in small patches distributed throughout the type. Most of the type is under cultivation. It is considered one of the most productive soils of the county.

This soil is used chiefly for the production of cotton and corn. Oats, rye, hay, coarse forage, and sorghum also are grown, with some fruit and garden truck. Cotton produces one-third to three-fourths bale per acre, and corn 10 to 40 bushels, oats 20 to 50 bushels, wheat 15 to 30 bushels, and rye 15 to 20 bushels per acre, while grains cut green for hay yield 1 ton to 3 tons, cowpeas 1 ton to 1½ tons, redtop and clover 1 ton to 1½ tons, and sorghum sirup 100 to 150 gallons to the acre.

Fruit is grown for home use. It consists of apples, peaches, plums, grapes, strawberries, and raspberries. The peach crop is quite uncertain on account of late frosts in the spring, but in favorable years the yields are quite heavy and the fruit is of good quality. A number of varieties are grown, the most common being the Early Elberta. The apple crop is more certain. The favorite varieties grown are the Early Harvest and the Ben Davis. Plums, grapes, and raspberries do well, and strawberries particularly so. The more extensive production of strawberries offers good opportunities on this type.

As on most of the soils of the county, cotton and corn are generally produced year after year on the same fields to the exclusion of other crops. The yields of cotton are maintained by the use of increasing quantities of commercial fertilizers and of corn by applying manure where available. Red clover is not generally successful on account of the lack of lime and organic matter. Where good stands can be obtained this legume and redtop are sowed with oats, and more rarely with wheat, after corn. Under this method crop yields are easily maintained or increased, but in most instances the practice is only resorted to as the need of renovation becomes acute.

The Decatur silt loam is one of the most valuable soils in the county for general farming. In its improvement it needs deeper and more thorough tillage, the maintenance of a good supply of organic matter, and the frequent use of crushed limestone or lime, with a systematic rotation of crops making provision for the winter and summer legumes.

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

Mechanical analyses of Decatur 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.*
414730	Soil	1.0	2.1	2.2	12.9	10.2	52.7	18.9
414731	Subsoil	.2	1.6	1.6	10.0	7.0	54.6	25.1

DECATUR SILTY CLAY LOAM.

The Decatur silty clay loam is a dark-red, friable silty clay loam, underlain at 10 to 30 inches by a deep-red clay. The soil is quite mellow and has a well-defined crumblike structure. The subsoil is compact and heavy and the line of demarcation between the soil and subsoil is well defined. In the flat or depressed areas the soil has its usual depth, but is not typical, being darker in color, or almost chocolate colored, while the subsoil consists of a mottled brown or rusty-brown and yellowish silty clay loam, with a spongelike structure. In these positions much of the surface soil is derived from adjoining soils, as a result of surface wash. As other types are approached, the soil becomes shallower and less uniform in color and texture.

The Decatur silty clay loam occupies flat or nearly level areas and distinct depressions in the limestone valleys. It occurs as very small areas distributed throughout the Decatur clay loam and associated types.

Drainage is not generally well established on this type, and crops do not suffer in dry seasons. Water frequently remains on the surface after heavy rains.

Nearly all of the type is under cultivation, although small patches of woodland are encountered, including chiefly white, red, and black oak, with some hickory, poplar, and black walnut. Where cultivated, this soil is used for the production of corn, cotton, oats, rye, wheat, cowpeas, and sorghum, with Bermuda grass, redtop, red clover, and millet. The yields of corn range from 25 to 60 bushels, of cotton from one-half to 1 bale, oats 40 to 60 bushels, rye 15 to 25 bushels, wheat 15 to 30 bushels, cowpea hay 1½ to 2 tons, millet hay 1 ton to 2 tons, redtop and clover 1½ to 2 tons, and sorghum sirup 150 to 200 gallons to the acre.

Crop yields are quite uncertain in seasons of excessive rainfall, while in dry seasons the growth is inclined to be coarse and rank. The grasses and coarse forage do unusually well, but trouble is often experienced in maintaining a good stand of red clover because of winter killing. Millet is grown only where the stand of some culti-

vated crop has been impaired by excessive moisture. The quality of the small grain produced on this type is not so good as that produced on the Decatur silt loam or clay loam, but the yield of straw is much heavier. The proportion of cotton grown on this type, as compared with corn, is very small. The former is inclined to rust, or develop such an excessive growth that the dense shade prevents the maturing of the lower bolls. Corn is usually grown year after year in the same fields to the exclusion of other crops. When the yields begin to decline, oats or wheat may be sowed in the fall, and after the grain is harvested the following summer cowpeas are usually planted. The cowpeas are cut for hay, grazed down by live stock, or turned under as a green-manuring crop. Where clover can be grown successfully, redtop and red clover are sowed in a nurse crop of either wheat or oats. This is cut for hay the second summer and the field pastured for some time before being put back in corn or cotton.

