

Issued October 21, 1909.

U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE STATE OF ALABAMA—B. B. COMER, GOVERNOR;
J. A. WILKINSON, COMMISSIONER OF AGRICULTURE AND INDUSTRIES.

SOIL SURVEY OF COLBERT COUNTY,
ALABAMA,

BY

WILLIAM G. SMITH, OF THE U. S. DEPARTMENT OF AGRICULTURE,
AND C. S. WALDROP, OF THE ALABAMA DEPARTMENT OF AGRICULTURE
AND INDUSTRIES, ASSISTED BY J. C. BRITTON
AND C. R. ZAPPONE, JR.

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



WASHINGTON:
GOVERNMENT PRINTING OFFICE.

1909.

[PUBLIC RESOLUTION--No. 9.]

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

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

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

Approved March 14, 1904.

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

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LETTER OF TRANSMITTAL.

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

Washington, D. C., June 5, 1909.

SIR: One of the projects completed during the field season of 1908 was the survey of Colbert County, Ala. This work was done under the cooperative arrangement with the State of Alabama, and its selection bore the indorsement of the State authorities as well as of Hon. William Richardson, Representative in Congress for the district within which the county lies.

I recommend the publication of this report and map as advance sheets of the Field Operations of the Bureau of Soils for 1908, as authorized by law.

Very respectfully,

MILTON WHITNEY,
Chief of Bureau.

HON. JAMES WILSON,
Secretary of Agriculture.

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MAP.

Soil map, Colbert County sheet, Alabama.

SOIL SURVEY OF COLBERT COUNTY, ALABAMA.

By WILLIAM G. SMITH, of the U. S. Department of Agriculture, and C. S. WALDROP, of the Alabama Department of Agriculture and Industries, assisted by J. C. BRITTON and C. R. ZAPPONE, Jr.

DESCRIPTION OF THE AREA.

Colbert County, Ala., lies in the northwestern corner of the State. The Alabama-Mississippi State line forms the western boundary, while Lauderdale, Lawrence, and Franklin counties bound it on the north, east, and south sides, respectively. In an east-and-west direction the county is 40 miles long, while in the widest portion north and south the distance is about 23 miles. Town Creek forms the eastern border and the Tennessee River the northern border, and the meandering of these streams gives the county an irregular outline. Within these boundaries there is comprised an area of about 384,000 acres, or 600 square miles.

A part of the northern portion of Colbert County lies in the Tennessee River valley region; the remainder of the county is in the mountain section. The valley section embraces level to gently rolling upland, with an elevation of 50 to

100 feet or more above the general level of the Tennessee River, while the mountain section includes lands 50 to 300 feet higher and characterized by rather broken topography made up for the most part of narrow ridges with steep slopes and narrow, deeply eroded stream valleys, with only occasional plateau-like areas. Practically

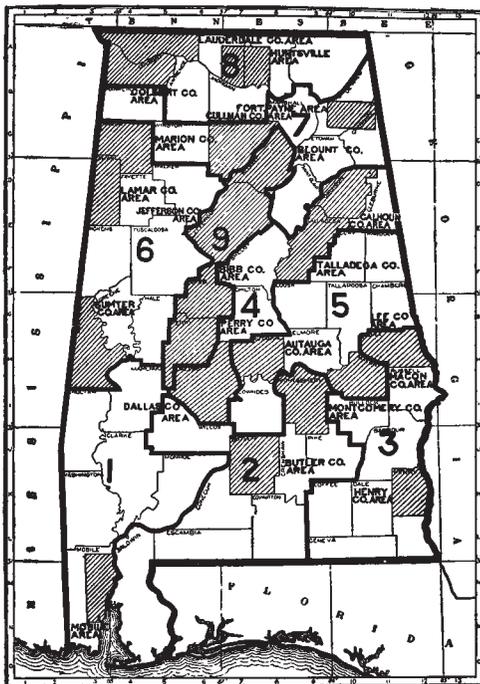


Fig. 1.—Sketch map showing location of the Colbert County area, Alabama.

all the drainage of the county is northward into the Tennessee River, which flows in a westerly direction along the north border of the county, and thence into the Ohio near its junction with the Mississippi River. Among the more important streams of the county are Big Bear River near the western boundary, Buzzard Roost Creek, Bear Creek, and Spring Creek in the central part, and Town Creek in the eastern part. Occasional points on these streams afford some water power and there is a possibility of developing a large amount of power in the vicinity of Muscle Shoals. None of the smaller streams, with the possible exception of Big Bear River and Town Creek, are navigable.

Colbert County was organized in 1867, having been cut off from Franklin County. The portion of the county comprised by range 9 was added, however, by act of legislature in 1895. According to the Twelfth Census the population of the county in 1900 was 22,341, of which 9,546 was colored.

The land included within Colbert County was sectionized about 1836, or shortly following the removal of the Cherokee Indians westward into Mississippi. Quite a number of white people had settled within this section a decade or more preceding the removal of the Indians, but after their removal settlers came in more rapidly from the older States. Many of the white inhabitants of the county are descendants of these early settlers.

The first land used for agriculture lay mostly in the valley section, practically all of which is now cleared and under cultivation. Over 60 per cent of this part of the county is owned in plantations containing from 400 to 2,000 acres. It is parceled out into 20 to 100 acre tracts to tenants, of which about an equal number are cash and share tenants. The proportion of the farms operated by white and colored farmers are about two of white to one colored. The white landowners of the valley section live mostly in and about the towns and villages, where many are engaged in business.

Only a small percentage of the mountain section has ever been cleared for farming, and most of it is still covered with the native forest of shortleaf pine, oak, and hickory. What few farms there are in this section are practically all operated by the owners, and the average size of the farms is about 160 acres. The greater proportion of the wild land is held by a few men in large tracts, reaching in one or two instances an acreage represented by five figures. The forested areas still contain considerable merchantable timber, though the sawmills and forest fires are rapidly depleting the supply.

The chief towns of the county are Tuscumbia, the county seat, with a population of about 5,000; Sheffield, the site of iron furnaces and railway shops, with a population of about 6,000; Leighton with

about 800, Cherokee with about 500, and Riverton with about 200 inhabitants. Much of the country trading is done at these points, though no small amount is also done at stores located in the villages and at crossroads settlements.

The county is traversed near the central part, east and west, by the Southern Railway and north and south by the North Alabama Railway. Along these roads are many shipping points. A few of the wagon roads are macadamized. The majority of the roads, however, are dirt roads, those of the valley section being muddy in wet weather, while those of the mountain section are usually steep, stony, and badly eroded much of the time.

Farm products, mostly cotton and corn, are hauled to the different towns on the railways for shipment to large markets, such as Memphis, Chattanooga, Nashville, and Birmingham. There is a local demand at Tuscumbia and Sheffield for vegetables, poultry, and dairy products.

Water for domestic use is plentiful and of good quality. Many large springs occur in both the valley and the mountain sections. Some of these are highly mineralized, chiefly with sulphur and iron.

CLIMATE.

Colbert County lies within the limits of the warm temperate zone and is characterized by rather long, hot summers and alternating cold and warm spells during winter.

The average annual temperature is 61.2° F. The coldest months are December, January, and February, averaging about 42.5° F. Freezes, light snows, and cold rains of moderate duration occur during these months. July and August mark the hottest period of summer, averaging 78.5° F.

The average annual rainfall is 49.70 inches, the greater part of which falls during the winter and spring months.

The average date of last killing frost in spring is April 2 and of first killing frost in fall October 26, making a period of two hundred and seven days, or about seven months, during which tender vegetation may safely be grown. The winters, however, are open enough to allow growing such vegetables as turnips, cabbages, and onions, while the winter grains and certain grasses make some growth throughout the winter and give grazing practically all the year round.

Much farm work may be done during the winter time in the way of clearing land, plowing, constructing fences and buildings, and otherwise preparing for the more active period of the summer's work.

The tables following give the normal monthly and annual temperature and precipitation and dates of last and first killing frosts reported by the Weather Bureau station at Tuscumbia.

