Soil Survey

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Colbert County Alabama

By
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and
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SOIL SURVEY OF COLBERT COUNTY, ALABAMA

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COUNTY SURVEYED

Colbert County lies in the northwestern part of Alabama, in the Muscle Shoals district, about 95 miles northwest of Birmingham (fig. 1). It lies south of Wilson Lake and Tennessee River, and the Mississippi-Alabama State line forms the western boundary. The county is irregular in shape, being narrow in the middle and wide at each end, extending in an east-west direction about 40 miles, and being 10 miles wide in the middle and approximately 20 miles wide at each end. It has a total area of 606 square miles, or 387,840 acres.

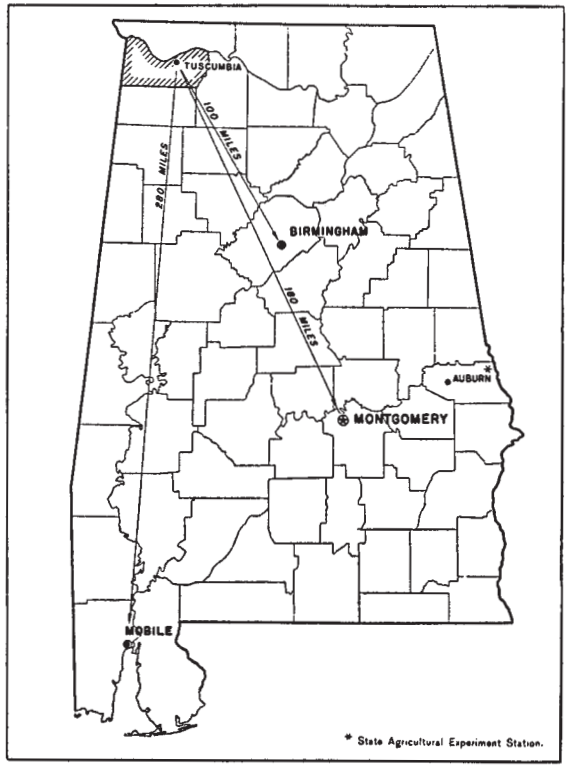

FIGURE 1.—Sketch map showing location of Colbert County, Ala.

Physiographically Colbert County comprises two well-defined divisions, the limestone valley and the mountains. The limestone valley comprises about 42 percent of the county and lies adjacent to Tennessee River and its tributaries. This valley is a lowland belt, rather than a river valley, and owes its existence to a series of limestone beds which constitute one of the series of rocks underlying the Appalachian Mountain system. The line separating the valley from the mountains begins in the southeastern corner of the county near Old Bethel Community and extends northward around the base of LaGrange Mountain, thence westward by Spring Valley to a point 2 miles south of Tuscumbia, Barton, and Cherokee, and then northward by way of Lane Springs to Tennessee River.

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The relief of the limestone valley division is undulating to rolling and ranges in elevation from 400 feet at the river's edge to 550 feet above sea level on some of the higher elevations. The average elevation is approximately 500 feet. In places lateral streams from the adjacent mountains dissect this valley, and natural drainage is good, except in sinks, swales, and ponds, but most of these have been artificially drained. Some of the rain water finds its way into subterranean channels.

The mountain division lies south of the limestone valley and occupies a much higher position, ranging in elevation from 550 feet at the limestone foothills to 920 feet on some of the highest parts. The average elevation is approximately 750 feet. This division extends in an east-west direction with lateral ridges extending north and south. Many of these ridges are narrow and rounded, being greatly dissected by coves and by deep V-shaped stream valleys of the dendritic drainage system. The majority of the streams flow northward into Tennessee River. The escarpment is rather sharp to almost perpendicular in places above an elevation of 650 feet, as the result of a stratum of less erosive limestone and the capping of sandstone. LaGrange Mountain and Sutton Hill are each a part of this division.

The limestone valley was originally covered with a thick growth of oaks, principally post, blackjack, white, red, and Spanish, together with hickory, walnut, poplar, chestnut, and cedar.

The large size of the hickory, walnut, and chestnut trees, the broad areas having favorable relief, and the navigable streams, all of which offered high agricultural possibilities, caused the red limestone soils to be first settled. In the mountainous area the hardwood growth was originally much the same as in the valley, but post, blackjack, and chestnut oaks were dominant. In addition, rosemary, old-field, and Virginia pines constituted a large part of the tree growth of the hills.

Indians had settled around the springs and streams of the limestone valley before the advent of the white man and had built several villages and towns along the water routes, one of the largest being at the mouth of Town Creek. The Chickasaw Indians owned the western part of the territory to Cane (Caney) Creek, and the Cherokee Indians, with Doublehead as chief, held the part east from this creek. The county takes its name from George Colbert, Chief of the Chickasaws, whose home was at Georgetown Landing, 6 miles north of Cherokee. The chimney is still standing in perfect condition, although the two-story home burned a few years ago.

A few white settlers came into the territory and began clearing and farming the red lands of the limestone valley about 1817, but growth was slow until the Indians were forced farther west about 1836. Large plantations of the red lands were acquired at low cost about this period by immigrants from Virginia and the Carolinas, and a large number of these plantations are still held as units by descendants of the original families. A number of the villages in the county were named in honor of the first settlers. Developments were much slower in the mountains, and small tracts of land were acquired, which characterize present-day conditions.

Colbert County was organized in 1867, having previously been part of Franklin County. Part of Colbert County was annexed

to Franklin County between 1890 and 1900, and that part of Lawrence County between Town Creek and the range line passing through Leighton was annexed to Colbert County by an act of the legislature in 1895.

According to the 1930 census, the total population of Colbert County was 29,860, of which 19,106 were classed as rural and 10,754 as urban. Approximately one-fourth of the farm population is Negro, according to the 1935 census. The principal towns are Tuscumbia, the county seat, with a population in 1930 of 4,533; Sheffield, the site of iron furnaces and railroad shops, with a population of 6,221; and Cherokee and Leighton, with populations of 659 and 670, respectively. Riverton and Barton are villages in agricultural centers. The advent of the automobile and good roads has shifted a large proportion of the mercantile trade from the smaller to the larger towns, and many cross-roads general merchandise stores have been replaced by gasoline stations and small stores carrying a few groceries and a few farm tools.

Railroad transportation facilities are good. The Washington & Memphis branch of the Southern Railway traverses the county from east to west, passing through Leighton, Tuscumbia, Sheffield, Barton, and Cherokee; and the Northern Alabama Railway (Southern Railway system) traverses the county from south to north, passing through Littleville, Spring Valley, Tuscumbia, and Sheffield. Nitrate Plant No. 2 is also accessible by railroad, and all the larger trading points have railroad facilities.

Colbert County is well supplied with good roads. Asphalt-surfaced United States Highway No. 72 passes from east to west through Leighton, Tuscumbia, Barton, and Cherokee. Jackson Highway (United States Highway No. 43), which is partly asphalted traverses the county from south to north, passing through Littleville, Tuscumbia, and Sheffield. Muscle Shoals is accessible by a paved highway, and all cross-roads communities and country stores are accommodated by graded and graveled county roads, part of the limestone valley being served by graded section-line roads at 2-mile intervals. The mountainous area contains good road-building material and has a good road system. Several graded and graveled roads traverse the mountains from north to south, most of which are connected by graveled lateral roads. Rural mail routes reach all localities. Cotton gins are conveniently located for practically all farmers.

Revenue is derived from several sources, but the larger part of the income is derived from the farming industry, which is confined to the limestone valley and plateaulike areas on the mountains. Cotton is the principal cash crop and is marketed through local buyers at Cherokee, Tuscumbia, Sheffield, and Leighton.

The lumber industry is second in importance. Practically all the mountainous area, except the narrow ridge tops, is forested with second-growth shortleaf pine and hardwoods, which are regularly marketed in the form of finished lumber, framing materials, pulpwood, poles, staves, and cross ties. A large planing mill is located at Chisca which handles a large part of the lumber going out of the county and gives employment to a number of local people throughout the year.

Asphalt mines are located in the southwestern and west-central parts of the county and afford part-time employment to a large number of workers. Most of the asphalt is marketed in Tennessee, but part of it is marketed locally.

When the Tennessee River is completely harnessed, hydroelectric power in the vicinity of Colbert County will be abundant. Wilson Dam has a possible 630,000-horsepower development, and when Wheeler and Norris Dams are completed, Wheeler Dam will have a possible 280,000-horsepower development. Wilson Dam connects Colbert and Lauderdale Counties, and Wheeler Dam is only a short distance away. Part of the electric power is used for the production of fertilizers at Nitrate Plant No. 2, which is located in Colbert County, but the greater part is transmitted to many nearby and distant municipalities. Electricity is supplied locally to Sheffield, Tuscumbia, Leighton, Cherokee, and to the asphalt mines.

Colbert County has good educational and social facilities. Four high schools, a number of consolidated junior high schools, and several one-, two-, and three-room grade schools are in the county. The number of colored schools is almost equal to those for the whites, but most of them are one-room schools. Most of the school buildings are in a good state of repair. Churches are conveniently located.

The water supply ranges from fair to excellent, depending on the locality. In the mountains an ample supply of good lime-free water is available throughout the year from wells ranging from 25 to 60 feet deep, and from springs along the mountain slopes. A few farmers who have built their homes along the coves near the stream bottoms, pipe water from springs into them from the adjacent hills, and a few others, who have built on the mountains, use hydraulic rams to force the water into their homes. Water is rather difficult to obtain in the limestone valley, except near the base of the mountains. The wells range from 60 to 120 feet deep, water being found beneath a stratum of blue limestone which is difficult to penetrate. A large proportion of the farmers in the valley use cisterns or carry water from a central plantation well or spring. A few large springs exist in the valley, the most famous one being at Tuscumbia, but the water in most of these is of questionable purity, as it comes from subterranean streams having surface inlets. The water in a large number of the wells in the limestone valley near the mountains is hard and contains an excess of minerals, chiefly sulphur, iron, and some magnesia. Magnesia water of high analysis comes from a well at Cherokee.

CLIMATE

The climate is temperate, having an average range of only 35° F. between the summer and winter temperatures. During the winter, temperatures occasionally approach 0°, but they seldom continue longer than 3 days at one time. These cold periods are very detrimental to poorly housed livestock, winter cover crops, and winter vegetables, but they are beneficial in insect control, especially of the boll weevil. Mild, comfortable weather may be expected any time during the winter and may continue through several consecutive days.

Killing frosts may occur any time between November 3 and March 26, the average dates of the earliest and latest killing frosts, but frosts have been recorded as early as October 7 and as late as

April 17. The average length of the frost-free season is 223 days, which is sufficient for the maturity of most crops. Hardy vegetables, such as cabbage, collards, turnips, beets, onions, and radishes, may be grown during a large part of the winter and in the early spring. Winter legumes, oats, wheat, and rye, if well rooted, are seldom completely destroyed by cold weather. Farm work may be carried on throughout most of the winter.

In summer, the days are generally hot, but the nights are generally pleasant, especially on higher areas, as a result of a prevailing northwest breeze.