With good drainage this soil is well suited to the production of corn, small grain, grass, and leguminous forage crops. Where difficulty is experienced in obtaining a stand of red clover, crushed limestone or burnt lime is usually needed. Land of this type is valued at $40 to $100 an acre.

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

Mechanical analyses of Decatur 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.*
414732	Soil	0.4	1.8	2.0	10.6	7.1	54.0	24.0
414733	Subsoil	.6	2.0	1.6	7.8	5.0	46.5	36.5

DECATUR CLAY LOAM.

In its typical development, the Decatur clay loam consists of a red, dark-red, brown, or brownish-red, mellow clay loam, underlain at about 6 to 10 inches by a brighter red or deep-red, moderately crumbly clay, which passes downward into a deep-red, stiffer clay. At about 20 to 24 inches the subsoil is frequently compact, but there is little change in the character of the material from directly beneath the surface soil to a depth of 3 feet or more.

The type includes small eroded patches or "gall spots" of Decatur clay, too small to map. These represent sloping areas from which the surface soil has been washed away. On the other hand, there are many gentle slopes, slight depressions, and level areas where material has accumulated by wash from above. Such colluvial material is usually dark reddish brown in color, more mellow in structure, and a

light clay loam to heavy loam in texture. The depth to clay in places averages much greater than in areas of the more typical soil. The type also includes small patches of Decatur silt loam, silty clay loam, and Decatur sandy loam. It is not uncommon to find some chert fragments in the immediate subsoil. These become more abundant as depth increases. Often they appear at the surface in spots, more particularly on the steeper slopes where erosion has been most active. Areas in which this condition exists would be mapped as Decatur gravelly loam if they were sufficiently extensive to be shown separately. Most of the chert in the soil profile occurs just above the parent rock. The rock is exposed in only a few spots where the soil has been completely removed by excessive wash. The residuary product attains a thickness of 20 feet in places, while in others it thins out considerably, but it is rarely less than 3 feet in depth.

This type is very sticky and plastic after rains, although it dries out rapidly as a result of good natural drainage and excessive evaporation. It is a difficult soil to put in good physical condition. If plowed too wet it does not scour from the plow, and if too dry it turns up in clods.

The Decatur clay loam is included in that part of the county known as the "red lands" and has a very extensive distribution. Although restricted in general to the southern part of the county, areas of this soil occur in all sections. It is particularly well developed in the southeastern townships.

The topography is gently rolling to rolling, and low hills and knolls are conspicuous. It insures good drainage, but favors erosion in places to such an extent that very careful treatment is required to counteract serious damage.

The original forest growth on this type consisted of red, black, and white oaks, hickory, walnut, and poplar, but this is now restricted to a few small patches, the greater part of the type being under cultivation. Where cultivated it is used principally for the production of cotton and corn, with occasional fields of oats, cowpeas, sorghum, and hay, consisting of redtop and red clover, and oats cut green, in addition to some fruit and vegetables and a few experimental crops of alfalfa. The yields of cotton range from one-third to three-fourths bale, corn from 20 to 40 bushels, oats from 30 to 50 bushels, rye from 10 to 15 bushels, cowpea hay and mixed hay from 1 ton to 1½ tons, and oat hay from 1 ton to 3 tons per acre. Sorghum for sirup produces 75 to 150 gallons per acre.

There is proportionately more fruit grown on this type than on the Decatur silt loam. The best quality is produced on the shallower soil, but the trees are not so large. The fruit consists of apples, peaches, and plums, as well as raspberries and strawberries. Apples

are most hardy and dependable. The common varieties grown are the Ben Davis, Early Harvest, and Winesap. Peaches are more or less uncertain on account of the late frosts in spring, but in favorable years the yield is abundant and the fruit is of good quality. Plums are grown on all parts of the type and do particularly well on the thinner soil. Strawberries are quite successful, and yields of 1,000 to 3,000 quarts to the acre are reported. Raspberries are not so important, but they are grown successfully.

The acreage in cotton greatly exceeds that in corn. In many fields cotton has been grown continuously for 12 to 30 years. The yields are maintained by the use of increasing quantities of fertilizers, usually analyzing 10 per cent phosphoric acid, 2 per cent nitrogen, and 2 per cent potash. Sometimes cotton is alternated with corn every 3 or 4 years, but in general no definite rotation is practiced and either of these crops may be grown for a number of successive years in the same fields. When the yields decline the lands are frequently thrown out of cultivation and left to grow up in weeds, broom sedge, or lespedeza. In three or four years they are said to be renewed. Some farmers use cowpeas for renovation. Much difficulty is generally experienced in getting a stand of red clover and wheat. This in part is attributed to the acid condition of the soil, depletion of organic matter, and the shallow seed beds. The Decatur clay loam is a heavy soil to work, and the plowing is very shallow, rarely over 4 inches. Better results are possible where this is gradually increased to 8 or 10 inches. The acidity of the soil is easily corrected by the use of crushed limestone or lime. Lands of this type are valued at $30 to $100 an acre.