Normal monthly and annual temperature and precipitation.

| Month. | Tuscumbia. | | Month. | Tuscumbia. | |
|---------------|--------------|----------------|----------------|--------------|----------------|
| | Temperature. | Precipitation. | | Temperature. | Precipitation. |
| | °F. | Inches. | | °F. | Inches. |
| January..... | 40.2 | 4.92 | August..... | 78.2 | 3.50 |
| February..... | 43.5 | 4.78 | September..... | 70.0 | 2.97 |
| March..... | 52.7 | 6.80 | October..... | 62.0 | 2.10 |
| April..... | 62.0 | 5.18 | November..... | 52.9 | 3.34 |
| May..... | 71.0 | 3.00 | December..... | 43.8 | 4.38 |
| June..... | 79.6 | 4.30 | Year..... | 61.2 | 49.70 |
| July..... | 78.7 | 4.43 | | | |

Dates of first and last killing frosts at Tuscumbia

| Year. | Last in spring. | First in fall. |
|------------|-----------------|----------------|
| 1902..... | Mar. 19 | Nov. 27 |
| 1904..... | Apr. 4 | Oct. 27 |
| 1905..... | Apr. 17 | Oct. 22 |
| 1906..... | Mar. 21 | Oct. 11 |
| 1907..... | Apr. 14 | Oct. 14 |
| Average... | Apr. 2 | Oct. 26 |

AGRICULTURE.

The year 1836 marked the beginning of farming in this section. The valley lands were among the first opened up and the original forest growth of oak, hickory, and walnut was so rapidly removed that by 1860 most of these lands were cleared and in cultivation, and there were many large, prosperous plantations scattered throughout the valley section. The mountain section still retains much of the native forest growth, consisting of shortleaf pine, oak, and hickory. According to the Twelfth Census 46.1 per cent of the farm land in Colbert County is improved. The valley section makes up nearly all of this.

During the period preceding the civil war the Tennessee River afforded one of the means of travel and transportation, the cotton being hauled to the various landings for shipment. The completion of the railroad, now the Southern Railway, about 1850 greatly improved transportation. The conditions were made still better in 1883, when the North Alabama Railway was extended across the county from north to south.

During the last few years considerable attention has been given to the study of better and more intensive methods of farming. Cotton and corn still continue to be the principal crops produced, with cotton in the lead. Rotation of crops is not commonly practiced, however, with the exception of occasionally alternating corn with cotton. When land begins to fall off in productiveness, it is allowed to lie idle a few years and to grow up in native grasses, after which it is again brought under cultivation for a time. If it so happens that Japan clover (*lespedeza*) forms a large part of the growth during this resting period, the soil is very much improved by reason of the addition of nitrogen and the accumulation of organic matter.

Commercial fertilizers are used to some extent on the uplands with greater or less degrees of profit, the bottom lands as a rule not seeming to need fertilizing, except in some cases where applications of kainit or mixed fertilizers high in potash have proved beneficial.

Two general methods of plowing and preparing the land for cotton and corn are followed, both of which have advantages under certain conditions. On the gently rolling areas the land is usually plowed during the winter or in the spring and subsequently harrowed and then bedded up in ridges 3 or 4 feet apart by throwing four furrows together with a turn plow, or by using a 4-disk cultivator. A large double-moldboard plow is also sometimes used for this purpose. The cotton seed is planted along the top of the ridges, usually by means of a 1-horse implement, which drops the seed and distributes the fertilizer in one operation. Some farmers consider it a little better to apply the fertilizer two or three weeks before planting the cotton, distributing it along the top of the rows and mixing it well with the soil. In this way the fertilizer becomes thoroughly incorporated with the soil before the young cotton plants have started. The use of the cotton planter, however, saves considerable labor and is popular for this reason. In the well-drained, level upland areas as well as in the rolling areas the method of handling the soil just described is highly recommended by many well-informed farmers. Some good farmers, however, favor the practice of level cultivation for such lands.

On the other hand, upon the low-lying areas and upon the steeper hillsides the farmers find it very desirable to ridge row the land without previously plowing the fields. In the former case the ridges are run so as to divert the drainage waters into some near-by channel; in the latter they follow the contours of the hill with a view to preventing erosion. The old practice of shallow plowing, turning up the soil to a depth of 3 or 4 inches only, still prevails, though the

increased yields and better tilth resulting from deeper plowing have been realized by some.

Three to five cultivations are given cotton and corn during the first half of the growing period of the crops. For this purpose the small "Dixie" plow is much used, one man and one mule or horse being required to run it. A number of improved 2-horse cultivators are being used, and these have the advantage of cultivating a row at a time, thus very materially increasing the area covered in a day, besides leaving the soil in a much better condition. The 1-horse sweep, however, is often very effectively used. Shallow cultivation, frequent enough to keep down weeds and maintain a loose dirt mulch, is beginning to find many adherents, as opposed to the old practice of cultivation or plowing so deep as to injure the feeding roots of the growing crop.

The old practice of stripping the corn leaves (pulling fodder) before the ear corn is mature is very slowly giving way to the practice of cutting the whole corn plant about the stage when the ear corn is almost mature, but the leaves and stalks still quite green; then gathering this into small shocks.

The old practice of burning the corn and cotton stalks and other trash is being displaced to some extent. The better way is to turn all such organic matter under. An implement, the rolling-knife stalk-cutter, which breaks down the stalks and cuts them into small sections, makes it practicable to turn the stalks under with the plow. This practice tends to keep up the organic content of the soil and the resulting humus, a constituent which many of the cotton soils lack.

Cotton is the principal crop of the area and is grown in many cases almost to the exclusion of other crops, though this one-crop practice is gradually giving way to a more diversified farming, such as the growing of corn, small grain, forage crops, and vegetables. More attention is being given to raising hogs and other live stock for home consumption and marketing. It is well recognized that there are considerable areas of soil in the county upon which it is possible to carry on this diversified system of farming with profit.

Systematic crop rotation is not as yet much practiced in the county. The following three-year rotation, however, is used by some of the more progressive farmers and is strongly recommended as being well suited to the soils and climatic conditions of the area: First year cotton, second year corn, third year oats or other small grain. For this rotation it would be desirable for the three fields to be of nearly the same size, though of course this is not imperative. This rotation should be further amplified as follows: First year, cotton, followed by a seeding of a catch-crop mixture of vetch and rye just before the last cultivation of the cotton. This will not only furnish considerable pasturage during the winter months, but will also protect the field

from leaching and washing; and besides, when the ground is plowed in the spring for the corn crop, considerable amounts of organic matter and nitrogen will be added to the soil. Second year, corn, followed by cowpeas sown at the last cultivation of the corn. This will likewise add to the organic and nitrogen supply of the soil. After the corn and cowpeas have been removed the field should be thoroughly prepared for the fall seeding of oats or wheat that follows next in the rotation. After the harvesting of the oats or wheat in the third year the ground should be immediately disked or plowed to a depth of 2 or 3 inches and sown to cowpeas. During the following winter the growth of grass and weeds is usually sufficient to furnish good pasturage. However, if better pasturage is desired the ground should be disked lightly in the fall and a catch crop of rye and vetch should be sown. Instead of sowing cowpeas after the wheat or oats some advocate the sowing of Japan clover in the young oats in the latter part of February. On removal of the oats, the young clover plants quickly thicken up in the oat stubble and by fall afford one or two cuttings of hay. If the second crop matures too late to be cut for hay, good winter grazing is afforded without any further effort on the part of the farmer. In the spring the land should be plowed and prepared for cotton if the above rotation is strictly observed.

By adopting this rotation the following advantages are secured, namely, the constant utilization of the land the year round for profit, the continuous addition of nitrogen as well as organic matter to the soil by growing catch crops largely of a leguminous nature, the destruction of many weeds and insect pests, and the retarding of erosion by winter cover crops. With its use the soil becomes more productive the longer it is cultivated instead of declining in yields, as is too often the case under the old methods of cultivation.