The average annual precipitation of 49.41 inches is distributed fairly uniformly throughout the year—the greater amount falling during the winter and spring and the least during the late summer and early fall—and is favorable for maturing and harvesting crops. In summer, the precipitation, part of which comes in the form of torrential or heavy rainfalls, is generally sufficient to supply ample moisture for growing crops, although considerable damage to corn and hay may result from an insufficient supply. Cotton frequently suffers as a result of excessive rainfall. These torrential rainfalls may occur over long enough periods to overflow the bottom lands, causing a heavy loss of crops. Part of the bottom land along Bear Creek is subject to such damage.

Table 1 gives the normal monthly, seasonal, and annual temperature and precipitation as shown by the records of the United States Weather Bureau station at Tuscumbia. These data are considered representative for Colbert County.

TABLE 1.—*Normal monthly, seasonal, and annual temperature and precipitation at Tuscumbia, Colbert County, Ala.*

[Elevation, 488 feet]

Month	Temperature			Precipitation			
	Mean	Absolute maximum	Absolute minimum	Mean	Total amount for the driest year (1925)	Total amount for the wettest year (1932)	Snow, average depth
	° *F.*	° *F.*	° *F.*	*Inches*	*Inches*	*Inches*	*Inches*
December	43.5	74	7	4.82	2.66	9.20	0.7
January	41.8	76	−6	4.66	5.18	7.37	1.2
February	44.3	80	−8	4.79	2.57	7.00	.9
Winter	43.2	80	−8	14.27	10.41	23.57	2.8
March	51.5	87	17	5.76	2.51	3.85	(1)
April	61.1	90	26	4.57	2.96	9.26	(1)
May	69.2	100	36	3.94	2.13	.48	0
Spring	60.6	100	17	14.27	7.60	13.59	0
June	77.2	107	48	4.04	1.07	4.38	0
July	80.2	104	57	4.10	3.41	4.44	0
August	78.7	102	53	3.72	1.15	3.64	0
Summer	78.7	107	48	11.86	5.63	12.46	0
September	72.0	99	39	2.83	2.42	5.80	0
October	61.3	92	27	2.80	6.66	11.00	(1)
November	50.3	81	12	3.38	5.56	2.77	.1
Fall	61.2	99	12	9.01	14.64	19.57	.1
Year	60.9	107	−8	49.41	38.28	69.19	2.9

[1] Trace.

AGRICULTURAL HISTORY AND STATISTICS

The agriculture of Colbert County dates back to the crude methods of the Indians in the latter part of the eighteenth and the early part of the nineteenth centuries. About 1816 a few white settlers from the Carolinas, Virginia, Tennessee, and Pennsylvania moved into the limestone valley and settled along Tennessee River and its larger tributaries, which, at that time, afforded the only means of transportation. The settlers began clearing the land, which was covered principally with post, red, Spanish, and white oaks, hickory, walnut, and cedar, and began growing crops such as corn, hay, oats, wheat, fruit, and some cotton. By 1830, colonies were located throughout the valley, growth was rapid, except during the Civil War period, and large plantations were soon acquired.

As the population increased and the necessity for more land became apparent, the hilly and mountainous section was settled, small areas of land were cleared, and the forest-covered ridge tops were converted into farms. A large part of this section is still forested, the land being too broken for agricultural purposes. The forest cover consisted of pine and a mixture of hardwoods. A large part of this section is still held in small farms, although some lumber companies own large tracts of land.

According to the Federal census reports, the number of farms increased from 1,821 in 1880 to 2,726 in 1935. During this period the average size of the farms decreased from 130 acres in 1880 to 80.6 acres in 1935. The increase in number of farms and the corresponding decrease in size of farms probably is the result of sale of some farm land in the mountainous section and the division of some of the larger plantations in the limestone valley.

The percentage of farms operated by owners decreased during the period 1880–1935 and the percentage of tenancy increased. According to the 1935 Federal census, 925 farms were operated by owners and part owners, of which 734 were whites and 191 Negroes; 1,798 by tenants, of which 1,233 were whites and 565 were Negroes; and 3 by managers. Practically all the Negroes live in the limestone valley, and most of them are tenants.

The 1935 Federal farm census reports that of the 219,825 acres in farms, 121,578 acres were classed as improved land, which includes cropland and plowable pasture; 19,927 acres as woodland pasture; 14,283 acres as other pasture; 48,112 acres as woodland not pastured; and 15,925 acres as all other land in farms.

Table 2 gives the acreage of the principal crops as reported by the Federal census for the years 1879 to 1934, inclusive. The data in this table indicate that the agriculture is built around the production of the subsistence crops—corn, hay, and potatoes—and one cash crop—cotton.

TABLE 2.—*Acreage of the principal crops in Colbert County, Ala., in stated years*

Crop	1879	1889	1899	1909	1919	1929	1934
	Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
Cotton	25,411	23,059	31,678	37,642	40,929	54,960	31,898
Corn	31,575	27,125	38,035	39,519	43,659	32,052	38,478
Oats	3,846	1,997	630	1,950	206	830	528
Wheat	1,704	72	701	73	61	----------	15
Hay and forage	426	644	2,046	3,702	10,669	6,767	13,115
Potatoes	----------	109	33	131	214	266	342
Sweetpotatoes	286	208	73	310	472	236	423
	Trees	*Trees*	*Trees*	*Trees*	*Trees*	*Trees*	*Trees*
Apples	----------	10,401	16,021	10,669	8,470	5,542	7,367
Peaches	----------	14,718	24,090	28,288	14,282	11,224	18,689

Owing to the adaptability of the soils and climate, cotton production has steadily increased, and in 1929 this crop was grown on 54,960 acres. This gain was made in spite of boll weevil conditions during the last 15 or 20 years. The introduction of earlier maturing varieties and the use of heavier fertilizer applications have made it possible for farmers to grow cotton more economically than any other cash crop.

The acreage of corn has changed very little during the period 1880–1935. The acre production increased from 12.6 bushels in 1879 to 15.5 bushels in 1934, with the major increase being within the last 10 years. The use of improved varieties, improved machinery, and better farming methods is the reason for the increase in production.

Oats, which held second place in importance among the cereals, have been rapidly decreasing in acreage in recent years. The peak of labor on the farms growing cotton comes in the spring at oat-cutting time, consequently oat production decreased in order that more time might be devoted to cotton. The same is true of wheat.

Sorgo production amounted to 13,315 gallons of sirup in 1929, most of which was used at home or sold locally. In addition to that used for the production of sirup, a considerable acreage is cut for hay.

The acreage of hay and forage crops increased from 1879 to 1934. Although leguminous hay crops increased in popularity, in 1934 the grass hays constituted about two-thirds of the hay crops.

Potatoes and sweetpotatoes have been grown as subsistence crops throughout the history of the county. These crops gradually increased until 1934 when a total of 21,026 bushels of potatoes and 36,907 bushels of sweetpotatoes were produced.

Orchard fruits, apples, peaches, pears, plums, and cherries are grown to some extent for home use and local sale. The decline in fruit production during the last 20 years can probably be attributed to the migration of a large number of the farm owners from the country to the towns, allowing the trees to be neglected. Very few tenants have orchards. Grapes and berries have followed closely the trend of the orchard fruits.

The use of commercial fertilizers has been constantly changing depending on commodity prices. According to census data, $126,960 was spent for fertilizers on 1,938 farms in 1919 and $276,690 on 2,603 farms in 1929.

Domestic animals decreased during the 10-year period 1920–30, according to the Federal census. Work animals, consisting largely of mules, decreased from 7,161 in 1920 to 5,828 in 1930 and to 5,139 in 1935. Cattle suffered an even greater set-back, dropping from 14,150 in 1920 to 6,776 in 1930, but increased to 12,406 in 1935. Not enough butter and milk are produced to supply local needs. Sheep and goats decreased in number until only a few small flocks remain. The census reports 9,885 hogs in the county in 1935. A few chickens are raised by most farmers to provide poultry products for home use and the local markets. The surplus chickens and eggs are generally traded for sugar, coffee, tobacco, flour, and other commodities. The total value of all domestic animals was $927,522 in 1930, which was a decrease of 39.3 percent from 1920.

The farming practices are modern and up-to-date. Tractors are used by a few farmers. About 90 percent of the farmers use two-horse cultivators and planters. Several use two-row cultivators. Most of the one-horse plows are used in the southern and southwestern parts.

Farmhouses and outbuildings are fair. A large proportion of the farm homes owned by the occupants are painted, and the barns are generally well constructed and spacious. The living conditions on tenant farms are not good. Many of the houses are unpainted two-room structures, and the barns are small, many being nothing more than cribs, shelters, and pens.

Labor is plentiful. Day wages range from 50 cents to $1, depending on the season and the demand for labor. In summer during the peak labor periods, labor is scarce and wages are higher. The average wages are approximately $20 a month, including board and laundry. In the valley, the larger part of the labor is colored, but in the mountains, practically all the laborers are white.

SOIL-SURVEY METHODS AND DEFINITIONS

Soil surveying consists of the examination, classification, and mapping of soils in the field.

The soils are examined systematically in many locations. Test pits are dug, borings are made, and exposures, such as those in road or railroad cuts, cellars, and wells, are studied. Each excavation exposes a series of distinct soil layers, or horizons, called, collectively, the soil profile. Each horizon, as well as the parent material, is studied in detail; and the color, structure, porosity, consistence, texture, and content of organic matter, roots, gravel, and stone are noted. The reaction of the soil [1] and its content of lime and salts are determined by simple tests in the field. The drainage, both internal and external, and other external features, such as the relief or lay of the land, are taken into consideration, and the interrelation of soils and vegetation is studied.

The soils are classified according to their characteristics, both internal and external, special emphasis being given to those features influencing the adaptation of the land for the growing of crop plants, grasses, and trees. On the basis of these characteristics, the

[1] The reaction of the soil is its degree of acidity or alkalinity expressed mathematically as the pH value. A pH value of 7 indicates precise neutrality, higher values alkalinity, and lower values acidity.

soils are grouped into classification units. The three principal ones are (1) series, (2) type, and (3) phase. Areas of land, such as coastal beach or bare rocky mountain sides, that have no true soil development are called (4) miscellaneous land types.

The most important of these groups is the series, which includes soils having the same genetic horizons similar in their important characteristics and arrangement in the soil profile, and developed from a particular type of parent material. Thus the series includes soils having essentially the same color, structure, and other important internal characteristics, and the same natural drainage conditions and range in relief. The texture of the upper part of the soil, including that commonly plowed, may vary within a series. The soil series are given names of places or geographic features near which they were first found. Thus Decatur, Colbert, and Dewey are names of important soils series in Colbert County.

Within a soil series are one or more soil types, defined according to the texture of the upper part of the soil. Thus the class name of the soil texture, such as sand, loamy sand, sandy loam, silt loam, clay loam, silty clay loam, and clay, is added to the series name to give the complete name of the soil type. For example, Dewey silt loam and Dewey loam are soil types within the Dewey series. Except for the texture of the surface soil, these soil types have approximately the same internal and external characteristics. The soil type is the principal unit of mapping and because of its specific character is usually the soil unit to which agronomic data are definitely related.