Hagerstown Series.

The surface soils of the Hagerstown series are prevailingly brown. The subsoils are light brown or yellowish brown to dull red. These soils are typically developed in the limestone valleys of the Appalachian Mountain region, in the central basins of Kentucky and Tennessee, and in the eastern part of the Ozark Mountain region, with smaller areas in many other parts of the eastern United States. The material is residual from limestone. Fragments and outcrops of limestone are of common occurrence. The topography is undulating to gently rolling. Two types—the Hagerstown gravelly loam and silt loam—are encountered in Limestone County.

Hagerstown gravelly loam.

The Hagerstown gravelly loam is a brown or yellowish-brown mellow silt loam underlain at about 6 to 12 inches by reddish-yellow to yellowish-red friable silty clay loam, which generally passes into a

dull-red friable silty clay within the 3-foot section. Occasionally thin layers of white, soft, partially decomposed chert material are encountered in the subsoil. Small angular fragments of chert and limestone are abundant on the surface and throughout the soil section, being most common in the subsoil and deeper substratum.

The Hagerstown gravelly loam occurs in only a few small areas in the northwestern townships. It occupies the tops or crests of the hills near the Elk River. The soil is well drained, absorbs moisture readily, and conserves it in sufficient quantities to supply the needs of crops throughout ordinary periods of drought. The porosity of the soil and the resistance offered to erosion by the gravel fragments on the surface prevent serious wash.

The material is residual from interbedded chert-free and cherty limestone. The color of the soil is darker and the texture heavier, while the subsoil is redder, than is true of the corresponding Clarksville gravelly loam. In agricultural value this type is similar to the Hagerstown silt loam, except that fruit is less frequently injured by late spring frosts, and the type withstands more protracted periods of drought.

Hagerstown gravelly loam, steep phase.—The steep phase of the Hagerstown gravelly loam is essentially the same as the main type except in topography. It occurs on most of the steep slopes bordering the Elk River and its tributaries, and has a much greater extent than the typical soil. It is usually separated from the main type by strips of the Clarksville gravelly loam, but this in many places is so narrow that it is included on the map with either the typical soil or the phase. The deeper areas of the Clarksville gravelly loam generally occur just below typical Hagerstown material at the heads of draws and in swales, and in most instances are timbered, marking a distinct boundary between the upland and steep phase of the Hagerstown gravelly loam.

A large part of the steep phase is cultivated. Where forested the growth consists of oak, walnut, poplar, hickory, and some chestnut. The cultivated areas are devoted to the production of corn, cotton, grain, and grass. The phase is considered a valuable soil for these crops, and is very productive, although farming operations are more difficult than on the more nearly level land, as the greater part of the work is necessarily performed by hand labor. Although the phase occupies steep slopes, it is not subject to severe erosion, because of the presence of rock fragments.

Yields of corn range from 25 to 50 bushels per acre. Oats produce 30 to 60 bushels, wheat 15 to 30 bushels, cotton one-third to three-fourths bale, and mixed hay 1 to 1½ tons. No difficulty is experienced in obtaining a stand of red clover. This crop and redtop are

usually sowed with the grain crop in the fall. The quality of the grain produced is said to be superior to that of grain grown on any other soil in the county, and the pastures are almost permanent. This land is valued at $30 to $50 an acre.

HAGERSTOWN SILT LOAM.

The soil of the Hagerstown silt loam consists of a brown or reddish-brown silt loam 8 to 15 inches deep. It is underlain by reddish-yellow, reddish-brown, or dull-red, friable clay or silty clay, which continues to more than 3 feet and has a more intense color and heavier texture with increased depth. In local areas, particularly where the type occupies slight depressions or more gentle slopes, the surface silt loam extends to a depth of 24 inches, as a result of colluvial wash from above. Chert fragments are quite common in the subsoil and are locally conspicuous on the surface of the narrow areas. This type frequently marks the transition between the Clarksville silt loam and the Decatur silt loam. Such transition areas are in some cases too small to be mapped separately.

Included with the Hagerstown silt loam are spots of Hagerstown and Decatur clay loam, which have been developed in places where the surface soil and immediate subsoil have been washed away by erosion, exposing the clay loam material. These areas occur near the foot of slopes along the second bottoms of Elk River and its larger tributaries.

The Hagerstown silt loam is inextensive. It is developed in the northern, northwestern, and western parts of the county, and in the southeastern part, near Limestone and Beaverdam Creeks and the Tennessee River. A few small areas occur within the Decatur soils.