It has been found that commercial fertilizers are much more effective when used on soils already well supplied with organic matter; hence the above rotation plan is desirable even where fertilizers are to be used. An acre mixture for cotton on rather thin land which yields one-third to one-half bale per acre may be as follows: Two hundred pounds of high-grade acid phosphate, 200 pounds of cotton-seed meal, and 10 or 20 pounds of muriate of potash. A smaller quantity of this mixture may of course be used on an acre, but the 400-pound application is highly recommended by those who have tested the matter. After the land becomes more productive, giving three-fourths to 1 bale of cotton or more per acre, the following formula might be used: Three hundred pounds acid phosphate, 100 pounds cotton-seed meal, and the usual 10 or 20 pounds of muriate of potash. The nitrogen carrier is much reduced in this formula, this being admissible because the soil has become more highly charged with decaying organic matter. Various intermediate

mixtures between these two formulas may of course be made up according to one's judgment of what the soil requires. For corn the formula varies some in the direction of larger proportion of cotton-seed meal. For the thin soil conditions noted above the acre mixture may be proportioned as follows: One hundred and fifty pounds acid phosphate, 250 pounds cotton-seed meal, and 6 to 10 pounds of muriate of potash. As the organic matter in the soil increases the formula may be changed, as follows: Two hundred and seventy-five pounds of acid phosphate, 125 pounds of cotton-seed meal, and the usual 6 to 10 pounds of muriate of potash.

For oats under similar soil conditions, a mixture of 125 pounds acid phosphate, 225 pounds cotton-seed meal, and 50 pounds muriate of potash is recommended as an acre application, the oats requiring a higher proportion of potash than either of the preceding crops. As the organic matter in the soil increases the cotton-seed meal may be reduced to something about as follows: Two hundred and fifty pounds acid phosphate, 100 pounds cotton-seed meal, and 50 or 60 pounds of muriate of potash. It is usually more practical to apply the fertilizer for oats or any small grain at the time of seeding, the grain drills usually having fertilizer distributor attachments that can be adjusted to let down the number of pounds per acre desired.

Nitrate of soda in some cases may be advantageously used as a top dressing on young cotton, corn, and small grain to the amount of say 30 to 100 pounds per acre, the larger amount where strong stimulation seems necessary. It may be applied in two or more applications, thus enabling the farmer to judge more accurately when enough has been used. An application of 100 pounds of nitrate of soda represents a cost of about \$3.

The acre fertilizer formulas given above for cotton, corn, and oats represent a cost of \$4 to \$6 each, a smaller amount if home mixed. At best fertilizing is expensive, and this further emphasizes the idea that commercial fertilizers should be used conservatively and judiciously; that is to say, the right mixture and amount for each soil and crop should be sought after diligently.^a

Not enough poultry and hogs are produced to supply the local demands. The price paid for these and dairy products suggests that there is room for an extension along these lines, both for local markets and shipping purposes. On the whole, it is believed more extensive live-stock raising would be practicable and profitable. The great native summer pasture grass is Bermuda, but Japan clover and crab grass also make good summer forage, while for winter pasture the

^a For further information on fertilizers see Bull. No. 23, Ala. Dept. of Agr. and Ind.

vetches, bur clover, and Texas bluegrass afford succulent feed through most of the winter. Notwithstanding the fact that local conditions appear so favorable for the production of plenty of good hay in the area itself, a great deal of baled hay is shipped in annually. Probably this will cease with the extension of diversified farming.

Vegetables of various sorts are easily grown almost the year round for home use and for the local markets, though there is some importation of these products, especially Irish potatoes. No doubt market gardeners could develop quite a profitable business supplying the local and outside markets. The growing of celery has been attempted upon the rich bottom lands near Cherokee. Fruit has never been produced except in a small way for local use. The mountain section of the county by reason of its elevation and good air drainage is recognized as being fairly well suited for the production of peaches and apples, and some fair-sized orchards are being set out.

Day labor is scarce, the iron works at Sheffield and the Government works incident to the construction of the 8-mile Colbert Shoals Canal on the northwestern edge of the county being partly responsible for the labor shortage during the last few years.

When labor is hired by the day the average wage is about 75 cents for ten hours' work. Ten to twenty dollars a month is the usual wage, with board in addition, for farm labor during six or seven months of the growing season. During cotton-picking time labor is usually more scarce, and the wage for picking varies from 50 cents to \$1 per 100 pounds of seed cotton. Most of the tenants, however, rely on their families to do the picking.

According to the Twelfth Census about 63.6 per cent of the farms of the county are operated by tenants, cash and share rentals being about equally divided. An agreement in which the tenant must give 100 pounds of lint cotton per acre regardless of the acreage yield is sometimes entered into. Cash rentals vary from \$2 to \$5 an acre. There are two methods of share rentals practiced. One is where the owner, furnishing the land, necessary buildings, tools, work stock, and half the fertilizer, receives half the crop. The other, which seems to be in greater favor, is where the owner furnishes only the land and necessary buildings, while the tenant furnishes all the tools, work stock, labor, and fertilizers. In this case the rent is one-third of the corn and one-fourth of the lint cotton. Most of the tenants are found in the valley section.

The average size of farms in Colbert County, according to the Twelfth Census, is 93.6 acres, which is misleading, as each tenancy is classed as a "farm." The size of the majority of holdings ranges from 20 to 500 acres, while there are a good many tracts containing 1,000 to 5,000 acres, and in one or two cases from 20,000 to 40,000 acres, these latter being in the mountain section.

The value of cleared farm land in the valley section of Colbert County ranges from about \$10 to \$25 an acre. In the mountain section land with the timber removed is valued at from \$1 to \$2 an acre, and with timber on it about \$5 an acre, while improved farm land here may also bring \$5 an acre. The very hilly, stony, and gravelly lands have but little value aside from the timber. The bottom lands, like the valley uplands, usually have a value of from \$15 to \$25 an acre, wherever not too often subject to overflow. In the mountain section a tract containing some bottom and considerable rough, hilly land with timber may have an apparently high value for farming purposes, since the bottom may easily be cultivated, while the hill land affords range for live stock.

SOILS.

The surface features of Colbert County fall naturally into two divisions—the valley section and the mountain section. The valley section is confined to the northern part of the area where it occupies approximately 40 per cent of the county, its southern boundary, which is approximately parallel to the Tennessee River, passing through Lagrange, Springvalley, Pride, and Cherokee. The topography of the valley is as a rule gently rolling, though there are some small areas where it is flat. Where gently rolling it is quite well drained, but the flat areas are usually in need of artificial drainage. The rock underlying the valley is mainly the St. Louis limestone, though in places along the edge of the mountain section the Bangor limestone appears and enters into the formation of the soils. Both of these formations are of Lower Carboniferous age.

With the exception of the bottom lands the valley soils are all residual, and consist mainly of clay loams and silt loams. They are the Decatur silt loam, the Abernathy silt loam, Clarksville loam, Colbert fine sandy loam, Clarksville stony loam, Leighton loam, Guthrie silt loam, Colbert silt loam, King clay loam, and King clay. The last three soils are derived from the Bangor formation; the rest from the St. Louis formation.

The topography of the mountain section varies from rolling to hilly, rough, and broken. The valleys are narrow and steep sided as a rule, while the divides are often much dissected and eroded. There are, however, occasional broad, plateaulike areas on some of the divides. The drainage is excellent, the area being crossed by many streams flowing northward into the Tennessee River. Many of the smaller streams and branches are swift running and have little or no bottom land along their courses. The rocks underlying the mountain section belong to the Coal Measures and are Carboniferous in age. They consist principally of alternating layers of sandstone and sandy shales. The aggregate thickness of these is hundreds of feet.

The soils of the mountain section are of two classes, namely, those which are purely residual, being derived directly from the weathering of the underlying sandstones and shales; and those which are sedimentary, derived from the weathering of the unconsolidated material known as the Tuscaloosa formation, which during the Cretaceous period was deposited as a mantle over the sandstones and shales. The residual soils are the Dekalb silt loam and the Dekalb stony loam. The distinction between these two soil types is mainly one of topographic position, the former being found in limited patches upon plateaulike areas on the tops of divides, while the latter occurs in large areas upon the steep valley sides below or in any location where erosion has been specially active. To the sedimentary soils belong the Glenn loam and the Glenn gravelly loam. As in the case of the Dekalb types, the difference between the Glenn soils is due primarily to erosion, the loam areas being found on the plateaulike tops of ridges where erosion has been least, and the gravelly areas on the steep slopes where it has been especially active.