A phase of a soil type is recognized for the separation of soils within the type which differ from the type in some minor soil characteristic that may, nevertheless, have an important practical significance. Differences in relief, stoniness, and the degree of accelerated erosion are frequently shown as phases. For example, within the normal range of relief for a soil type, there may be parts which are adapted to the use of machinery and the growth of cultivated crops and other parts which are not. Even though there may be no important differences in the soil itself or in its capability for the growth of native vegetation throughout the range in relief, there may be important differences in respect to the growth of cultivated crops. In such an instance the more sloping areas of a soil type may be segregated on the map as a sloping or hilly phase. Similarly, soils having differences in stoniness may be mapped as phases even though these differences are not reflected in the character of the soil or in the growth of native plants.

The soil surveyor makes a map of the county or area, showing the location of each of the soil types, phases, and miscellaneous land types, in relation to roads, houses, streams, lakes, section and township lines, and other local cultural and natural features of the landscape.

151492—39——2

SOILS AND CROPS[2]

Colbert County lies in the Muscle Shoals district of the Tennessee Valley on the south side of Tennessee River. The county is naturally divided into two soil divisions. The limestone valley division, the greater part of which is tillable land, comprises about 42 percent of the county, and the mountain division, with its low proportion of tillable land, comprises the rest.

The soils in the valley have for the most part been derived through soil-forming processes from the weathered or broken-down limestone which underlies them. The limestone rocks are softer than the sandstone formations which underlie the mountains. The valley part has worn down to an area of fairly smooth relief, but the underlying limestones differ considerably in character from place to place and produce soils widely different in color, texture, and structure. The brown friable soils derived from limestone, which are members of the Dewey and Decatur series, are inherently fertile, and they dominate the agriculture of the county and influence, to a large extent, the location of the farms. Some areas of Colbert soils near the base of the mountains are comparatively poor, owing to the shaly nature of the limestone from which they are derived.

The more resistant or hard rocks in the valley are responsible for the existence of the knolls and ridges, and the soils on these knolls and ridges are thin and generally stony or gravelly. In many places ledges of limestone outcrop, or a large quantity of hard angular chert is on the surface and mixed with the surface soil and subsoil.

Large areas of brown or yellow soils are developed on the second bottoms, or terraces, lying principally near Bear, Spring, and Town Creeks. Like the best soils derived from limestone, these soils are inherently fertile and respond to fertilizer treatment and crop production. They are derived from old stream-deposited material, part of which is almost entirely of limestone origin, whereas other soils are derived from coastal-plain material.

Along most of the streams are narrow strips of alluvial or overflow soils. These recent alluvial deposits are composed of the finer materials washed from the limestone sections and from the mountains and deposited by the streams at times of overflow. These materials give rise to some of the most productive soils in the county.

In the mountain section, the underlying rock formation is sandstone, with some limestone. This is covered, to various depths, with a blanket of coastal plain material, except where it has been removed by erosion. The sandstone is more resistant to weathering than the limestone of the valley, and this condition has resulted in a large area of steep and broken country. High rock ledges and solid rock outcrops are numerous over a large part of this area, particularly near the stream channels and on the upper escarpments. Throughout this

[2] On the soil map of Colbert County, it will be noticed that the soils do not everywhere join along the county lines with those shown on the soil map of Franklin County (1927). These discrepancies are owing to a better understanding of the soils, more detailed mapping, and a more logical classification since the soils of Franklin County were mapped. In some places in Colbert County, Colbert silt loam, flat phase, is mapped against Colbert silt loam in Franklin County; Colbert silt loam in Colbert County is mapped against Hartsells very fine sandy loam in Franklin County; Guin soils, undifferentiated, in Colbert County, are mapped against Dewey gravelly fine sandy loam, rough stony land, and Atwood gravelly loam in Franklin County; Colbert clay in Colbert County is mapped against rough stony land in Franklin County; and Savannah loam in Colbert County is mapped against Atwood gravelly loam and Guin soils, undifferentiated, in Franklin County.

section, however, are spots of inherently productive soil which have excellent physical characteristics but are barred from use for agriculture because of their unfavorable relief, and are used principally for forestry. This section also includes some plateaulike areas, narrow ridge tops, and rolling upper slopes which are used rather extensively as farm land, but owing to the rolling to sloping relief, considerable care is required in handling this land to prevent gullying which renders it unsuitable for farming. A large acreage of this steep land has reverted to pasture and forest as the result of severe erosion. The areas best suited to farming support a well-diversified system of crop production.

The characteristics of the soils, in conjunction with the relief, influence the agriculture. Cotton, corn, hay, and truck crops are grown to a greater or less extent in all parts of the county where the relief, drainage, and soil conditions are favorable, and they constitute the bulk of the farm products.

Cotton leads all other crops in acreage, as the mild and favorable climate, soil adaptation, plentiful farm labor, ease of marketing, and the fact that expensive farm machinery is not essential have favored the production of this crop to the exclusion of practically all other cash crops. This is particularly true of the upland soils in the limestone valley, where the land is held in tracts ranging from 80 to 4,000 acres, the greater part of which is farmed by tenants, as cotton growing lends itself well to the tenant-farming system. Cotton is also grown in the mountainous section on a small scale as a cash crop to supplement the subsistence crops. Farms in this section are small, and most of them are operated by the owners.

The cotton boll weevil is a serious pest but is not nearly so destructive as in the central and southern parts of the State. In the mountainous part of the county, where hibernating places are plentiful, the damage is rather high, especially in years of excessive rainfall during the cotton-fruiting season. Boll weevil damage is not so great in the valley as in the hilly and forested parts of the county, owing to the clean cultural practices of the farmers, a small number of hibernating places, and soils that warm early in the spring.

Corn and hay are the principal subsistence crops produced, most of which are grown for home use. In the valley section these crops are grown chiefly on the bottom lands and swales, the soils of the uplands being used primarily for the production of cotton, although small areas of the upland soils in the valley are used for these crops. The surplus, if any, is marketed locally to farmers who produce cotton to the exclusion of the subsistence crops. In the mountainous section where all the soils are sandy, a system of rotation, consisting of corn, cotton, and hay, is practiced by many farmers, although a few farmers clear small areas each year and use the fresh land for the production of corn and the old fields for the production of cotton and hay.

The soils and climate are favorable for the production of fruits and vegetables. A few small orchards and many gardens are scattered over the county, that supply enough produce for home needs and some for local markets. Fruits, such as apples, pears, cherries, quinces, apricots, and plums, as well as grapes, dewberries, strawberries, and blackberries, can be successfully grown. Fine-quality

peaches are grown in the vicinity of Leighton. Truck and garden crops, consisting of potatoes, sweetpotatoes, beans, peas, cabbage, collards, turnips, radishes, watermelons, cantaloups, squashes, cucumbers, onions, and others, are grown on a small scale, especially in the mountainous section. Complete information on fruit and vegetable growing may be obtained from the State Extension Service, Auburn, Ala., or from the county agricultural agent.

The soils of Colbert County, based on their characteristics, their capabilities, agricultural production, and drainage conditions are grouped into (1) red or brown clay loam and loams and brown or gray fine sandy loams, (2) red or brown silt loams and fine sandy loam, overflowed lands, (3) gray or yellow silt loams and fine sandy loams, (4) gray or red gravelly and cherty loams, (5) poorly drained gray silt loams, and (6) miscellaneous soils and land types.

In the following pages of this report the soils are described in detail, and their agricultural relationships are discussed; their distribution is shown on the accompanying soil map; and table 3 gives their acreage and proportionate extent.

TABLE 3.—*Acreage and proportionate extent of the soils mapped in Colbert County, Ala.*

Soil type	Acres	Percent	Soil type	Acres	Percent
Decatur clay loam	15,872	4.1	Colbert fine sandy loam	3,584	0.9
Dewey loam	57,600	14.8	Dickson silt loam	1,536	.4
Dewey silt loam	3,776	1.0	Savannah loam	4,544	1.2
Dewey cherty loam	4,864	1.3	Savannah very fine sandy loam	17,472	4.5
Etowah silt loam	1,600	.4	Atwood very fine sandy loam	5,440	1.4
Cahaba fine sandy loam	1,728	.4	Hartsells very fine sandy loam	1,216	.3
Cahaba gravelly fine sandy loam	832	.2	Dewey cherty loam, rolling phase	6,912	1.8
Kalmia fine sandy loam	1,152	.3	Atwood gravelly loam	17,792	4.6
Kalmia loamy fine sand	320	.1	Guthrie silt loam	6,016	1.6
Atwood very fine sandy loam, valley phase	5,120	1.3	Melvin silt loam	1,984	.5
Huntington silt loam	10,688	2.8	Colbert silt loam, flat phase	4,672	1.2
Abernethy silt loam	15,552	4.0	Guin soils, undifferentiated	68,544	17.7
Ochlockonee silt loam	6,272	1.6	Colbert clay	41,088	10.6
Ochlockonee fine sandy loam	7,744	2.0	Rough stony land	57,984	14.9
Colbert silt loam	15,936	4.1	Total	387,840	

RED OR BROWN CLAY LOAM AND LOAMS AND BROWN OR GRAY FINE SANDY LOAMS

This group includes Decatur clay loam, Dewey loam, Dewey silt loam, Dewey cherty loam, Etowah silt loam, Cahaba fine sandy loam, Cahaba gravelly fine sandy loam, Kalmia fine sandy loam, Kalmia loamy fine sand, and Atwood very fine sandy loam, valley phase. The Dewey and Decatur soils are the so-called limestone lands and are underlain by limestone at various depths. The Etowah, Cahaba, and Kalmia are developed on the second bottoms and terraces and owe their origin to the deposition of materials brought down and deposited by streams.

All these soils are developed in the valley section of the county and occur in both large and small areas. They have smooth undulating to gently rolling relief and are well drained, both internally and externally. They range in elevation from about 400 to 550 feet above sea level. The Dewey, Decatur, and Etowah soils are recognized as being potentially fertile and have those characteristics

which enable them to be built up to a high state of productivity. The soils of this group are used principally for the production of cotton, and they produce probably 75 percent of all the cotton grown in the county. They are also well suited to the production of other crops and to a diversified type of agriculture. All the soils in this group respond readily to the application of fertilizer or the addition of barnyard manure and to good management.

Decatur clay loam.—Decatur clay loam, locally known as "red clay land", is one of the principal soils and is recognized as being the reddest soil and one of the best cotton-producing soils. It occurs in close association with Dewey loam but differs in that it is redder and has a heavier surface soil and slightly tougher subsoil which is deeper to the bedrock. Sheet erosion has been constantly active on the soil for many years, therefore the surface soil is rather shallow, in most places ranging from 3 to 5 inches. The surface soil is a reddish-brown or red clay loam which is granular and friable under optimum moisture content. The subsoil, to a depth ranging from 60 to 100 inches, is a rather heavy stiff brownish-red or dark-red clay which, under optimum moisture content, breaks into irregular-shaped lumps and then into granules. A few yellowish-gray mottles are conspicuous in the lower part of the subsoil. The subsoil grades into partly weathered material which is of much the same composition as that underlying the Dewey soils, being a mixture of sticky reddish-brown and gray clay material and angular chert fragments. The subsoil material contains numerous soft very small iron or manganese concretions and iron-stained colloidal coatings, which increase in number with depth.