With the exception of the areas along the north county line and the areas northeast of the confluence of the Elk and Tennessee Rivers, in addition to a few patches in the upland, the soil is compact and lacks the mellow, crumblike structure which it has in the better areas. The greater part of this type occupies the lowest slopes just above the bottoms of the Elk River and other streams, ranging in topography from smooth to more or less dissected country, including very gentle to moderately steep slopes. The type is less extensive in the uplands, and occupies flat and depressed areas. The drainage is generally well established.

The original forest growth consisted of oak, hickory, walnut, and poplar, with some beech and chestnut. The best timber in the county was cut from this and adjoining soils. Although it is generally recognized that this soil is adapted to a wide range of crops, it is used mainly for the production of cotton and corn. However, proportionately more oats, wheat, and grasses are grown than on any of the other soils.

Cotton yields one-third to 1 bale, corn 20 to 60 bushels, oats 20 to 60 bushels, wheat 20 to 30 bushels, and mixed hay, consisting of clover and redtop, 1½ to 2 tons to the acre. The variation in yields is attributed to different methods of handling the soil. Where cotton is produced year after year in the same field the yields decline rapidly. Corn yields also decline where the crop is grown continually on the same land. A means of improvement occasionally resorted to is the growing of wheat or oats, in which are sowed clover and redtop. When the hay is removed the second summer the soil is usually pastured for some time and then returned to tilled crops. No difficulty is experienced on this soil in getting a good stand of red clover, but, although its restorative value is well known, this legume is grown by only a few farmers.

The Hagerstown silt loam is an excellent soil for general farming, and especially for the production of grass and small grain. Land of this type is held for $20 to $60 an acre.

Guthrie Series.

The Guthrie series includes grayish to almost white, silty soils developed in flat or slightly depressed areas having poor surface drainage. The subsoils are usually pale yellow or pale yellow mottled with gray, and are rather compact in structure. These soils are associated with the Clarksville, and really represent poorly drained areas of that series. The Guthrie series is represented in this county by a single type, the silt loam.

GUTHRIE SILT LOAM.

The Guthrie silt loam is a light-gray to almost white, floury silt loam, underlain at an average depth of about 6 inches by light-gray, mottled with yellow or rusty-brown, silt loam or silty clay loam. This passes into a mottled yellow or yellowish-brown and gray or drab, impervious, plastic clay in the lower part of the 3-foot section. Frequently the surface soil is an ashy-gray, mottled with yellow and rusty-brown, compact silt loam. A few iron concretions commonly occur in the lower part of the subsoil. As this soil grades into other soil types the transition is marked by differences in color, texture, and depth.

This type occurs as small patches within or adjoining areas of the Clarksville soils, particularly the Clarksville silt loam. It occupies flat or nearly level areas or saucerlike depressions.

The natural surface drainage is very poor, and rainwater stands on the surface during the winter and spring months. Artificial drainage is impracticable in the typical areas on account of their basinlike position.

Most of this type is forested with willow, water, and white oaks, sweet and black gum, swamp maple, and to a less extent pine, while moss makes a conspicuous growth in places.

The wet and undrained condition of this soil precludes its use for agriculture except in a few fields where artificial drainage has been established by open ditches. In its present condition it is best suited to lespedeza and redtop, which make good pasturage.

For the successful production of the general farm crops upon this soil good drainage, lime, and phosphatic fertilizers are needed, in addition to deep plowing and the incorporation of organic matter.

The Guthrie silt loam is sold only in conjunction with other types.

Colbert Series.

The surface soils of the Colbert series are grayish to light brown, and the subsoils yellow and frequently plastic in structure. The series is derived from pure limestone or limestone mixed with sandstone. These soils are typically developed as flat to undulating valley lands. Both surface drainage and underdrainage are often poorly established. The Colbert silt loam is the only member of this series mapped in Limestone County.

COLBERT SILT LOAM.

The surface soil of the Colbert silt loam has a depth of 6 to 10 inches and consists of a light-gray to brownish-gray silt loam of a very mellow structure. It is underlain by a pale-yellow, compact silt loam, which grades into a brownish-yellow and gray silty clay loam or silty clay of plastic structure within the 3-foot section. A few small iron concretions are frequently present on the surface, and larger quantities are usually distributed throughout the subsoil.

This type is inextensive in Limestone County, and is confined to small patches within areas of the Clarksville silt loam. It is best developed in the vicinity of Cross Keys, and about the headwaters of Piney and Swan Creeks.

The topography of the Colbert silt loam is uniformly flat and nearly level, with a slight gradient toward the streams. All areas have a lower elevation than the associated Clarksville silt loam. The typical areas of the type have poor natural drainage, but practically all of it can be drained by open or tile ditches and restored to a condition suitable for crop production. After heavy rains, particularly in the winter or early spring months, water remains on the surface for long periods.