Throughout both the valley and mountain sections are found many areas of bottom land. The largest development occurs along Town Creek in the eastern part of the county and along Big Bear River in the western part. Besides these more important areas, many smaller bodies occur as strips of varying width along the minor streams. There are few farms that do not contain some bottom land, though in many cases owing to the narrowness of the strips it was not practicable to show them in the map accompanying this report.

The surface features of the bottoms vary from flat to slightly rolling. Most of them are subject to annual overflow. Along some of the larger streams there is an occasional high-lying area known as second bottom, which is somewhat more rolling than the rest of the bottom land and is not subject to overflow except during very high water in the streams. These bottom lands are alluvial in origin and each successive overflow brings fresh material from the uplands and deposits it upon the surface. The character of these deposits is often quite variable in short distances, but it is not possible to show these variations upon a map of the scale used in the survey. All of the bottom land in the county was mapped as one soil type, Huntington loam.

The following table gives the names and areas of the several different types of soil mapped in Colbert County:

Areas of different soils.

| Soil. | Acres. | Percent. | Soil. | Acres. | Percent. |
|-----------------------------|--------|----------|------------------------------|---------|----------|
| Dekalb stony loam..... | 81,856 | 21.3 | Leighton loam..... | 5,440 | 1.4 |
| Glenn gravelly loam..... | 69,312 | 18.0 | Guthrie silt loam..... | 5,312 | 1.4 |
| Decatur silt loam..... | 55,872 | 14.5 | King clay loam..... | 3,136 | .8 |
| Huntington loam..... | 37,440 | 9.8 | King clay..... | 1,408 | .4 |
| Clarksville loam..... | 36,160 | 9.4 | Colbert fine sandy loam..... | 960 | .3 |
| Colbert silt loam..... | 33,088 | 8.6 | Abernathy silt loam..... | 832 | .2 |
| Dekalb silt loam..... | 26,368 | 6.9 | Total..... | 384,000 | ..... |
| Clarksville stony loam..... | 19,712 | 5.1 | | | |
| Glenn loam..... | 7,104 | 1.9 | | | |

DECATUR SILT LOAM.

The Decatur silt loam, locally known as "red land," consists of a reddish to brownish silt loam with a depth varying from 6 to 10 inches, underlain to a depth of 3 feet or more by a reddish colored clay or silty clay. In spots the soil is inclined to contain considerable fine sand and in other places the sand is replaced by clay. The type is, however, easily cultivated and may usually be handled under a rather wide range of moisture conditions. Sometimes when the soil has been cropped so close as to reduce its organic content there is a tendency for it to run together and bake if handled when too wet.

The Decatur silt loam is confined to the valley section of the county, forming the greater part of the area east of Tusculumbia. The surface varies from level to gently rolling, the latter topography predominating. As a rule, the surface drainage is good and this, together with the mellow texture of the soil, makes the type an excellent one for general farming.

Residual in origin, the Decatur silt loam owes its formation to the weathering of the St. Louis limestone. It is possible that the material may have been modified to a slight extent by alluvial action during some remote geologic time.

The native forest consisted of oak, hickory, and walnut, which has been almost entirely removed. Under cultivation the soil is well adapted to all of the general farm crops of the region, including cotton, corn, and oats, besides such forage crops as Bermuda grass, Japan clover, and alfalfa.

Under the prevailing tenant system the average yield per acre of cotton is from one-half to three-fourths bale; corn, 20 to 40 bushels, and oats, 20 to 40 bushels. It is believed that double these yields could often be secured by better methods of cultivation. The fertilizer applications per acre recommended for the above crops upon this

soil type are as follows: For cotton, a mixture of about 200 pounds of acid phosphate, the same quantity of cotton-seed meal, and from 10 to 20 pounds of muriate of potash; for corn about 250 pounds of acid phosphate, 150 pounds of cotton-seed meal, and 6 to 10 pounds of muriate of potash; for oats, 125 pounds of acid phosphate, 225 pounds of cotton-seed meal, and 50 pounds of muriate of potash. These applications, and especially the cotton-seed meal portion of the mixtures, may be greatly reduced as the soil is brought to a higher state of productiveness.

Fall plowing may be practiced if desired on the Decatur silt loam and the surface is level enough so that the fields may be allowed to stand throughout the winter without a cover crop and yet not suffer from erosion. The best practice, however, is to sow some such crop as hairy vetch, rye, or oats, which make good winter forage and enable the farmer to carry more live stock.

Besides the staple crops, there are a number of special crops that may be grown to advantage. Cowpeas produce very well on this soil, and if fertilized at all require only about 300 pounds of acid phosphate and 20 or 25 pounds of muriate of potash to the acre. The cowpea is distinctly a hot-weather plant, matures in sixty or seventy days from time of planting, and serves very well as a catch crop in corn or for sowing on oat stubble. The Decatur silt loam is also suited to alfalfa, red clover, Japan clover, and the other clovers. Sweet potatoes, Irish potatoes, and other truck crops produce well, and small fruit, such as strawberries, can be grown to perfection.

The land of this type is as high priced as any in the area, ranging in value from \$15 to \$30 an acre.

The following table shows the results of mechanical analyses of typical samples of the Decatur silt loam.

Mechanical analyses of Decatur silt loam.

| No. | 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. | <i>Per cent.</i> |
| 19893 | Soil | 0 0 | 0.5 | 3.8 | 3.7 | 8.1 | 63.6 | 20.3 |
| 19894 | Subsoil | .3 | .7 | .9 | 4.5 | 4.4 | 48.6 | 45.6 |

ABERNATHY SILT LOAM.

The soil of the Abernathy silt loam, which has a depth of 5 to 8 inches, consists of a reddish silt loam. Beneath this and extending to a depth of 36 inches or more occurs a subsoil of reddish heavy silt loam which in the lower depths changes from a solid to a mottled color.

This type of soil occurs in a few small areas in the northeastern part of the county and is closely associated with the Decatur silt loam. It occupies depressions in the upland and is usually poorly drained. It owes its origin to surface wash from the surrounding higher lands. It contains a high percentage of organic matter, and where well drained produces excellent yields of corn and forage crops, as well as fairly good cotton. Most of the type is in cultivation. A top dressing of lime would doubtless make this type still more productive. Commercial fertilizer if used at all should have a rather lower cotton-seed meal content than indicated for use on the Decatur silt loam.

Of the forage crops Bermuda grass, Japan clover, Texas bluegrass, and sorghum produce well on this type.

The following table shows the texture of the soil and subsoil of the Abernathy silt loam:

Mechanical analyses of Abernathy silt loam.

| No. | 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. | <i>Per cent.</i> |
| 19891 | Soil | 0.2 | 0.6 | 0.8 | 5.5 | 5.2 | 70.2 | 17.2 |
| 19892 | Subsoil | .4 | 1.6 | 1.8 | 10.4 | 10.9 | 55.0 | 20.0 |

CLARKSVILLE LOAM.

The Clarksville loam, locally known as "gray land," consists of a mellow gray loam with a depth of 6 or 8 inches, underlain to 36 inches or more by a subsoil of brown clay to silty clay which changes with depth to red. The texture and structure as well as the topographic features of this type are practically the same as those of the Decatur silt loam, the gray surface soil of the Clarksville loam being the feature distinguishing the two types. Within the areas of Clarksville loam there are often spots of red land which closely resemble the Decatur silt loam, but these are usually too small to be shown upon the map. The type is mellow and is easy to plow and cultivate.

Soil of this character is confined to the valleys of the Tennessee and Big Bear rivers and is best developed in the northeastern and northwestern corners of the county. The surface is level to gently rolling in character and the natural drainage is good. The soil owes its origin to the weathering of the St. Louis limestone. It is, as a rule, rather deficient in organic matter.