The largest areas of Decatur clay loam are in the eastern part of the county, principally around Muscle Shoals City, Valley Grove Church, Cave Springs, St. James School, and Pruett Bridge.

A few areas of Decatur silt loam are included with this type as mapped. These areas have a brownish-red or red friable silt loam surface soil, which ranges from 5 to 7 inches in thickness, and the subsoil is similar to that of Decatur clay loam. These areas are slightly less sloping, a little easier to cultivate, and produce slightly higher yields than Decatur clay loam. A few areas of Decatur clay are also included with Decatur clay loam in mapping. These areas occupy the more rolling positions, consequently the surface soil has been almost completely removed by sheet erosion. The soil in such areas is less productive and more difficult to farm than Decatur clay loam, and should be planted to winter- and spring-growing crops, or cotton and alfalfa, and these crops should be heavily fertilized.

The cultivation, crops grown, crop yields, fertilizer recommendations, erosivity, and future possibilities are essentially the same for Decatur clay loam as for Dewey loam.

The Tennessee Valley substation at Belle Mina, in Limestone County, Ala., is located on Decatur clay loam, and the fertilizer application found to be most profitable for cotton production during normal seasons consists of 600 pounds an acre of a 6–8–4 [3] mixture, or 300 pounds of superphosphate, 225 pounds of sodium nitrate, or the equivalent, and 48 pounds of muriate of potash. Fertilizer recom-

[3] Percentages, respectively, of nitrogen, phosphoric acid, and potash.

mendations for corn, alfalfa, pasture grass mixtures, and other crops may be obtained at this substation.

Dewey loam.—Dewey loam, locally known as "red lands", is the largest and agriculturally the most important soil, and it probably produces more than 50 percent of all the cotton. It has been used almost exclusively for the growing of cotton since the advent of the white man in this section.

The surface soil of Dewey loam, to a depth of 4 or 6 inches, is a brown or reddish-brown mellow and friable loam which contains a large quantity of silt, some fine sand, and clay. This is underlain by a 1- to 3-inch subsurface layer of reddish-brown clay loam. The subsoil is a reddish-brown silty clay loam or clay which extends to a depth ranging from 3 to 12 feet. This material is uniform in color, is fairly heavy but friable, has a massive structure, and breaks down into irregular-shaped lumps which are fairly easily crushed under normal moisture conditions. It is sticky when wet but hard and brittle when dry. It is underlain by a reddish-brown, mottled with yellow, and in a few places with gray, heavy sticky to tough clay, containing many partly weathered chert fragments. A few very small soft iron or manganese concretions are present in the subsoil.

The more rolling areas of Dewey loam have suffered from sheet erosion under clean cultivation, and in many places all of the original surface soil has been removed, exposing the red clay loam subsoil. Most of the surface material has been deposited in the sinks and depressions to form Abernethy silt loam. The subsoil is thinner in these areas, owing probably to the fact that it never was so thick as on the areas having smoother relief. On some of the flatter areas the surface soil contains a relatively high proportion of silt or fine sand. In the northeastern corner of the county near Brick, the surface soil is lighter in color and more subject to erosion than the larger areas of this soil. Where Dewey loam joins the Colbert soils, the color and consistence of both the surface soil and subsoil grade toward the characteristics of the Colbert soils. A few angular chert fragments occur on the surface throughout all areas of this soil. Included with Dewey loam as mapped, are small areas of Abernethy silt loam, Decatur clay loam, and Dewey cherty loam, which were too small to map separately.

Dewey loam occupies large continuous areas, broken mainly by areas of Decatur clay loam, other soils of the Dewey series, and by many small areas of Abernethy silt loam. It occurs in close geographic association with Decatur clay loam. The largest areas of Dewey loam are developed west, north, and east of Cherokee, south of Tuscumbia, in the vicinity of Sheffield, south of Muscle Shoals, and around Mount Pleasant. The relief ranges from undulating and gently rolling to rolling, with here and there some long gentle slopes. Natural surface drainage and the internal drainage of all areas of this soil are good. Part of the surface water runs into small drainageways, but the drainage of a large part of this soil is through subterranean channels. The excess surface water runs onto areas of Abernethy silt loam and into the small sinks, or depressions, and fianlly reaches the underground passages.

Many areas of Dewey loam would be benefited by terracing to check further sheet erosion. Where the subsoil of Dewey loam is exposed, if handled properly, it can be made productive by the incorporation of organic matter and by applying phosphate. This is an advantage over soils having more shallow subsoils.

Practically all of Dewey loam has been cleared and farmed for a long time, although a few small areas of second-growth old-field pine still remain. The original tree growth was mainly hardwoods. This soil is used largely for the production of cotton, but under proper treatment, corn and hay crops can be grown successfully. On tenant farms cotton yields from one-third to three-fifths of a bale an acre, but this soil is capable of producing from 1 to 1½ bales an acre when properly fertilized and worked. The average acre application of fertilizer is from 200 to 300 pounds of a 4–10–4 mixture, but larger yields of cotton are obtained from the application of about 600 pounds of a 6–8–4 fertilizer. Corn yields range from 15 to 30 bushels an acre, most of the corn being grown on the more gentle slopes where the surface soil is deep, as the more rolling areas of this soil and the moisture conditions are not favorable for growing corn. By plowing the surface soil to a depth of 6 or 8 inches, by the incorporation of organic matter, and by the addition of commercial fertilizer, this soil can be made to produce from 25 to 50 bushels of corn an acre. Other crops, including soybeans, cowpeas, garden vegetables, lespedeza, oats, wheat, black medic, and hop clover, do well. Potatoes are grown successfully in the St. Florian locality in Lauderdale County on Dewey loam. Kentucky bluegrass, orchard grass, and redtop can be grown successfully if the soil is properly prepared and phosphate applied. Sorgo gives fair yields of sirup, but the quality of the sirup is not so good as the quality of that produced from cane grown on the gray or yellow soils.

Dewey loam is inherently a good soil capable of being built up to a high state of productivity. Like all the soils in this county, it is deficient in organic matter, and this can best be supplied by adding barnyard manure. Very little manure is available, however, and, therefore, the organic matter should be supplied by turning under green-manure crops. Deeper plowing and better preparation of the seedbed, thus allowing the soil to absorb more of the rainfall and hold more moisture for growing crops, proves beneficial on this soil. Less sheet erosion would take place if more of the rainfall could be absorbed by the soil. Some farmers find that Dewey loam is improved by the application of lime, especially where leguminous crops are to be grown.

Dewey silt loam.—Dewey silt loam differs from Dewey loam in that it contains more silt, is not so red, the surface soil is deeper, and it occupies slightly lower and flatter positions. In cultivated fields the surface soil is grayish-brown or reddish-brown silt loam to a depth ranging from 5 to 18 inches. The subsoil is uniformly reddish-brown silty clay loam or silty clay, which is dense and heavy, yet fairly friable, and breaks down into a granular mass. It extends to a depth ranging from 50 to 100 inches, where it grades into partly weathered heavy sticky clay material and chert fragments. This material is predominantly brown to brownish yel-

low and contains numerous mottlings of yellowish brown and gray. Soft iron concretions and dark iron splotches are present in the upper part of this layer and in the subsoil.

Dewey silt loam is uniform over the areas of its occurrence, but a few small areas of Dewey loam and Abernethy silt loam, which are too small to map separately, are included with this soil as mapped.

Dewey silt loam is one of the less extensive but agriculturally important soils in the county and occurs as small areas in close association with Dewey loam. The principal areas are near Spring Valley, Muscle Shoals, Cottontown, and Leighton.

This is one of the best all-purpose agricultural soils in the county. Its water-holding capacity, as a result of its mellow friable structure and level position, makes it particularly well suited for all-season cropping, and its natural fertility is sufficient to produce fair yields of any crop grown without fertilization, although fertilizers can generally be used economically.

On account of its almost level to smooth relief, terracing is not particularly necessary, as erosion is almost negligible. It is the only upland soil in the county that is not affected by erosion. It is not so fertile as Abernethy silt loam or Huntington silt loam, but crops are more certain on this soil, as Huntington silt loam is subject to overflow. Furthermore it lends itself to a good system of diversified farming.

At least 95 percent of this soil is in cultivation, about 35 percent being used for the production of cotton and the rest is devoted largely to the production of the subsistence crops—corn and hay. Fertilizer requirements for cotton are not so great as on Dewey loam, but most farmers apply from 300 to 400 pounds of a 4–10–4 or higher grade fertilizer. The yields of cotton under this rate of fertilization range from one-half to 1 bale an acre.

Corn yields from 20 to 30 bushels an acre with no fertilization, and hay from 1 to 2 tons under the same conditions. This soil is particularly well adapted to the production of late potatoes or any fall-grown crop. This soil, like Dewey loam, can be built up to a high state of productivity, and it is one of the most desirable soils in northern Alabama for general farming.

Dewey cherty loam.—Dewey cherty loam differs from Dewey loam in that it occurs on knolls, knobs, and narrow ridges, which have irregular surface features, and it contains enough angular chert fragments on the surface and in the subsoil to lower its agricultural value. The chert fragments range in diameter from one-half inch to as much as 5 inches, and the content of chert fragments on the surface and in the subsoil differs greatly from place to place. As normally developed the surface soil is brown friable cherty loam ranging in depth from 3 to 5 inches, the angular chert constituting, perhaps, 30 percent of the soil mass. The subsoil differs from that of Dewey loam in that it is shallower, ranging in depth from 20 to 40 inches, contains an abundance of chert fragments, and is less uniformly colored, being brownish red to brownish yellow. This layer grades into tough heavy sticky brownish-yellow clay material and chert fragments.

Several small swales, ranging in size from 1 to 3 acres, of Abernethy silt loam and a few small areas of Dewey loam, too small

to separate, are included with this soil as mapped. An area of this soil west of Tuscumbia differs from the other areas in that it contains some rounded chert gravel in addition to the angular chert fragments.

This soil occurs in medium to large bodies scattered over the limestone valley in close association with Dewey loam. The largest areas are 1 mile south of Lane Springs extending southward toward Cherokee, near Lyle Academy, west of Tuscumbia, northeast of Cave Springs, near the mouth of Little Bear Creek, and northeast of Pride adjacent to the river, and small areas are north of Spring Valley and near Leighton.

Only the areas having the more level relief and fewer chert fragments are farmed. These areas comprise about 35 percent of the total. The areas suitable for farming are comparable with Dewey loam as regards crops grown, and fertilizer requirements, and in many seasons the yields are as high.

Under a changed economic condition more of this soil could be put into cultivation. The uncultivated areas are used for pasture and building sites. Because of exceptionally good drainage, rolling relief, and rather high position, this soil is used as sites for farm buildings on many farms.

Lespedeza is well adapted to this soil, and common lespedeza is the principal pasture grass on the pastured areas. The quality of the pasture can be improved further by the use of orchard grass, Dallis grass, Kentucky bluegrass, and white clover. A liberal application of lime and superphosphate is necessary for best results.