At present only a small part of the type is under cultivation, the remainder being forested with a native growth of water, willow, and white oaks, sweet and black gum, with some ash, elm, and hickory.

This soil is best adapted to pasturage under present conditions. Bermuda grass, redtop, and lespedeza do well in cleared areas and afford good grazing. The soil is adapted to millet. Some of the better drained areas are used for the production of corn and cotton. The yields of the former are reported as 15 to 30 bushels and of the latter one-third to one-half bale to the acre.

The greatest need of the Colbert silt loam is artificial drainage. It also requires deep and thorough tillage and the incorporation of organic matter.

Land of this type is generally sold in conjunction with adjoining soils.

Elk Series.

The members of the Elk series have light-brown to brown soils and pale-yellow to yellow subsoils. The series is developed on second terraces lying mainly above overflow. The material is largely or entirely alluvial, and is derived from soils of limestone, sandstone, and shale formations. The Elk soils contain a larger percentage of limestone material than the Holston. Gravelly material is frequently encountered in the substratum. In places the surface is so flat that water stands after wet seasons. The Elk silt loam is the only member of this series encountered in Limestone County.

Elk silt loam.

The Elk silt loam is typically a brown, mellow silt loam, underlain at varying depths, usually at 8 to 13 inches, by a lighter brown or yellowish-brown, more compact silt loam or light silty clay. Where it occurs along the courses of the smaller streams on rather low terraces which stand only a few feet above the first bottoms, the soil is a brown to yellowish-brown silt loam about 6 to 8 inches deep, while the subsoil is a yellowish-brown silt loam to silty clay loam, grading below into a somewhat plastic silty clay mottled with different shades of gray and yellow and containing some dark oxide-of-iron concretions. This mottled phase represents an approach toward the Robertsville silt loam. Along the outer margin, toward the uplands, some brown colluvial wash is frequently present, while as the watercourses are approached local exposures of Elk gravelly loam are of rather frequent occurrence. The gravelly loam areas are too small to be shown satisfactorily on the soil map.

The Elk silt loam occurs on the second bottoms of the Elk River and some of its tributaries, and along Swan, Limestone, Beaverdam, and Piney Creeks. It is rarely subject to overflow, being inundated only in seasons of unusual rainfall.

This type occupies flat to very gently rolling country, with a slight incline toward the uplands, and is well drained except in a few local areas.

The type is largely under cultivation, although patches of timber, consisting of red, black, and white oaks, beech, and poplar, with some sweet and black gum, are quite common, while in one area along Piney Creek a growth of pine is encountered.

Where the soil is cultivated it is used for the production of cotton, corn, grass, and small grain. The yields of cotton range from one-third to 1 bale, corn 30 to 60 bushels, wheat 10 to 25 bushels, and oats 20 to 40 bushels per acre. Mixed redtop and red clover produce 1 ton to 2 tons of hay to the acre.

The soil is easily cultivated, and economically, as all kinds of improved machinery can be utilized. The compact nature of the soil is due to its low organic-matter content. The type is capable of development to a high state of productiveness by the systematic rotation of crops, including grass, small grain, and leguminous forage crops.

Land of this type is valued at $30 to $70 an acre, depending mainly on improvements and location with respect to markets.

Cumberland Series.

The surface soils of the Cumberland series are brown to yellowish brown in color, and the subsoils are yellow to reddish yellow. The series comprises high-terrace soils in the limestone region of the South. Many of the larger streams traversing the limestone region formerly flowed at considerably higher levels, and this resulted in the formation of more or less distinct terraces. Upon these terraces was deposited a stratum of sedimentary material. Typically the material consists of alluvium derived largely from limestone soils. In places the subsoil is residual from limestone. In this county the Cumberland series is represented by only one type, the silt loam.

CUMBERLAND SILT LOAM.

The Cumberland silt loam is a brown to reddish-brown silt loam, 8 to 12 inches deep, underlain by a dull-red or brownish-red, friable silty clay, which usually extends to depths of more than 3 feet. Patches of this soil, too small to be indicated on the soil map, occur within areas of the Elk silt loam.

The soil is quite mellow, and has a well-defined crumblike structure, while the deeper subsoil is compact and friable. The intermediate material usually has a spongelike structure.

This type occupies the hammocky or gently rolling second bottoms of the rivers and large streams. There is usually a slight slope toward

the watercourses. The soil is generally well drained and is rarely subjected to overflow.

A few patches of timber, consisting of white, red, black, and water oaks, poplar, hickory, walnut, and less commonly sycamore, beech, and gum, are encountered, but most of the type is under cultivation. Where cultivated, it is used principally for the production of cotton and corn, with some wheat, oats, and grass. Cotton yields one-half to 1 bale, corn 20 to 50 bushels, oats 20 to 40 bushels, wheat 15 to 25 bushels, and mixed hay, consisting of red clover and redtop grass, 1½ to 2 tons to the acre.