Originally this soil supported a forest growth of oak, hickory, and walnut, but this has been largely removed and most of the area is in cultivation. Cotton, corn, small grain, forage crops, and truck crops

do well, though it is not considered quite as productive as the Decatur silt loam. The yield of cotton ranges from one-third to one-half bale per acre, corn 15 to 30 bushels, and oats 20 to 40 bushels per acre. Deeper plowing, rotation, and fertilization recommended for the Decatur silt loam applies equally well to this type.

Farms composed of this soil bring from \$10 to \$25 an acre, and are considered among the most desirable in the valley uplands. Better farm practices would soon put the soil in a much more productive state.

The following table gives the results of mechanical analyses of typical samples of soil and subsoil of the Clarksville loam:

Mechanical analyses of Clarksville loam.

| No. | 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. | <i>Per cent.</i> |
| 19877 | Soil..... | 0.0 | 0.7 | 2.9 | 24.0 | 14.3 | 44.7 | 13.5 |
| 19878 | Subsoil | .3 | 1.4 | 1.4 | 13.5 | 11.0 | 43.8 | 28.5 |

COLBERT FINE SANDY LOAM.

The Colbert fine sandy loam consists of a gray, sometimes brownish, fine sandy loam 6 or 8 inches in depth, underlain to a depth of 36 inches by a red silty to fine sandy clay. In proximity to the Decatur silt loam the soil is inclined to be somewhat silty in texture and a little browner in color than in typical areas.

Only a very limited area of this soil occurs. One area containing about 1 square mile lies east of Springvalley and two other much smaller areas north of Mahama. The surface is level to gently rolling and the drainage is good. It is a residual type, probably derived from some fine-grained sandstone associated with the St. Louis or Bangor limestone formation.

The soil of this type makes very desirable farm land, being mellow and easy to cultivate and well adapted to growing the staple crops of the region. It is deficient in organic matter and the crop yields would be greatly increased by rotation of crops including some legume. Under the present system of farming the yield of cotton is about one-fourth to one-half bale per acre and of other crops in like proportion. Owing to its light texture, the soil is well adapted to the growing of truck crops.

The rotation and fertilizers suggested for the Decatur silt loam would be valuable in case of the Colbert fine sandy loam. Indeed, the necessity for adding organic matter to the Colbert fine sandy loam is, if anything, of greater importance. The keeping of more live stock, conserving the manure and applying it to the fields, preferably

before the sowing of the winter forage or pasture crops, would also have a marked effect in increasing the yields of cotton and corn, besides giving much heavier yields of hay and better pasturage.

Land of this type of soil, like that of the other better valley lands, ranges in value from \$15 to \$25 an acre.

The following table gives the results of mechanical analyses of typical samples of the Colbert fine sandy loam:

Mechanical analyses of Colbert fine sandy loam.

| No. | 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. | <i>Per cent.</i> |
| 19875 | Soil..... | 0.1 | 4.4 | 17.1 | 40.7 | 3.5 | 14.8 | 18.7 |
| 19876 | Subsoil..... | .0 | .5 | 1.6 | 11.2 | 7.0 | 82.2 | 48.2 |

CLARKSVILLE STONY LOAM.

The Clarksville stony loam consists of 6 or 8 inches of a gray silt loam, underlain to a depth of 3 feet or more by a yellowish or reddish-brown silty clay. Disseminated through both soil and subsoil are found from 30 to 60 per cent of rounded gravel and angular quartz and cherty limestone fragments varying from one-half inch to 6 inches in diameter. The angular rock fragments are often so numerous as to interfere seriously with cultivation. In places, however, where these fragments are not too numerous the type is an easy one to plow and cultivate.

There is a considerable area of the Clarksville stony loam in Colbert County. It occurs in an almost unbroken strip in the northern part of the county, where it forms the bluffs and hollows along the Tennessee River. It is also found in a few small isolated ridges and knobs back in the valley. The natural drainage of the type is good.

The Clarksville stony loam is a residual type derived through weathering from the St. Louis limestone. Its stony character is due to an accumulation of the resistant quartz and cherty rock which were bedded in the massive limestone. Erosion has removed much of the other finer material and left these fragments strewn upon the surface and in the soil and subsoil. Along the Tennessee River the underlying massive limestone outcrops as bluffs from 20 to 100 feet high.

Originally the type was forested with oak, hickory, walnut, and some chestnut. The more stony and hilly areas are still forested, while the less stony and gently rolling areas are cleared and used for farming. Bermuda and Japan clover grow well. Cotton also produces well, averaging about one-half bale per acre. The yields of

corn vary from 15 to 30 bushels per acre. The farmers believe that the stony nature of this soil makes it more retentive of moisture and better able to resist drought than the other upland soils of the valley. It is believed that deeper plowing, rotation of crops, more rational fertilization, such as suggested for Decatur silt loam, would very materially increase crop yields on this type. The value of this land varies from about \$5 to \$20 an acre.

The following table gives the results of mechanical analyses of fine-earth samples of the soil and subsoil of the Clarksville stony loam:

Mechanical analyses of Clarksville stony loam.

| No. | 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. | <i>Per cent.</i> |
| 19881 | Soil | 0.5 | 1.1 | 3.6 | 19.1 | 8.7 | 53.1 | 13.7 |
| 19882 | Subsoil | .4 | 1.1 | 2.2 | 16.0 | 8.3 | 51.8 | 20.1 |

LEIGHTON LOAM.

The Leighton loam, locally known as "gray land," consists of a mellow, gray silty loam with a depth of 8 to 10 inches, underlain to a depth of 3 feet or more by a brown to yellowish-gray clay or silty clay. In places throughout both soil and subsoil iron concretions occur, and occasionally traces of small quartz gravel are found, though the presence of the latter is not a characteristic feature of the type.

Very limited areas of this soil occur in the valley of the Tennessee. It is best developed in the northeastern corner of the county. Over the greater proportion of the type the underdrainage is deficient, though where the surface features are gently rolling the natural drainage is good. It is a residual soil, derived through weathering from the underlying St. Louis limestone.

Forests of oak, hickory, and walnut, only small areas of which remain, at one time covered the areas of this soil. At present most of the type is cleared and in cultivation. It is an excellent soil for general farming. Cotton, corn, forage, and truck crops are grown. The yield of cotton ranges from about one-fourth to one-half bale per acre. Under a better cropping system, such as suggested for use on the Decatur silt loam, much better yields could be expected. This system would tend to add organic matter to the soil, a substance in which as a rule it is now lacking.

In value this soil compares favorably with other soils of the locality. Farms may be purchased for \$10 to \$25 an acre, depending upon the character of the improvements and the situation with respect to market and shipping points.

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

Mechanical analyses of Leighton loam.

| No. | 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. | <i>Per cent.</i> |
| 19917 | Soil | 0.8 | 2.1 | 1.6 | 10.8 | 14.0 | 51.3 | 19.2 |
| 19918 | Subsoil | .0 | .7 | 1.0 | 7.0 | 10.6 | 47.3 | 33.2 |

GUTHRIE SILT LOAM.

The surface soil of the Guthrie silt loam consists of 6 or 8 inches of gray to dark-gray, usually mottled, compact silty loam. It is underlain to a depth of 3 feet by a compact, rather impervious, grayish or mottled clay or silty clay. Both soil and subsoil contain varying quantities of iron concretions, the result of swampy conditions. It is a difficult type to plow and cultivate.

Areas of this soil are found in the valley section in the northeastern part of the county, where they occur mainly as small basinlike depressions from 5 to 10 feet below the level of the surrounding uplands. The surface is flat and the drainage is very poor. During winter rain water often stands in these depressions for long periods.

Most of the type is covered with oak, sweet gum, and an undergrowth of shrubbery and water grasses. Very little of it is under cultivation. Drainage is necessary before the soil can be used for farming. Under present conditions the areas should be allowed to remain in forests. Native grasses afford some pasturage.

The value of this land probably ranges from \$2 to \$10 an acre, though its mode of occurrence makes it rather difficult to determine its value.

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

Mechanical analyses of Guthrie silt loam.

| No. | 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. | <i>Per cent.</i> |
| 19913 | Soil | 0.2 | 0.9 | 0.4 | 1.4 | 2.1 | 68.3 | 26.0 |
| 19914 | Subsoil | 1.8 | 5.6 | 1.7 | 3.4 | 3.5 | 55.2 | 28.6 |

COLBERT SILT LOAM.