Etowah silt loam.—Etowah silt loam, to a depth of 4 or 6 inches, is brown or yellowish-brown mellow friable silt loam. The subsoil, to a depth ranging from 28 to 40 inches, is firm stiff brown or yellowish-brown silty clay or silty clay loam. Below this depth is grayish-brown clay loam material mottled with rust brown, gray, and grayish yellow. Locally the surface soil, and to less extent the subsoil, contains a few soft iron concretions. In some places a few small rounded chert gravel are on the surface and mixed throughout the soil mass.

Etowah silt loam is developed along Bear, Spring, and Town Creeks. In part of the area near Walker along Bear Creek the subsoil is lighter colored than the typical soil. The area near the mouth of Bear Creek and the area near the mouth of Town Creek have a 4- to 6-inch surface covering of brown fine sandy loam or very fine sandy loam. On account of this, these areas are easily tilled. This soil is developed on the second bottoms, or terraces, and lies from 4 to 50 feet above the normal level of the streams. The relief ranges from almost level to undulating, and both the surface soil and subsoil are well drained. This soil warms early in the spring.

Etowah silt loam was one of the first soils in the county to be cleared of vegetation, as the Indians evidently occupied this land at one time, judging from the quantity of arrowheads and pieces of pottery found on it. About 90 percent of this soil is farmed. It is well suited to practically all the crops grown in the county, but as it lies adjacent to Huntington silt loam, which is used mainly for the pro-

duction of corn and hay, Etowah silt loam is used for growing cotton. Cotton, under good management and fertilized with 300 to 400 pounds of a 4–8–4 mixture, yields from one-half to two-thirds of a bale an acre; and higher yields are obtained under normal conditions when 500 to 600 pounds of a 6–8–4 fertilizer are applied. Corn yields range from 15 to 30 bushels and hay from one-half ton to 1½ tons an acre. A very small amount of fertilizer is used for corn and practically none for hay. Corn would be benefited by a side dressing of 100 to 150 pounds of nitrate of soda an acre when the plants are about 18 inches high. Etowah silt loam is one of the good soils in the county and can be built up to a fair or high state of productivity.

Cahaba fine sandy loam.—The surface soil of Cahaba fine sandy loam, to a depth ranging from 5 to 8 inches, is grayish-brown or brown fine sandy loam, underlain, to a depth ranging from 30 to 35 inches, by yellowish-red or reddish-brown friable fine sandy clay, which grades into mottled light-red, brown, and yellow friable fine sandy clay. In the flatter areas where drainage is imperfect the subsoil becomes mottled with light gray and yellow at a depth of about 20 inches. Some of the areas of Cahaba fine sandy loam along Bear Creek and also areas near Pruett Bridge and northeast of Midway School, have a heavy subsoil and show evidences of limestone influence in the lower part. The material in such areas is generally heavy throughout the entire soil mass.

Cahaba fine sandy loam occurs in close association with Kalmia fine sandy loam and differs from that soil primarily in color. It is developed on the second bottoms and lies several feet above normal overflow. The material from which this soil has been derived was brought down from the hills and deposited by the streams when they flowed at higher levels. The relief ranges from almost level to undulating and in a few places is billowy. All of this soil has good surface drainage and internal drainage, except for a few of the flatter areas. Most of this soil is along Bear and Town Creeks.

Approximately 95 percent of Cahaba fine sandy loam is under cultivation, and about 80 percent of this is annually planted to cotton. It is well suited to growing cotton, corn, peanuts, and other general farm crops. This soil occurs in close association with Huntington silt loam, which is a good soil for the production of corn and hay; therefore, farmers owning some of both of these soils use the Huntington soil for growing corn and the Cahaba soil for growing cotton. Cotton yields from one-third to two-thirds of a bale an acre, depending on the preparation of the land and the amount of fertilizer used. Generally from 200 to 400 pounds an acre of 3–8–3 or 4–8–4 or a higher grade fertilizer is applied. Some of the more successful farmers have found it profitable to increase the fertilizer to as much as 600 pounds of a 6–8–4 mixture an acre, and considerably increase the yield. Corn produces from 15 to 30 bushels an acre, and hay from one-half ton to 1½ tons. These crops are generally fertilized, but not so heavily as cotton. Sweetpotatoes, peanuts, and garden vegetables do well on this soil when given liberal applications of fertilizer.

Cahaba gravelly fine sandy loam.—Cahaba gravelly fine sandy loam differs from Cahaba fine sandy loam in that small rounded

gravel comprise from 20 to 60 percent of the soil mass. The surface soil, to a depth of 4 to 7 inches, is a grayish-brown or brown friable gravelly fine sandy loam. This grades into a yellowish-brown or brown gravelly fine sandy clay, which continues unchanged to a depth ranging from 24 to 30 inches, where it is mottled with light gray and yellow. This is underlain by a gravelly mass of gray and yellow fine sandy clay material. The gravel are present throughout the surface soil and subsoil to a depth ranging from 4 to 7 feet. In the flatter areas, generally near the lateral stream channels, the soil is grayish yellow, but these areas are small. In a number of places the gravel are so numerous that penetration with a soil auger is impossible.

Areas of this soil along the eastern edge of Bear Creek Valley between Margerum and Riverton are composed of materials that have been washed into this valley by lateral streams originating in the gravelly areas in the mountains. These areas occupy a terrace position slightly higher than the associated soils and are naturally well drained.

Approximately 60 percent of this soil is in cultivation, and the rest is too gravelly for agricultural purposes and is used largely for pasture. Cotton is the principal crop grown, although some corn and hay are grown in small fields. This soil is somewhat difficult to work on account of the gravel content, but the gravel are an aid to water percolation and soil aeration. The soil warms early in the spring, as a result of free drainage, which allows early fruiting and maturing of cotton. This is very important for the production of cotton under boll weevil conditions. Cotton yields range from one-third to one-half bale an acre but when the land is properly prepared and fertilized with 400 or 500 pounds of a 6–8–4 fertilizer it produces two-thirds of a bale. Lespedeza, carpet grass, and Dallis grass are the principal pasture grasses.

Kalmia fine sandy loam.—Kalmia fine sandy loam is a grayish-yellow soil occupying a terrace position. The materials from which this soil was derived were transported from the sandy upland soils and deposited by high water, but since deposition the stream channels have deepened, leaving this soil above overflow. The relief ranges from almost flat, or undulating, to gently sloping, and drainage is good. To prevent erosion the more sloping areas should be terraced.

In cultivated fields the surface soil, to a depth ranging from 4 to 7 inches, is yellowish-gray fine sandy loam or loamy fine sand containing a small quantity of organic matter. This layer grades into friable grayish-yellow loamy fine sand which extends to a depth of about 10 or 12 inches. The subsoil, to a depth ranging from 25 to 30 inches, is a bright-yellow friable fine sandy clay which has a few faint gray and rust-brown mottlings in the lower part. This layer grades into grayish-yellow fine sandy clay which is mottled with light gray and rust brown and is slightly compact in place but when removed is easily pulverized to a granular mass. In the flatter areas, the subsoil contains gray mottles at a depth of about 15 or 20 inches, indicating poor internal drainage.

Kalmia fine sandy loam occupies small strips along Bear Creek in the western part of the county and along Town Creek in the eastern

part. About 90 percent of this soil is in cultivation, and the rest is in pasture. As this soil lies adjacent to the overflow bottoms, which are good soils for the production of corn and hay, about 70 or 75 percent of it is devoted to the production of cotton. It is fairly well adapted to any crop grown, except those crops needing a high content of lime. Cotton produces from one-third to two-fifths of a bale an acre under the present system of farming where only a small amount of fertilizer is used. By increasing the application to 600 pounds of a 6-8-4 fertilizer, the yield can, under most conditions, be increased to two-thirds or 1 bale an acre. Corn generally produces from 12 to 20 bushels an acre and hay from one-half to 1 ton, neither of which is heavily fertilized. This soil is particularly well adapted to the production of sorgo, especially in the locations where the moisture conditions are most favorable, and an excellent quality of sirup is produced. It is particularly responsive to a complete fertilizer and to the turning under of winter cover crops or the application of barnyard manure.

Kalmia loamy fine sand.—Kalmia loamy fine sand is locally called "sandy land." It is somewhat variable in texture and color, depending on the depth of the loamy fine sand and on the character of the underlying soil material. The surface soil, to a depth ranging from 5 to 12 inches, is grayish-yellow or light-brown fine sand underlain, to a depth ranging from 18 to 30 inches, by yellow friable loamy fine sand. This in turn is generally underlain by grayish-yellow mottled fine sandy clay material, but in some places it is underlain by a heavy tough bluish-gray clay.

During heavy rains, fine sand was transported from the hills into the valleys by streams and deposited on the outer edges of the flooded areas, leaving this soil adjacent to but slightly higher than the overflow bottoms. The largest areas occur south of Buck Bridge and near Pruett Bridge along Town Creek.

About 60 percent of Kalmia loamy fine sand is cultivated, but the rest is too sandy and porous to retain the necessary moisture for plant growth. This soil is used for the production of cotton, corn, and truck crops. Watermelons and peanuts are particularly well adapted to this soil. Cotton is grown on about one-third of the cultivated land and produces from one-third to one-half bale an acre when fertilized with 200 to 400 pounds of a complete fertilizer analyzing 4–8–4 or 3–8–5. More economical production could be obtained by side-dressing the cotton with 20 pounds of nitrate of soda for each 100 pounds of fertilizer. As much as 600 pounds of fertilizer used in the above ratios should be economical. This soil is responsive to fertilizers and is benefited by the addition of organic matter.

Corn produces from 5 to 20 bushels an acre, and hay, principally cowpeas, from one-half to 1 ton when following a winter cover crop or when fertilized. The earliest and some of the best watermelons grown in the county are produced on this soil.

Atwood very fine sandy loam, valley phase.—Atwood very fine sandy loam, valley phase, occupies a relatively high position resembling an old eroded terrace in the northeastern corner of the county. It lies from 20 to 60 feet higher than the surrounding soils underlain by limestone. The surface soil and subsoil are very variable

in color. The materials giving rise to this soil were laid down by Tennessee River when it flowed at a much higher level, or they are old coastal-plain deposits similar to those underlying Atwood very fine sandy loam in the mountains.

In the more representative areas the surface soil is grayish-brown or light-gray loam or very fine sandy loam to a depth of 4 or 6 inches. The upper subsoil layer, which extends to a depth ranging from 8 to 12 inches, is brownish-yellow friable silt loam or silty clay loam. This grades into reddish-brown friable silty clay loam which becomes mottled and streaked with red, gray, and yellow at a depth ranging from 24 to 30 inches. The material in this layer is slightly compact and hard but very brittle. An outstanding characteristic of this soil is its friability. Rounded water-worn chert gravel are on the surface and in some places in the subsoil. In the flatter areas, the subsoil is brownish yellow, and the reddish-brown lower subsoil layer is lacking. The subsoil of a large part of the areas along the slopes and adjacent to the Dewey soils has more red than is representative of the soil of this phase. These variations could not be separated on a small-scale map.

The relief is gently rolling to rolling, and drainage is good to excessive. This is one of the most severely eroded soils in the county. Erosion is not entirely due to the relief but to the friability of the soil material and quantity of silt and very fine sand in the subsoil. Terracing is much needed, as a considerable acreage is out of cultivation as the result of deep gullies and sheet erosion of the surface soil. This soil, where erosion has not been particularly serious, works up easily into a good tilth.