No systematic crop rotation is practiced. Corn and cotton are grown for many years in succession on the same fields. When the yields decline, the fields are put in small grain, followed by grass, and when this is removed the land is pastured for some time and then returned to cotton or corn.

This is a strong soil, well suited to the production of grass, grain, and forage crops. Clover and wheat are grown successfully, and the type is susceptible to marked improvement through growing these in addition to leguminous forage crops in systematic rotations.

Land of this type is valued at $30 to $50 an acre, depending on improvements and location with respect to markets.

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

Mechanical analyses of Cumberland 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.*
414724	Soil	0.0	0.7	1.2	6.6	5.9	68.8	17.0
414725	Subsoil	.6	1.2	1.2	7.2	4.8	55.7	29.2

HUNTINGTON SERIES.

The Huntington soils are light brown to brown, and the subsoils are yellow to light brown. Frequently there is little change in the color or character of the material from the surface downward throughout the soil section. These soils are developed in the first bottoms of streams, where they are subject to overflow. As a rule they are well drained. They consist generally of material derived from limestone, sandstone, and shale soils. Three members of the Huntington series, the silt loam, silty clay loam, and clay, are recognized in Limestone County.

HUNTINGTON SILT LOAM.

The Huntington silt loam is a brown to dark-brown, mellow silt loam, which along the larger streams, such as the Elk and Tennessee Rivers, frequently extends to a depth of 3 feet or more without mate-

rial change. Usually the lower subsoil has a slightly lighter color and is heavy in texture. Along the immediate course of the Tennessee River perceptible quantities of fine sand are present in places. Along the smaller streams the soil is lighter brown in color and shallower than usual. Frequently it consists of a brown or yellowish silt loam, underlain at 6 to 10 inches by a yellowish-brown silty clay loam or light silty clay, which is often somewhat mottled grayish and yellowish in the lower part. Along the streams flowing through the Clarksville belt and those of the Elk River system, the subsoil and substratum in places contain so much chert gravel that boring is impossible. Chert fragments are frequently present on the surface and in the soil.

The largest areas are along the Tennessee River and the lower courses of the creeks, and although subject to inundation they are usually well drained between overflows, with the exception of those areas having a mottled silty clay loam subsoil. Along the main watercourses the type is ridged slightly at the banks, and descends gradually toward the uplands. It also has a mellower structure and is less compact than along the small streams.

The greater part of this type is under cultivation, although there are scattered areas still in hardwood timber, which consists largely of white and red oak, hickory, beech, and some sycamore, ash, elm, and sweet and tupelo gum, while in places the canebrake undergrowth is quite conspicuous. The soil is much easier to work than the Huntington silty clay loam, and responds readily to proper treatment. Little or none of it is plowed in the fall, on account of possible overflows which remove the loose soil. It is prepared in the spring, and is usually plowed with 2-mule teams to a depth of 3 to 6 inches. The soil, in general, has a good supply of organic matter, which is continually renewed by overflows.

Where cultivated, the Huntington silt loam is used almost exclusively for the production of corn, although some oats and cotton and small fields of Bermuda grass, Johnson grass, and alfalfa are grown. Cotton yields 1 bale or more to the acre under favorable conditions, but the growth is usually so rank and maturity so delayed that many of the lower bolls are lost on account of shade from the thick foliage and the crop is generally uncertain on account of overflows. The yield of oats for forage ranges from 1½ to 3 tons per acre; corn produces 35 to 100 bushels; millet, 1 ton to 2 tons of hay; and Johnson grass 2 to 4 tons of hay to the acre. Alfalfa is grown successfully, but only in an experimental way.

Land of this type is sold for $40 to $100 an acre, depending upon location and improvements.

HUNTINGTON SILTY CLAY LOAM.

The soil of the Huntington silty clay loam is a brown silty clay loam about 5 to 6 inches deep, while the subsoil is a light-brown or yellowish-brown silty clay loam, which grades downward into a mottled gray, yellow, and drab, plastic silty clay. The type in this county represents a transition between the Huntington clay and the Huntington silt loam, and frequently includes swales or sloughs of the former and hummocks of the latter.

This type is restricted in distribution to the bottoms of the Tennessee River, and is closely associated with the other types of the Huntington series. The surface features are slightly irregular, the topography varying from flat to hummocky. The type is subject to overflows with the rise of the river, and but little of it is under cultivation. The prevailing timber is beech, willow, water oak, tupelo gum, and swamp haw. Where cultivated it is used for the same crops as the Huntington silt loam. It is a heavier soil, however, and much more difficulty is experienced in getting a good tilth. Where plowed too wet it does not scour readily from the plow, and where too dry it turns up in clods. This type is less well drained than the silt loam of the series, and crops are late in beginning their growth and in maturing, as the fields can not be prepared as early as on the silt loam type.