The surface soil of the Colbert silt loam, locally known as "gray land," consists of 6 or 8 inches of gray silty loam. The subsoil to a

depth of 3 feet or more consists of a yellowish or grayish mottled clay or silty clay. The type is usually mellow and easy to cultivate.

Areas of this soil mark the southern boundary of the valley stretching from the eastern limits of the county, with only a few interruptions, to within 6 miles of the western boundary. The areas are from one-fourth to 2 miles wide and mark the dividing line between the valley and the mountain sections. The surface is gently rolling and the natural drainage good.

In origin the Colbert silt loam is residual, being derived principally from weathering of the Hartselle sandstone, influenced to a considerable extent by the decay of the associated Bangor limestone. These formations underlie the type at depths varying from 5 to 20 feet.

Like most of the other valley soils, this type in its virgin state supported a forest growth of oak, hickory, and walnut, and a considerable proportion of the area is still forested. The soil is usually considered rather unproductive, possibly the poorest of the valley soils. The effects of fertilizers are not very lasting, as the soil is inclined to be somewhat leachy. Under the present conditions cotton yields from one-fourth to one-half bale per acre, and other crops are correspondingly low. There is a marked deficiency in the organic content of the soil, and any system of farming that will supply humus will greatly increase the yield. There is no apparent reason why this should not be a fairly good soil for all the general farm crops.

The value of land of this type of soil ranges from \$5 to \$20 an acre, which is somewhat lower than the prices of some of the other gray lands of the valley section.

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

Mechanical analyses of Colbert silt loam.

| No. | 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. | <i>Per cent.</i> |
| 19887 | Soil..... | 0.7 | 2.6 | 1.5 | 9.1 | 19.9 | 54.1 | 11.2 |
| 19888 | Subsoil.... | .2 | .8 | .5 | 3.6 | 9.2 | 49.8 | 35.7 |

KING CLAY LOAM.

The surface soil of the King clay loam consists of a gray clay loam of rather compact structure. The subsoil consists of a mottled gray clay which extends to a depth of 3 feet or more. This type is locally included within the general term "gray land." Owing to its somewhat compact structure it is a rather difficult soil to cultivate.

Small areas of this soil occur 4 miles south of Leighton. There are also two areas shown along the southern boundary of the county

and a smaller area 2 miles south of Barton. The surface varies from flat to undulating. The areas are surrounded by higher lying land, and this topographic position results in poor natural drainage.

The King clay loam owes its origin principally to weathering of limestone, though in places it may have received some wash from the higher lying types surrounding it. The parent limestone is found at depths ranging from 3 to 10 feet below the surface. Like the other valley soils, this type was largely forested with hardwood species, including oak, hickory, and walnut, with some red cedar, a characteristic tree on this type. Much of the type is still in forest or in old fields which support a growth of grasses.

Where well drained the King clay loam is well adapted to cotton, corn, and forage crops. The undrained areas may better be left in forest. The crop practice suggested for the Decatur silt loam could be relied on to improve materially the productiveness of this soil, which is naturally low. The value of this type of soil ranges from \$5 to \$15 an acre.

The following table shows the average results of mechanical analyses of typical samples of the King clay loam:

Mechanical analyses of King clay loam.

| No. | 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. | <i>Per cent.</i> |
| 19921, 19923 | Soil | 0.2 | 1.2 | 1.1 | 9.7 | 14.0 | 46.2 | 27.4 |
| 19922, 19924 | Subsoil | .2 | 1.2 | 1.4 | 6.7 | 10.1 | 37.9 | 43.2 |

KING CLAY.

The King clay consists of a dark-gray to black sticky clay with a depth of 4 to 6 inches, underlain to a depth of 3 feet or more by a very sticky yellow to mottled-gray clay. There are usually present some limestone fragments in the surface soil. It is a rather difficult type to cultivate unless handled when in just the right moisture condition. Little of this soil is found in Colbert County. Small, scattered areas of it occur in the vicinity of Littleville, Pride, and Cherokee. The surface of the type is gently rolling, and the natural drainage is good.

The King clay owes its origin to the solution and decomposition of limestone, which usually is found beneath the soil in an unweathered state at depths of 3 to 10 feet. Red cedar is a characteristic tree on this soil, and the timber is exceedingly valuable at the present time.

Some of the type is cleared and in cultivation. Corn and alfalfa seem well suited to it. It is very retentive of moisture, and where

rightly handled better corn yields are secured than from most of the other upland soils of the area.

Land of this type of soil ranges in value from \$3 to \$15 an acre.

The following table shows the results of mechanical analyses of samples of the soil and subsoil of the King clay:

Mechanical analyses of King clay.

| No. | 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. | <i>Per cent.</i> |
| 19925 | Soil..... | 0.0 | 4.1 | 2.7 | 8.3 | 3.0 | 34.9 | 47.0 |
| 19926 | Subsoil | .4 | 2.4 | 2.4 | 8.2 | 5.1 | 24.1 | 57.1 |

DEKALB SILT LOAM.

The surface soil of the Dekalb silt loam consists of a gray silt loam which in places tends toward a fine sandy loam. The depth of this surface material averages about 6 inches. The subsoil is a yellowish-gray to brownish-red clay or silty clay extending to a depth of 3 feet or more. Like most clay subsoils, it is retentive of moisture, and this characteristic, together with the mellow, easily cultivated soil, places the type among the most desirable of the mountain soils.

This is not the most extensive soil of the mountain section, though it occupies a considerable portion of the southeastern part of the county. It has a surface varying from rolling to hilly. It is found on the plateaulike tops of the ridges and knobs that characterize the mountain topography, and in places it extends down some of the moderately steep slopes. By reason of its topographic position natural drainage is at times excessive, the crops suffering from drought sooner than on lower lying lands.

The Dekalb silt loam is a residual soil, derived from the weathering of a fine-grained gray sandstone of the Coal Measures. Only a small proportion of the type has ever been cleared and farmed, most of it being still forested with the original growth of oak, hickory, and shortleaf pine. The staple crops, cotton, corn, small grain, forage crops, and truck crops are grown, but the yields are usually rather low. Cotton yields from about one-third to one-half bale per acre, and other crops in like proportion. The type is very well adapted to Japan clover. By reason of its elevated position it is believed that there are considerable possibilities for orcharding. The organic content of the soil is naturally low, and the small yields are in part due to this deficiency. By following out the suggestions on crop practice outlined in the chapter on agriculture, it is believed that much higher yields and a higher quality of staple crops could be secured.

Deeper plowing, say to a depth of 6 to 8 inches, is advisable, but it is not safe to practice broadcast plowing or to allow plowed land to lie uncovered during the winter, as may be done in the valley section, because of the tendency of the soil to wash and gully during the winter and spring months. The land should be broken in ridge rows run on contours around the slopes of the hills. In the steeper locations it is advisable to keep the land well terraced. Very steep hillsides, however, might better be left in forests or kept in permanent pasture than cultivated. Whenever the land is plowed in the fall some winter cover crop should be sown so as to minimize erosion.

The rotation which seems best suited to this type is as follows: First year, cotton, followed by a seeding of a mixture of vetch and rye just before the last cultivation of the cotton. This makes a cover crop that prevents washing and gulying during the winter months besides affording winter grazing, and with the cotton stalks furnishes additional organic matter for the soil. Second year, corn, in which cowpeas are sown as a catch crop either before or after the last cultivation of the corn. In the fall of the second year sow oats. These are harvested early in the third year, after which another crop of cowpeas should be sown. Next year return to cotton.