Probably 50 percent of this soil is under cultivation, two-thirds of which is planted to cotton and the rest to corn and hay. Cotton yields from one-fourth to one-half of a bale an acre under present farming methods when fertilized with 150 to 250 pounds of 4–8–4 fertilizer. Applications of 400 to 600 pounds of a fertilizer analyzing 6–8–4 or 6–10–4 would, under normal conditions, return greater profits. Corn yields from 8 to 30 bushels an acre and hay from one-third to 1 ton. The corn and hay crops are generally grown in the lower areas where erosion has not been particularly serious.

This soil is adapted to a wide variety of crops. Its greatest need, particularly on the more gullied areas, is well-constructed terraces and a permanent cover crop, such as kudzu or lespedeza, or a winter cover crop that is to be followed by a summer hay crop would control the erosion. Kudzu, if properly handled, is probably the best crop that can be grown on the more gullied areas, as it not only stops erosion but furnishes hay as well.

RED OR BROWN SILT LOAMS AND FINE SANDY LOAM, OVERFLOWED LANDS

This group comprises Huntington silt loam, Abernethy silt loam, Ochlockonee silt loam, and Ochlockonee fine sandy loam. These soils, with the exception of Abernethy silt loam, are developed in the first bottoms and are subject to overflow but have fair to excellent surface drainage. Abernethy silt loam occurs dominantly in slight depressions or sinks, and drainage is mainly through subterranean channels. These soils seldom overflow during the cropping season, and generally

each overflow adds a slight deposit of silty material which is an advantage to the soil. These soils are inherently fertile and are seldom fertilized. They are considered the best in the county for the production of corn and hay. Good yields are obtained without the use of commercial fertilizers.

Huntington silt loam.—Huntington silt loam is a brown silt loam occupying the first bottoms of streams in the limestone valley and is recognized as being one of the principal soils for the production of corn and hay. It is derived principally from material washed from the red soils developed from limestone, which gives it its brown color. The surface soil is brown mellow friable granular silt loam containing dark splotches of organic matter, to a depth ranging from 7 to 12 inches, where it grades into the subsoil of brown friable silty clay loam. At a depth of about 40 inches the subsoil grades into brown material mottled with gray, yellow, and rust brown. This layer is slightly more friable than the layer above.

Huntington silt loam occurs along the larger streams of the county. The largest developments are along Bear Creek, Spring Creek, and Tennessee River near the mouth of Bear Creek. The relief ranges from almost level to slightly undulating. The land is comparatively well drained, and both surface and internal drainage are good. This soil is subject to overflow, but crops are seldom destroyed.

Along the Mississippi State line west of Free Bridge and north of this bridge, also west and northwest of Douthit School, a few small areas are included with Huntington silt loam in mapping that resemble Lindside silt loam as mapped in Lauderdale County. The soil in these areas is a gradation between Huntington silt loam and Melvin silt loam, but it is too small in extent to map separately. The surface soil of these areas, to a depth of 4 or 6 inches, is grayish-brown or grayish-yellow silt loam underlain, to a depth ranging from 18 to 24 inches, by light grayish-brown, gray, or grayish-yellow silty clay loam mottled with rust brown and yellow. This layer grades into gray compact but friable clay loam mottled with rust brown. Soft iron concretions and stains are present throughout the soil mass and in some places in the surface soil are more abundant. This included soil occupies a higher elevation than the typical soil and is very seldom overflowed, but in spite of its higher position it is more poorly drained, the poor drainage being the result of seepage water from lateral streams. The greater part of it is used for hay and pasture, although some is used for corn and cotton. Sorgo, Johnson grass, cowpeas, and soybeans are the principal hay crops grown, and they yield from one-half ton to 1½ tons of hay an acre. Cotton is grown on the better drained areas, producing from one-fourth to one-half of a bale an acre. According to the county agricultural agent, an acre application of 600 pounds of a 6–8–4 fertilizer with an addition of 25 to 50 pounds of muriate of potash is recommended for cotton on this soil. Corn produces from 8 to 25 bushels an acre. The use of 100 to 200 pounds of nitrate of soda, or its equivalent, should be economical for corn.

A few areas mapped with Huntington silt loam have a heavy compact dark-brown subsoil, which is much heavier and darker than that of the typical soil. The 3- to 6-inch surface layer is brown mellow silt loam underlain by dark-brown compact clay. This

shows very little change to a depth of 5 or 6 feet where it becomes mottled with yellow and gray clay. This soil was mapped as Huntington silt loam, heavy-subsoil phase, in Lauderdale County. These areas are small, comprising an aggregate area of not more than a square mile. Two small areas are along Tennessee River, one at Newport Landing, and the other at Georgetown Landing. Similar areas occur along Bear Creek, near the mouth of Rock Creek, and 1 mile south of Jackson Ridge Church. This soil occupies a slightly higher position than the typical soil and is seldom overflowed. The relief is slightly undulating to rolling. Erosion has removed a large part of the surface soil, leaving it shallow, and the tough, heavy subsoil causes it to be droughty. This soil is used extensively for the production of cotton and pasture, although some corn and hay are grown. Cotton produces from one-third to one-half bale an acre under fair management, corn from 5 to 18 bushels, and hay does proportionately well.

Probably 80 percent of the representative areas of Huntington silt loam is used for the production of corn and hay, and the rest, except a small amount in cotton, is used for pasture, as it is one of the best soils for pasture in the county. A small part is woodland pasture. The cultivated areas which are most subject to overflow are generally planted to Mammoth Yellow soybeans, as they are more resistant to damage from overflow than corn or hay crops. Corn yields range from 30 to 80 bushels an acre and hay from 1½ to 3 tons. Very little or no fertilizer is used on Huntington silt loam. During 1931 and 1932 a large proportion of the corn and hay along Bear Creek was lost as the result of overflows, although this had not previously happened since 1916. Huntington silt loam is the best soil in the county for the production of corn and hay.

Abernethy silt loam.—Abernethy silt loam, locally known as "made land", is recognized as one of the best soils for corn and hay production in the limestone valley. The soil varies in color and depth of the surface soil and in the character of the subsoil, depending on local drainage conditions. The surface soil ranges from 6 to 12 inches in thickness and consists of dark reddish-brown mellow and friable silt loam containing a considerable quantity of organic matter. This grades into a reddish-brown smooth but friable silt loam or silty clay subsoil which ranges in thickness from 10 to 25 inches, depending on the quantity of material that has been washed in from the higher lying Dewey and Decatur soils. Splotches of rust brown and yellow are present throughout the subsoil. The subsoil rests on light-gray sticky impervious silty clay or clay mottled with rust brown and yellowish gray. The present lower subsoil layer was at one time the surface of the land, but sheet erosion removed some of the surface soil from the adjacent red lands and deposited it in these locations to form this soil.

Abernethy silt loam soil occurs throughout the limestone valley occupying the swales, sinks, or saucerlike depressions in the Dewey and Decatur soils. Few of the areas are large, although some irregularly shaped basins cover about 200 acres each. Drainage is insufficient in the larger areas, but most of the smaller areas have fair drainage. Ditches are used to drain some of the small areas, and dynamiting for the purpose of providing subterranean drainage, to-

gether with ditches, has been practiced with good results on some of the larger areas.

Abernethy silt loam, like Huntington silt loam in the first bottoms, is seldom fertilized. It is used largely for the production of corn and hay. The limiting factor in crop production on Abernethy silt loam is excessive rainfall. Excessive spring rains cause delay in planting on this soil and, in addition, the crops are occasionally drowned out; and fall rains, at times, are detrimental in the maturing of crops and interfere with harvesting. Approximately 90 percent of Abernethy silt loam is in cultivation. Corn yields from 30 to 80 bushels an acre, and hay from 1 to 2 tons. Sorgo is generally grown on those spots having the more shallow surface soil and where this soil grades into the associated Guthrie silt loam. The sirup produced is of good quality.

Ochlockonee silt loam.—Ochlockonee silt loam differs from Ochlockonee fine sandy loam largely in that it has a finer textured surface soil and is not so well drained. The texture of the surface soil is subject to change in some places by the deposition or removal of materials during overflows. The surface soil of Ochlockonee silt loam, to a depth of 3 to 7 inches, is grayish-brown or dark-gray friable silt loam faintly mottled with light gray in the lower part. The subsoil, to a depth ranging from 10 to 25 inches, is light-brown friable silty clay or silty clay loam mottled and streaked with gray and rust brown. This grades into light-gray silty clay mottled with rust brown and pale yellow. This material is slightly compact and retards the percolation of water, causing the soil to drain rather slowly.

A few small areas of Ochlockonee clay and Ochlockonee silty clay are included with this soil in mapping. These areas are generally above normal overflow, the soils are darker colored, are more droughty, and are more sticky in character than Ochlockonee silt loam. They occur on the borders of the first bottoms, and the soils have been influenced by limestone material. A small acreage of this soil is used for growing cotton, and the rest is used for pasture.

The largest areas of Ochlockonee silt loam are along Town, Spring, Little Bear, Buzzard Roost, and Rock Creeks. The areas along Buzzard Roost Creek are more gray in the surface soil and are more poorly drained than typical. All areas of Ochlockonee silt loam are subject to overflow.

Probably 20 percent of this soil is farmed, most of which is planted to corn, hay, and sorgo. Corn is the principal crop grown, and the yields range from 15 to 30 bushels an acre, and hay produces from one-half ton to 1½ tons. Very little or no fertilizer is used. The soil is well adapted to the production of sorgo, producing a large yield of sirup of fair quality. Dallis grass and carpet grass do well on part of this soil, but the principal pasture growth is native vegetation—chiefly vines, reeds, cane, and underbrush. Common lespedeza should supplement the pasture grasses if the soil is drained. The use of basic slag or superphosphate should be particularly beneficial for growing lespedeza and Dallis grass.

Ochlockonee fine sandy loam.—Ochlockonee fine sandy loam is developed in the first bottoms from materials which have washed from sandy upland soils. This soil is variable, depending on sur-

face drainage and on the degree of influence of the soils from which it was derived. In the larger and more extensive areas the surface soil is gray or brown fine sandy loam to a depth ranging from 7 to 10 inches. The subsoil is light-brown or brownish-yellow fine sandy clay or clay loam containing a few mottlings of gray and yellow, which become more pronounced at a depth ranging from 20 to 30 inches. In the lower part it contains some soft iron concretions and iron stains. This grades into gray clay, which is intensely mottled with rust brown and yellow. In the lower and more poorly drained areas rust-brown mottlings are common in the surface soil, and the subsoil is gray mottled with rust brown and contains iron concretions.

The largest areas of Ochlockonee fine sandy loam occur along Bear, Rock, Channel Lowery, Buzzard Roost, and Cane Creeks, and small areas are along other creeks.