With good drainage this is a valuable soil for the production of corn, small grain, and grass. It is usually sold in connection with associated types.

HUNTINGTON CLAY.

The soil of the Huntington clay is a light-brown to drabbish-brown silty clay about 6 to 8 inches deep. This passes rather abruptly into a mottled drab, yellow, and gray plastic clay, which usually extends beyond a depth of 3 feet.

This type is limited to the first bottoms of the Tennessee River, and is found only in low situations, such as depressions, swales, or old stream channels. It has no agricultural value, as the greater part of it is in a permanently saturated or semiswampy condition, and during a part of each year the entire type is inundated. The forest growth consists principally of willow, tupelo gum, and alder, while the undergrowth includes a coarse water sedge, with a thick growth of cane around the edges in places.

The Huntington clay occupies a much lower situation than the silt loam of the series. It is sold only in conjunction with other bottom soils.

ABERNATHY SERIES

The surface soils of the Abernathy series are red, while the subsoils are mottled reddish, brown, and gray or grayish. These soils are developed in the first bottoms of streams, where they are subject to

overflow. The drainage is poor. The Abernathy soils are derived principally from Decatur material. The silty clay loam is the only member of this series recognized in Limestone County.

ABERNATHY SILTY CLAY LOAM.

The surface soil of the Abernathy silty clay loam consists of a dark-red to reddish-brown silty clay loam, ranging in depth from 6 to 20 inches. It is underlain by light-gray, drab, or mottled yellowish-gray or drab silty clay loam or plastic silty clay. Black oxide-of-iron concretions are common in the subsoil. Where this type borders the Decatur silt loam the red surface material gradually becomes thinner until it has a depth of only 1 or 2 inches.

This type is inextensive and occurs in small areas mainly in the first bottoms along some of the smallest streams and about the headwaters of drainage ways. Areas of this type occur in sink-hole depressions within areas of the Decatur soils, and narrow strips are encountered in the Tennessee bottoms bordering the red uplands. Its position is such that natural drainage has not been well established over the greater part of the type, although some areas have a sufficient elevation above the watercourses to have fairly good drainage. The drainage of the "sinks" and slight depressions is effected mainly by underground channels. The soil of such areas is closely associated with the Decatur silt loam. The slopes along the streams are subject to overflow, and some of the type requires artificial drainage to be made available for agriculture.

The Abernathy silty clay loam is mainly forested with willow, white, water, and red oaks, ironwood, elm, sweet and black gum, and hickory. The areas under cultivation are used principally for the production of corn, and the yields range from 30 to 50 bushels per acre without fertilization. This is one of the best corn soils in the county, and with the establishment of good drainage it is well suited to grass and small grain. This type is usually sold in connection with adjoining types.

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

Mechanical analyses of Abernathy 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.*
414728	Soil	0.1	0.6	0.6	2.6	2.6	69.0	24.6
414729	Subsoil	.9	.8	.6	4.6	6.2	67.9	18.9

Holly Series.

The Holly series is characterized by the gray color of the surface soils and the mottled gray and yellow or brown color of the subsoil. These soils are developed in the first bottoms of streams and are subject to frequent overflow. The drainage is poor, and in their natural condition the soils are best suited to grasses. The component material is alluvial and is derived from soils of the sandstone and shale formations of the Appalachian Mountains and from the limestone soils of the Limestone Valleys and Uplands region. These soils are less well drained and less productive than the Huntington. In Limestone County only one member of the series is encountered, the Holly silt loam.

HOLLY SILT LOAM.

The Holly silt loam to a depth of 8 to 12 inches is a light-gray to almost white silt loam of compact, floury structure. The subsoil is a mottled yellow and gray or drab plastic clay or silty clay, which extends to a depth of 3 feet or more. In places there is a layer of mottled gray and yellow silty clay loam between the soil and typical subsoil. Included with this type are occasional hummocks of Huntington silty clay loam or clay, too small to be shown separately on the map.

In distribution the type is limited to a few areas in the bottoms of the Tennessee River and the smaller streams which traverse the Clarksville soils and associated types. In its typical development the Holly silt loam occupies flat, level, and rather low situations along the larger watercourses and more sloping areas along the smaller streams. It is locally known as the "white bottoms" and is in a saturated or semiswampy condition except in seasons of unusually light precipitation.

This type is not cultivated. It supports a growth of sweet and black gum, willow, water oak, and beech, with sedges and lespedeza. This soil in its present condition is considered unproductive, but with good drainage it is capable of producing profitable crops of grass, small grain, corn, and coarse forage.

SUMMARY.