The fertilizer application per acre for cotton that best suits the present soil condition is as follows: 200 pounds of acid phosphate, 200 pounds of cotton-seed meal, and 10 or 20 pounds of muriate of potash. After the organic content increases and the soil becomes more productive the proportion of acid phosphate may be increased 2 or 3 parts to 1 of cotton-seed meal. For corn the acreage application recommended is 150 pounds of acid phosphate, 250 pounds cotton-seed meal, and 6 or 10 pounds of muriate of potash. After the land has been brought to a higher state of productiveness the proportion of acid phosphate can be increased to 2 or 3 parts to 1 of cotton-seed meal. For oats about 400 pounds per acre of a mixture composed of 125 pounds acid phosphate, 225 pounds cotton-seed meal, and 50 pounds of muriate of potash. The proportion of acid phosphate may be increased later, as in case of cotton and corn. Nitrate of soda as a top dressing on the growing crops in amounts of 30 to 100 pounds per acre may sometimes pay where the crop seems in need of quick stimulation.

The farms are small and usually operated by the owners. The value of land of this type ranges from \$3 to \$5 an acre.

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

Mechanical analyses of Dekalb silt loam.

| No. | 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. | <i>Per cent.</i> |
| 19897 | Soil | 0.0 | 1.0 | 4.3 | 16.8 | 5.6 | 60.1 | 12.2 |
| 19898 | Subsoil | .0 | .8 | 2.1 | 11.4 | 4.1 | 49.9 | 31.7 |

DEKALB STONY LOAM.

This type consists of about 6 inches of gray silty or fine sandy loam, which is underlain to 3 feet or more by a yellowish, brownish, or reddish silty loam or heavy fine sandy loam. Sometimes, however, there are small areas which have a lighter textured subsoil. Scattered upon the surface and disseminated through both soil and subsoil are usually found numerous flat sandstone and occasionally some quartz and limestone fragments, varying in size from 1 to 20 inches in diameter. The rock fragments are so numerous as to interfere seriously with cultivation, and only an occasional area is suitable for farming. In places the soil covering has been entirely removed and the underlying rocks outcrop in massive walls along the steeper valleys.

The Dekalb stony loam occupies a large proportion of the mountain section, and is the predominating type in the southwestern part of the county. The surface of the type is rough and broken, being made up mostly of narrow stony ridges and steep valley slopes. The natural drainage is excessive and the soil is inclined to be droughty except where supplied with seepage water near the base of slopes.

Residual in origin, this type of soil has been derived through weathering from a fine-grained sandstone of the Coal Measures. Erosion has entered largely into the formation of the soil, the clay and silt having been washed away, leaving an accumulation of stones upon the surface. Most of the type is in forest, consisting of oak, hickory, and shortleaf pine, and the timber in many instances forms its chief value. The timber, however, is being rapidly removed.

Much of the type at present provides an excellent range for live stock, and there are many locations where the soil and climatic conditions are adapted to orcharding. The value of this land when cleared is about \$1 an acre and when in forest about \$5 an acre.

The following table gives the results of mechanical analyses of fine-earth samples of the soil and subsoil of the Dekalb stony loam.

Mechanical analyses of Dekalb stony loam.

| No. | 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. | <i>Per cent.</i> |
| 19901 | Soil..... | 0.0 | 0.9 | 3.4 | 33.7 | 6.4 | 42.4 | 13.2 |
| 19902 | Subsoil..... | .1 | 1.0 | 3.5 | 32.3 | 7.5 | 22.5 | 32.8 |

GLENN LOAM.

The surface soil of the Glenn loam consists of 6 to 8 inches of gray silty loam containing occasionally some small gravel. The subsoil to a depth of 3 feet or more is a yellowish or brownish silty clay, also containing in places some small gravel. The soil is easy to cultivate.

Areas of this soil occur throughout the gravelly hill section south and west of Cherokee. Three areas lie northwest of this place. The type is developed in the same topographic position as the Dekalb silt loam and bears the same relation to the gravelly member of the series as to the Dekalb stony loam. It is found on the tops of narrow ridges and in broader plateaulike ridges of the gravelly hills. The natural drainage is inclined to be excessive and the soil apt to be droughty.

The Glenn loam is derived from the weathering of the Tuscaloosa formation known in the earlier geological reports as "drift," which was deposited over rocks of the Coal Measures. This drift material represents the northern limit of the sedimentary deposits of the Gulf Coastal Plains.

Only a small portion of the type is under cultivation, the greater part being still in native forest of oak, hickory, and shortleaf pine. The soil is rather deficient in organic matter, a condition which is rather prevalent in the mountain section. When cleared, the usual crops of the region are grown. Cotton yields from one-fourth to one-half bale per acre, and moderate yields of corn are secured. By increasing the organic content of the soil and by adopting approved methods of crop rotation and fertilization it is believed that the type can be made a fairly productive one for the general crops of the region. The suggestions made in connection with Dekalb silt loam would apply to this type also. Besides being naturally adapted to forestry and range purposes, practically all of the type is adapted to orcharding. Land values of this type range from about \$1 to \$5 an acre.

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

Mechanical analyses of Glenn loam.

| No. | 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. | <i>Per cent.</i> |
| 19905, 19907 | Soil..... | 0.3 | 1.3 | 2.1 | 17.3 | 13.6 | 51.5 | 14.0 |
| 19906, 19908 | Subsoil | .1 | .5 | 1.2 | 15.9 | 13.9 | 35.2 | 33.1 |

GLENN GRAVELLY LOAM.

The Glenn gravelly loam consists of 6 to 8 inches of gray silty loam, underlain to a depth of 3 feet or more by a gray to reddish-brown silty clay. Both soil and subsoil contain from 30 to 60 per cent of well-rounded gravel varying from one-fourth inch to 2 inches in diameter. This soil is locally known as gravelly hill land. Where the proportion of gravel is large, the soil is difficult to cultivate.

A large part of the south-central, southwestern, and northwestern parts of the mountain section is made up of this type of soil. The surface is as a rule quite broken and hilly and the natural surface drainage is rather excessive. During a dry season crops are apt to suffer considerably from drought.

The type owes its origin to weathering of the Tuscaloosa formation. The material was a shore deposit at a time when what is now the Gulf of Mexico extended much farther northward.

Most of the type is now in native forest of oak, hickory, and short-leaf pine. The small areas under cultivation give low yields. As a whole it is naturally best adapted to forestry and as range for stock. It is believed that there are many parts well suited to orcharding. Japan clover is well established and furnishes considerable grazing in the areas where the timber has been removed.

If it should ever become necessary to use this type for the staple crops a cropping practice such as pointed out for the Glenn loam and Dekalb silt loam would also be applicable. It is believed, however, that the type should be devoted exclusively to systematic forestry. Land of this type cleared of its timber is valued at about \$1 or less an acre and that in timber at about \$5 an acre.

The following table gives the average results of mechanical analyses of fine-earth samples of the Glenn gravelly loam :

Mechanical analyses of Glenn gravelly loam.

| No. | 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. | <i>Per cent.</i> |
| 19909, 19911 | Soil..... | 2.9 | 4.3 | 3.8 | 18.1 | 10.9 | 46.4 | 13.5 |
| 19910, 19912 | Subsoil | .6 | 1.7 | 2.6 | 13.1 | 9.7 | 44.7 | 27.6 |

HUNTINGTON LOAM.

The surface soil of the Huntington loam consists of 6 to 8 inches of a mellow, brown to dark-brown, silty to fine sandy loam. The subsoil to a depth of 3 feet or more is a brown to gray loam or heavy silty loam. In places the subsoil tends toward the texture of a fine sandy clay. Along many of the smaller streams the soil is underlain at a depth of 4 to 6 feet by a bed of gravel.

Areas of the Huntington loam are distributed throughout the county, both in the valley and mountain sections. It occurs along the smaller streams and rivers and is more largely developed along Town Creek in the eastern part of the county and Big Bear River in the western part. This soil is of alluvial origin, the greater part of it being first bottom land with a level to slightly rolling surface and subject in most cases to annual overflow. Along these bottoms there are areas of low, flat, "crawfishy" land. The texture of the soil in these spots is a little heavier, and often after an overflow water stands upon them for several days. Along the bottoms of the larger streams there are sometimes higher lying terracelike areas, locally known as "second bottom." These are more rolling than the first bottom and usually more sandy in texture, sometimes gravelly, and seldom overflowed. The first terrace areas are being built up by each successive overflow, which brings fresh material from the uplands. Much of this is in the form of organic matter. The native vegetation consists of oak, sweet gum, poplar, alder, briars, some pine, with coarse swamp grasses and other water-loving plants. The lower bottoms are still largely in forest, but the more elevated, better drained areas are nearly all cleared and in cultivation.