About 40 percent of this soil is in cultivation, most of which is planted to corn, hay, and sorgo. The uncultivated areas are used for pasture and woodlands. Along Channel Lowery and Rock Creeks in the vicinity of New Smyrna School, about 80 percent of this soil is in cultivation, but the proportion of the land in cultivation is much higher here than elsewhere in the county. Ochlockonee fine sandy loam in this locality, when used in connection with the soils occupying the terraces, makes this a good farming community, as the first-bottom soil is good for corn, hay, and sorgo, and the soils on the terraces are good for cotton and truck crops. This soil produces from 15 to 35 bushels of corn an acre, and hay yields from three-fourths ton to 2 tons. Sorgo does especially well on this soil, producing a good quality of sirup with yields ranging from 60 to 120 gallons an acre. Mammoth Yellow soybeans are frequently grown on the areas most subject to overflow, as they withstand overflow better than other crops. Carpet grass, Bermuda grass, and native shrubs are the principal pasture plants. Carpet grass is particularly well adapted to this soil.

A large part of this soil is overflowed during the winter season, but overflows are not common during the crop season. The crops grown on this soil are seldom fertilized, as the winter overflows generally leave a deposit of silt, fine sand, and organic matter on the surface.

GRAY OR YELLOW SILT LOAMS AND FINE SANDY LOAMS

Included in this group are Colbert silt loam, Colbert fine sandy loam and Dickson silt loam of the limestone valley, and Savannah loam, Savannah very fine sandy loam, Atwood very fine sandy loam, and Hartsells very fine sandy loam of the mountains. These soils occupy smooth to gently rolling relief and have fair to excellent surface drainage and internal drainage. They are not inherently as fertile as the soils of the first group, but they are responsive to management, and fair to good yields can be obtained. These soils lend themselves to a diversified system of agriculture, and almost any crop common to the county can be grown. A subsistence type of agriculture is practiced on these soils.

Colbert silt loam.—Colbert silt loam is extensive and the most important agriculturally of the Colbert soils, but its agricultural

value is much lower than that of the red soils. It occupies level to gently rolling areas, generally between the red limestone soils and Colbert clay of the lower mountain slopes. Practically all of this soil has good surface drainage.

The surface soil, to a depth of 4 to 7 inches, is yellowish-gray friable silt loam. The upper subsoil layer, to a depth ranging from 12 to 18 inches, is pale-yellow or yellow slightly plastic silty clay loam containing a few gray and brown mottles in the lower part. This layer grades into yellow, mottled with gray and reddish brown, silty clay which is hard when dry but plastic and sticky when wet. This, in turn, grades into bluish-gray plastic clay mottled with yellow and red. This rests on a gray laminated calcareous shale splotched with rust brown and yellow. In the more rolling areas the red color increases and in some places dominates the other colors, giving the surface soil and upper part of the subsoil a reddish-brown appearence. A few small areas are included with this soil as mapped, that have a brownish-yellow friable upper subsoil layer. These areas occupy the better drained positions. A few small areas of Colbert clay are also included. The value of these areas is less than that of Colbert silt loam.

Although the relief of Colbert silt loam is only slightly rolling to rolling, it has suffered very seriously from erosion where poorly managed. The loss of 2 or 3 inches of the surface soil in many places means the difference between a good and a poor soil, owing to the fact that the available moisture and root space of plants is confined to the surface soil and upper part of the subsoil. The lower part of the subsoil holds water so tenaciously that very little of it is taken up by the plant roots. This is particularly true in regard to the roots of corn.

The largest areas of Colbert silt loam lie in an almost unbroken chain from the northern base of LaGrange Mountain by way of Spring Valley to Melrose School south of Tuscumbia. Other large areas are east of Newfound School, around and south of Barton, at Cherokee, around Rock Creek School, and around Littleville.

From 15 to 60 percent of this soil is under cultivation, depending principally on the lay of the land and the location with respect to markets. Perhaps 60 percent of the areas cultivated is planted to cotton, and the rest is planted to corn, hay, sorgo, and some garden crops. Corn, hay, and sorgo are generally grown in the low-lying areas and slight depressions where the soil and organic matter have been accumulating. A small quantity of fertilizer is used for crops. The yields of these crops range from fair to good, and sorgo sirup is of excellent quality. Cotton is generally grown on the higher lying positions where sheet erosion has removed a large part of the surface soil. Cotton yields from one-fourth to one-half of a bale an acre. Crop yields, particularly of corn, are very low during years of low rainfall owing to the droughty nature of this soil. When this soil is first cleared, a fair yield is obtained by the use of phosphate and potash, but more profitable returns under normal economic conditions are obtained when a complete fertilizer is used. The county agent states that the use of 300 to 600 pounds an acre of a 6–8–4 or 6–10–4 fertilizer with an addition of 25 to 50 pounds of muriate of potash is recommended for cotton. The same amount

of plant nutrients may be obtained by the use of 225 pounds of nitrate of soda or its equivalent, 300 pounds of superphosphate, and 75 to 100 pounds of muriate of potash. If smaller amounts are being used the above proportion should be maintained. Oats should make satisfactory growth on this soil, and following cotton that has been heavily fertilized, an acre application of 150 to 225 pounds of nitrate of soda, or the equivalent, should be sufficient.

Colbert fine sandy loam.—Colbert fine sandy loam is of small extent. It differs from Colbert silt loam largely in texture and depth of the surface soil and occupies more rolling relief. The surface soil, to a depth ranging from 5 to 9 inches, is gray or grayish-brown friable fine sandy loam. This grades into yellow heavy fine sandy clay extending to a depth ranging from 10 to 15 inches, where it becomes grayish-yellow plastic clay highly mottled and splotched with gray, rust brown, and some red. The gray color increases with depth, and the material is underlain by partly weathered heavy gray clay and fragments of limestone rock or solid limestone rock at a depth ranging from 30 to 45 inches.

In the vicinity of Spring Valley a thin covering of sandstone which capped the limestone gave rise to this soil. In this locality, the surface soil, to a depth ranging from 6 to 24 inches, is brownish-yellow fine sandy loam or loamy fine sand. This grades rather abruptly into gray or brownish-gray mottled sticky clay resting directly on limestone. The limestone outcrops in many places, but in most places lies at a depth ranging from 2 to 5 feet below the surface.

Colbert fine sandy loam has a rolling relief and is well drained. The greater part of the cultivated land needs terracing. The principal areas of this soil are in the vicinities of Rock Creek School and Spring Valley. In the former location it is used largely for the production of timber. It is one of the best soils for forest in the county, supporting an excellent growth of rosemary and old-field pines and some hardwoods. The area near Spring Valley is largely open land, and part of it is idle land. Most of the area in cultivation is planted to cotton, but part of it is used for corn, hay, peanuts, and truck crops. It is fairly well adapted to the production of early spring vegetables, peanuts, and watermelons. Cotton yields range from one-fourth to one-half of a bale an acre when fertilized with 200 to 300 pounds of a 3–8–3 or 4–8–4 fertilizer. More profitable yields could be obtained by the use of a heavier fertilizer application, such as 600 pounds of a 6–8–4 mixture. Corn and hay yields are low. Corn yields from 5 to 15 bushels and hay from one-fourth to two-thirds ton an acre. To farm this soil successfully large amounts of organic matter should be incorporated yearly or, at least, in alternate years. This soil is subject to leaching, and large amounts of mineral fertilizer are lost by leaching if heavy rains immediately follow the application of the fertilizer.

Dickson silt loam.—Dickson silt loam is one of the less extensive agricultural soils of the county, occurring as small areas in an intermediate position between the Dewey soils and Guthrie silt loam. This soil, owing to its almost level to slightly sloping relief, is not so well drained as the Dewey soils, but it is much better drained than Guthrie silt loam.

The surface soil of Dickson silt loam, to a depth ranging from 4 to 6 inches, is brownish-gray or yellowish-gray friable silt loam. This grades into a brownish-yellow friable silty clay loam subsoil which rests on a compact or semihardpan layer at a depth ranging from 16 to 30 inches. This compact layer is mottled rust-brown, gray, and yellow clay which is hard but brittle and breaks up into a friable mass fairly easily. This layer ranges in thickness from about 12 to 24 inches and grades into mottled light-gray, yellow, or brown silty clay.

The principal areas of Dickson silt loam are on the Government reservation near Nitrate Plant No. 2, and scattered areas are near Hatton School and south of Leighton.

It was only within the last few years that this soil was put into cultivation, it being less productive than the associated Dewey soils. About 50 percent of this soil is cultivated, and the rest is largely within the Government reservation or is used as pasture land.

Approximately one-half of the land farmed is planted to cotton producing from about one-third to one-half of a bale an acre. The rest is planted to corn and hay, producing from 8 to 20 bushels of corn or from two-thirds of a ton to 1½ tons of hay. When this soil is first cleared and put into cultivation liberal amounts of phosphate and potash are required, and lime is very beneficial. After the phosphate, lime, and potash deficiencies are taken care of, the fertilizer recommendations for Dewey loam should be applicable to this soil.

Savannah loam.—Savannah loam is derived from unconsolidated coastal-plain material and occurs in the higher parts of the county. The surface soil to a depth of 4 or 6 inches is a light-gray loam. This grades into a yellow friable clay loam or silt loam subsoil which extends to a depth ranging from 20 to 35 inches. The subsoil grades rather abruptly into a compact or hardpan layer, consisting of yellowish-gray silt loam or clay loam mottled and streaked with gray, yellow, and rust brown. This compact layer is impervious, dry, only partly weathered, and hard in place, but when removed the material is easily crushed or pulverized into a friable mass. A few areas of Savannah silt loam and Atwood very fine sandy loam, too small to separate, are included with this soil as mapped.

This soil occupies a favorable relief, a large part having less than a 2-percent slope and only a small part having a gradient as much as 5 percent. The principal areas of this soil are in the central part of the county between Cane Creek and Little Bear Creek, and a few small areas are in the extreme southwestern corner.

Savannah loam on the more sloping areas is in need of terracing when used for crops. It is a shallow soil, and if erosion is allowed to advance it soon becomes unsuitable for agricultural proposes. This soil is well adapted to general farm crops and suited to a diversified type of agriculture. Probably 50 percent of this soil is cultivated, and the greater part is planted to cotton and the rest to corn, hay, sorgo, garden crops, and orchard fruits. It is particularly well adapted to peaches and grapes. In the vicinity of New Bethel School probably 75 percent of this soil is in cultivation. Cotton yields range from one-third to slightly more than one-half of a bale an acre when fertilized with 250 to 300 pounds of a 4–8–4 or a 3–8–5 mixture and side-dressed with 20 pounds of nitrate of soda per 100 pounds of commercial fertilizer, and corn from 8 to 25 bushels with no fertilizer.

For most economical returns, the use of 300 to 600 pounds of a 6–8–4 fertilizer for cotton is recommended. On farms where winter legumes are used in the rotation preceding corn, nitrate of soda is not needed.

Savannah very fine sandy loam.—Savannah very fine sandy loam is derived from unconsolidated coastal-plains material and occurs in the higher parts of the county. In wooded areas the topmost ½-inch layer of Savannah very fine sandy loam is colored with organic matter and leafmold, and to a depth of 2 inches is leached gray very fine sandy loam. This layer grades into grayish-yellow mellow and friable very fine sandy loam extending to a depth of 5 to 7 inches. The subsoil is yellow friable very fine sandy clay to a depth ranging from 22 to 35 inches. This grades rather abruptly into a compact or hardpan layer, ranging from 10 to 15 inches in thickness, consisting of yellowish-gray very fine sandy clay splotched, mottled, and streaked with gray, yellow, and rust brown. This compact layer is impervious, dry, only partly weathered, and hard in place, but when removed the material is easily crushed into a friable mass. Below this is mottled yellow, gray, and brown fine sandy clay.