Limestone County is in the extreme north-central part of Alabama. It has an area of 584 square miles, or 373,760 acres. With the exception of some rough land in the Elk River basin and small swampy areas in the river and creek bottoms or in upland "sinks," the topography is such that crops can be economically produced in all parts of the county. The county is well drained. The general drainage is south into the Tennessee River.

The climate is temperate. The rainfall is abundant and well distributed throughout the year. There is a normal growing season

of 193 days, which is sufficient for the growth and maturity of a wide range of crops.

The population of the county is rapidly increasing. It is reported by the census of 1910 as 26,880. The population of Athens, the county seat, is 1,715.

Limestone County is predominantly agricultural and is included in the "cereal belt" of Alabama. The crops grown are cotton and corn, supplemented by grains cut green for hay, oats, tame and wild grasses, wheat, miscellaneous vegetables, sorghum, sugar cane, cowpeas, Irish and sweet potatoes, peanuts, rye, and strawberries, apples, peaches, plums, and nuts, named in order of their importance.

Corn and cotton occupy more than two-thirds of the improved farm land, but there is a distinct tendency toward the production of a greater diversity of crops with the development of dairying and stock raising.

Sixteen soil types are mapped in Limestone County, representing 10 series. The soils fall naturally into two groups, the upland residual soils and the alluvial bottom-land types.

The Clarksville silt loam is the most extensive soil. It is locally known as "the barrens," and occupies flat to gently undulating country. It is a very productive soil when properly managed. Drainage in places is inadequate, while the organic content is generally low. This land ranges in value from $20 to $70 per acre.

The Decatur clay loam ranks next in importance. It is locally known as the "red lands," and occupies gently rolling to rolling areas. It has good drainage, but in places is subject to erosion. The soil is generally in need of lime and organic matter. With proper management this soil is well suited to general farming. It is valued at $30 to $100 per acre.

The Decatur silt loam is much less extensive than the clay loam. It has a gently rolling or billowy topography. The type produces more uniform yields than the Decatur silty clay loam or clay loam, but like the clay loam it is deficient in lime and organic matter. It has a value of $20 to $70 per acre.

The Decatur silty clay loam is limited to a few small level or depressed areas within the Decatur clay loam and associated types. With artificial drainage it is a good soil for the production of corn, small grains, grass, and leguminous forage crops. It is valued at $40 to $100 an acre.

The Hagerstown silt loam is an important type, although inextensive. It occurs in flat and level or depressed areas in the uplands and the lower valleys of the Elk River drainage system. This is a good soil for the production of general farm crops. It is valued at $20 to $60 an acre.

The Hagerstown gravelly loam is generally restricted to the lower slopes along the Elk River and tributary streams. It is considered a

good soil for grass, grain, and forage. The steep phase of this type can not be handled as economically as more nearly level types, as modern farm machinery can not be used so generally. This land is valued at $30 to $50 an acre.

The Clarksville gravelly loam has a much more limited distribution than the Hagerstown gravelly loam, and is considered less productive. It is not used for cultivated crops and seems best suited to fruit, pasturage, and forestry.

The Guthrie silt loam is inextensive. It occupies the flat bottoms of saucerlike depressions within areas of the Clarksville soils and associated types. It is generally poorly drained and is not cultivated.

The Colbert silt loam is restricted to small areas, flat to nearly level, the drainage of which is usually poor. With the establishment of good drainage this is a good soil for corn, cotton, grass, and small grains.

The Elk silt loam is one of the most important bottom types of the county. It occupies second terraces of the larger streams, and is rarely inundated. The soil is easily and economically cultivated, as improved farm machinery can be utilized. It can be developed to a high state of productiveness. This type is valued at $30 to $70 an acre.

The Cumberland silt loam is restricted to a few small areas. It occupies a position similar to that of the Elk silt loam, and in agricultural value is comparable with the Hagerstown silt loam.

The Abernathy silty clay loam has only a small total area. It is confined to the first bottoms of streams or upland "sinks." The stream-bottom areas are subject to frequent overflow. The type is rarely used for crops other than corn, which produces good yields.

The Huntington clay is restricted to the first bottoms. It has no agricultural value, on account of poor drainage.

The Huntington silt loam is the most extensive bottom soil in the county. It occupies low river and stream terraces and is subject to frequent overflow. Where cultivated it is devoted mainly to corn, which gives good yields without the use of fertilizers. This land is valued at $40 to $100 an acre.

The Huntington silty clay loam occupies the first or overflow bottoms of the Tennessee River. This soil is intermediate between the silt loam and clay of this series. Drainage is not well established, and but little of the type is under cultivation.

The Holly silt loam has a very limited distribution in this county, and occurs in the first bottoms of the upland streams and on the lower river terraces. The surface is usually flat, and drainage is not well established. This type has little or no agricultural value.

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