The Huntington loam is an excellent soil for corn and forage crops, yielding from 20 to 40 bushels of corn with ordinary treatment, while under better cropping systems much larger yields are secured. Cotton produces quite well also, yielding one-half to three-fourths bale per acre with prevailing cultural methods, though much larger yields are possible.

On the higher lying portion of the type, comparatively free from overflow, oats produce well. As a rule a much larger proportion of the type is available for growing cotton, corn, and summer truck crops than is safe for winter crops, owing to danger from winter and early spring overflows. Bottoms rather subject to overflow, besides being useful for forest purposes, can be seeded to grass so as to afford excellent hay and pasture. Bermuda grass grows well, as do other native grasses. Texas bluegrass thrives on the higher bottoms. Japan clover seems to grow under quite a wide range of bottom land conditions, and, together with Bermuda grass, insures a cutting of hay or grazing throughout the summer.

In cultivating cotton and corn upon this soil, neither crop should be grown continuously, but at least they should be alternated. The method of preparing the land recommended for the Decatur silt loam would be satisfactory for this type. Where the land is subject to frequent overflows, no winter cover crops should be sown.

Although the type is naturally fairly productive, crops seem to be benefited by applications of fertilizers. The following acreage application seems to approximate the average bottom land requirements: 200 pounds acid phosphate, 100 pounds kainit, and 100 pounds of cotton-seed meal. The same formula for corn might be used, but the following, with a higher proportion of cotton-seed meal, might be rather better to begin with: 150 pounds of acid phosphate, 150 pounds of cotton-seed meal, and 100 pounds of kainit. After the land becomes in good tilth and reasonably productive, a 300 or 400 pound per acre application of 10-4 goods might be used. If the land is sour, a top dressing of lime, say 1 to 1½ tons per acre, should be applied either before breaking or on the plowed ground before harrowing. If either cotton or corn look as if growth were being retarded, a top dressing of nitrate of soda in June or July, in one or two applications of not over 30 to 50 pounds per acre in each application, may be used to advantage.

The bottom lands are upon the whole among the most productive in the county, and are held in high esteem by the farmers. The value ranges from \$15 to \$25 or more an acre.

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

Mechanical analyses of Huntington loam.

| No. | 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. | <i>Per cent.</i> |
| 19871, 19873..... | Soil..... | 0.0 | 0.3 | 1.3 | 23.8 | 14.9 | 40.8 | 13.8 |
| 19872, 19874..... | Subsoil..... | .0 | .1 | .9 | 17.7 | 14.5 | 45.9 | 21.0 |

SUMMARY.

Colbert County, Ala., lies in the northwestern part of the State and comprises an area of about 384,000 acres, or 600 square miles. The surface features vary from level to gently rolling in the valley section to rough and hilly in the mountain section. The county was organized in 1867. Tuscumbia, the county seat, and Sheffield are the two important towns of the area. These towns are provided with good railway facilities.

The county is favored with a long growing season and short, mild winters, and an abundance of rain, fairly well distributed throughout the year.

Cotton and corn are the chief crops. Oats are sown for pasture or for hay, but are seldom thrashed.

Bermuda grass and Japan clover constitute the principal hay and pasture grasses. These are supplemented by cowpeas and sorghum. Alfalfa, burr clover, and Texas bluegrass are also used for hay and pasturage. A few peaches and apples are grown, and truck farming is engaged in to some extent to supply the local demands. It is believed that there are considerable opportunities for developing both the fruit and the trucking industries. As a rule no definite crop rotation is followed.

Usually the live stock is of rather inferior grade, but recently there has been considerable improvement along these lines.

The "Dixie" plow is still largely used, though larger turn plows, 2-horse cultivators, and other improved machinery are coming into use. Terracing, contour ditching, and level ridge rows for hilly lands are common practices.

The valley farms are largely operated by tenants, while the mountain farms are more often operated by the owners.

Farm land has increased in value considerably during the last decade. The valley lands now range from \$10 to \$25 an acre, the mountain lands from \$1 to \$5 or more, according to stand of timber, and the bottom lands from \$15 to \$25 an acre.

Fifteen soil types occur in the county. Nine of these are limestone soils and one of mixed origin in the valley section. Four soils occur in the mountain section, two derived from sandstone and two from unconsolidated deposits. One soil occupies the river and stream bottoms in both sections of the valley.

The Decatur silt loam is the most extensive soil of the valley section. It is held in large tracts, but most of it is farmed, being leased to tenants in 20 to 100 acre plots. It is naturally a strong soil. Cotton and corn are the chief crops, though it is also adapted to small grain, cowpeas, clover, Bermuda grass, and alfalfa.

The Abernathy silt loam, limited in extent, occupies basinlike and elongated depressions. The surface is flat and poorly drained. When drained, it is an excellent soil for corn and forage crops. The type is naturally a strong soil and much of it is in cultivation.

The Clarksville loam is an important valley soil. Most of it is in cultivation. Cotton and corn are the crops usually grown. It is also well adapted to small grain and to grasses and other forage crops.

The Colbert fine sandy loam is limited in extent, but is an important valley type. It has a gently rolling surface, is easily cultivated, and is adapted to a wide range of crops.

The Clarksville stony loam occurs along the bluffs of the Tennessee River, and its surface varies from gently rolling to very hilly. The

more level and less stony portions of the type produce good yields of cotton, corn, grain, grass, and forage crops. The stonier areas are forested and afford some pasturage.

The Leighton loam is a type of limited extent. Its surface features vary from level or depressed to gently rolling. It is practically all cleared and in cultivation to cotton, corn, small grain, grass, and forage crops. It is also used to some extent for trucking.

The Guthrie silt loam occurs in small areas in the northeastern part of the valley section. It is poorly drained, and the water often stands upon the surface during a wet season. Drainage is necessary before the soil can be cultivated.

The Colbert silt loam, quite an extensive type, occurs along the southern limit of the valley section. Its surface is gently rolling. About half of the type is in cultivation, the remainder being still in native forest. The staple crops, including truck crops, are grown, but as a rule low yields are secured.

The King clay loam is of limited extent. It occurs as small areas somewhat depressed and lower than the surrounding types. Its surface is flat or very slightly rolling and the drainage is very poor. In its present condition it is not well suited to farming. It should be kept in forest and used as a range for live stock.

The King clay is also of limited extent, occurring in small areas near the base of the foothills of the mountain section. It is locally known as black clay or black lime land. Its surface varies from level to rolling. Only a small part of the type is in cultivation. It is an excellent soil for corn and alfalfa, and grasses and other forage crops produce well.

The Dekalb silt loam occupies the tops of ridges, small plateaulike areas, and some of the slopes in the mountain section. It is of sandstone origin and not naturally productive. Only a small percentage is in cultivation. It is mostly in forest. Cotton and corn are grown with only moderate success. Small grain, truck, grass, and other forage crops may also be grown. From its location the type should be fairly well adapted to peaches and apples.

The Dekalb stony loam is an extensive type in the mountain section. Practically none of it is under cultivation. It is best adapted to forestry, live-stock range, and in places to orcharding.

The Glenn loam occurs in small areas in the mountain section. Its surface varies from level to quite rolling. It is derived from the Tuscaloosa formation and is not naturally productive. Only a small percentage of it is in cultivation, mainly to cotton and corn. It is probably a fair type for tree fruits.

The Glenn gravelly loam is an extensive type in the mountain section. Its surface is very rough and broken, consisting of narrow

ridges, knobs, and steep slopes. The type is derived from the Tuscaloosa formation. Only small areas are in cultivation. It is best suited to forestry and as range for live stock. The better areas could be used for fruit.

The Huntington loam is the bottom-land type in all parts of the county. Much of it is subject to overflow. It is a very productive soil and is practically all in cultivation. It is especially well adapted to corn, though cotton, oats, and forage crops do well.

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