Savannah very fine sandy loam occupies small to large bodies in the southern part of the county. The largest areas occur near Littleville and between Littleville and Old Bethel Community.

The relief of Savannah very fine sandy loam is undulating or sloping to gently rolling, having a gradient ranging from 2 to 8 percent. Terraces are badly needed on slopes where this soil has been put into cultivation. It is not a deep soil, and where sheet erosion has been active for many years as a result of poor management, the soil becomes too shallow for the production of farm crops and reverts to forest.

Owing to the fact that this is a shallow soil and very subject to erosion, probably not more than 15 percent has been put into cultivation, and the rest is forested with post oak, red oak, blackjack oak, water oak, old-field pine, rosemary pine, sweetgum, black gum, dogwood, maple, and hickory.

Probably 60 percent of the cultivated area is planted to cotton and the rest to corn, hay, sorgo, garden crops, and orchards. It is well adapted to peaches and grapes. Cotton yields from one-fourth to one-half of a bale an acre under present farming methods when a small application of fertilizer is used. By applying 500 to 600 pounds of 6–8–4 fertilizer and by increasing the plow depth of the surface soil to 6 or 8 inches, the yields can be increased to two-thirds of a bale or more an acre. When this soil is first cleared, good yields of cotton are obtained from the use of phosphate and potash, but larger and more profitable yields are obtained by the use of a 6–8–4 fertilizer, particularly after the first 2 or 3 years of cultivation. Corn yields range from 8 to 25 bushels an acre and hay from one-third to two-thirds of a ton. Sorgo is generally grown in small patches and from 75 to 150 gallons of sirup an acre are produced.

This soil is naturally low in plant nutrients, and one of its greatest needs, in addition to well-constructed terraces, is a liberal application of superphosphate, potash, and lime and the use of winter cover crops in a rotation of cotton and corn. It is well adapted to a diversified type of agriculture and to a definite system of crop rotation.

Atwood very fine sandy loam.—Atwood very fine sandy loam is a light-brown or grayish-brown soil occupying chiefly the plateau-like areas of the mountains. It occupies gently rolling to rolling areas and has good surface drainage.

The surface soil in cultivated areas, to a depth of about 5 to 7 inches, is a grayish-brown friable very fine sandy loam. The subsoil, to a depth ranging from 25 to 35 inches, is yellowish brown in the upper part and reddish brown in the lower part. It is granular and friable very fine sandy clay having a few small gray mottles in the lower part. This grades through a 4-inch transitional layer of streaked and mottled yellowish-brown material into a slightly compact layer which consists of mottled yellow, brown, and light-gray fine sandy clay that is hard and compact in place but when removed is easily crushed into irregular-shaped lumps and then into a granular mass. Stratified very fine sandy clay material underlies this layer at a depth ranging from 35 to 50 inches. Some areas of Savannah very fine sandy loam, too small in extent to separate on a small-scale map, are included.

An area, included with this soil as mapped in the southeastern corner of the county, has been influenced by both sandstone and coastal-plain materials. This area is redder than the typical Atwood soil. In addition, a few small areas of Red Bay very fine sandy loam are included with this soil in mapping. Such areas have a brownish-red surface soil and a red subsoil and are slightly heavier than the corresponding layers of Atwood very fine sandy loam. This soil is also slightly stronger agriculturally than Atwood very fine sandy loam.

Atwood very fine sandy loam occurs in close association with Savannah very fine sandy loam. The principal areas are in the New Bethel Community, on Kent Mountain, and in the central part of the county south of Pride. The proportion of land in cultivation, crops grown, crop yields, and fertilizer applications on Atwood very fine sandy loam are essentially the same as on Savannah loam. Like the associated Savannah soils, the Atwood soil would be much benefited by well-constructed terraces, the addition of mineral plant nutrients, and the use of winter cover crops.

Hartsells very fine sandy loam.—Hartsells very fine sandy loam is of small extent in this county. It occurs on the mountain tops in close association with Savannah very fine sandy loam and differs from that soil largely in not having a compact layer. It has been formed from the weathered products of the underlying sandstone.

The surface soil, to a depth of 5 or 8 inches, is grayish-yellow or yellowish-gray friable very fine sandy loam. The subsoil, extending to a depth ranging from 30 to 40 inches, is friable and crumbly brownish-yellow very fine sandy clay which breaks into irregular-shaped lumps and then into a granular mass. This is underlain by light-yellow very fine sandy clay mottled with rust brown and gray. Fragments of sandstone or soft partly weathered sandstone are present at a depth ranging from 45 to 60 inches. Included with this soil as mapped, are a few small areas of Hanceville very fine sandy loam, in which the surface soil is brown and the subsoil is brownish red. A few small sandstone fragments are present on the surface.

Probably 40 percent of Hartsells very fine sandy loam is under cultivation, and the rest supports a forest growth of shortleaf pine,

post oak, red oak, black gum, chestnut oak, a few hickories, and other hardwoods. The cultural practices and recommendations for this soil are the same as for Savannah very fine sandy loam; but this soil is probably a little more responsive to improved agricultural practices. This soil is particularly well adapted to growing peaches, grapes, and other fruits.

It occupies undulating to gently sloping relief and is everywhere well drained. It warms quickly in the spring, is easily cultivated, and responds readily to the application of commercial fertilizers and to the turning under of green-manure crops.

GRAY OR RED GRAVELLY AND CHERTY LOAMS

There are only two types in this group, Dewey cherty loam, rolling phase, and Atwood gravelly loam. These soils occupy well to excessively drained positions and have from 6 to 15 or more percent slope. The chert or gravel in some places interferes with cultivation. To farm these soils successfully large terraces are necessary and very careful supervision of the farming system should be practiced. Areas of these soils occur in rather narrow bodies, and the cost of farming operations would be rather high. Power machinery cannot be used advantageously on these soils. The areas having more gentle relief can be farmed, and fair yields may be expected. These soils are best suited to orchard fruits, pasture, or forest. Apples, peaches, pears, grapes, and other fruits can be grown. Lespedeza, redtop, and orchard grass will make satisfactory growth if a liberal application of basic slag or some other phosphatic fertilizer is applied.

Dewey cherty loam, rolling phase.—Dewey cherty loam, rolling phase, differs from typical Dewey cherty loam in that it is more rolling, occurs almost exclusively around stream heads instead of on knolls, knobs, and ridge tops, and contains slightly more chert throughout the surface soil and subsoil. Ledges of cherty material and limestone outcrop in many places, giving the surface a distinctly stony appearance, although these ledges are not everywhere uniform, and in some places loose stones occur on the surface.

Locally the chert fragments and numerous ledges of limestone interfere with cultivation. This condition, together with the rolling to steep relief, makes soil of this phase best suited for forestry and native pasture land, or, possibly, to some extent, for orchards. Common lespedeza is native to this soil. Kudzu, orchard grass, redtop, or Bermuda grass, or a combination of these grasses, should be planted on a large part of the cleared areas. The forest growth consists of white oak, red oak, post oak, cedar, hickory, elm, walnut, and other trees. Under present economic conditions, the amount of land in cultivation probably will not increase.

This soil is located principally around the heads of short streams adjacent to Tennessee River. The largest area lies west of Tuscumbia around and between the mouths of Little Bear and Spring Creeks. Other large areas are west of Georgetown Landing, in the Government reservation around Nitrate Plant No. 2, and around and east of Stinsons Hollow to Town Creek on the slopes overlooking Lake Wilson.

In the eastern part of the county a number of chert gravel pits are located in areas of this soil. The chert is used very satisfactorily as road-surfacing material.

Atwood gravelly loam.—Atwood gravelly loam comprises the greater part of the narrow ridge tops of the mountain section and represents a condition rather than a definite soil type. This soil comprises areas of Atwood, Savannah, and Cuthbert gravelly loams, among which Atwood gravelly loam predominates. These soils are so intricately mixed in occurrence that a separation of them could not be made on a small-scale map. The Cuthbert soil resembles the Atwood very closely in color and texture of the surface soil and upper part of the subsoil, but the lower part of the subsoil is redder, tougher, heavier, and more compact.

The surface soil of Atwood gravelly loam, to a depth ranging from 4 to 7 inches, is grayish-brown gravelly loam. The subsoil, to a depth ranging from 25 to 35 inches, is yellowish-brown gravelly friable sandy clay. This grades into mottled yellow, brown, and light-gray gravelly sandy clay which, in places, is somewhat compact. The surface soil and subsoil contain from 15 to 35 percent of small rounded quartz and chert gravel.

This soil occupies long narrow bodies on the mountaintops in the western half of the county. Few of the areas exceed one-fourth mile in width and average not more than half this width, but some of them extend in unbroken areas for a distance of several miles. This soil also occurs along the bases of the gravelly hills along the edge of the Bear Creek bottom land.

Perhaps 85 percent of this soil is used for the production of timber, supporting chiefly rosemary pine, old-field pine, and some hardwoods. Quail feeds, such as beggar lice, quail berries, acorns, dogwood berries, and French mulberries, grow abundantly, making this soil valuable as a quail preserve. The rest is used largely for roads, building sites, and truck and garden patches. A few small areas are planted to cotton and corn. Roads follow the ridge tops throughout this section of the county, consequently they are built on areas of this soil. This soil, as the result of its good drainage, high altitude, accessible water supply, and location with respect to farm land and roads, is especially desirable for building sites. The Allsboro Community, which is one of the most healthful centers in the county, is located on this soil. The areas occurring along the bases of the hills are also well adapted for building sites, most of which are close to springs and permanent flowing streams of fresh water flowing out of the hilly and mountainous areas.

POORLY DRAINED GRAY SILT LOAMS

Included in this group are Guthrie silt loam, Melvin silt loam, and Colbert silt loam, flat phase. Melvin silt loam occurs as low first-bottom land and is subject to frequent overflows. Guthrie silt loam is confined to slight depressions or sinks in the uplands, whereas Colbert silt loam, flat phase, has a level relief. Both soils are naturally poorly drained. These soils are wet and soggy during the greater part of the year. Water-loving flora consisting of sweetgum, black gum, elm, maple, and willow, and post, blackjack, water, and Spanish oaks and rattan vines are the principal vegetation. In a few places these soils are or have been sufficiently well drained for the production of carpet, Dallis, and related grasses and for the production of a few early-maturing crops that survive on wet strongly

acid soils. The best use for the soils of this group is pasture and forest. Lespedeza may be grown if the soils are artificially drained and a large application of basic slag or some other phosphatic fertilizer is made.

Guthrie silt loam.—Guthrie silt loam is a gray poorly drained soil occupying basins and swales in the limestone valley, that have little or no surface outlet. The areas are semiswampy, being covered with water during a part of the winter and early spring. The surface soil, to a depth ranging from 6 to 10 inches, is light-gray floury silt loam faintly mottled with rust brown. The subsoil, to a depth ranging from 24 to 40 inches, is whitish-gray silt loam with some mottles of yellow or brown. This changes rather abruptly into bluish-gray or steel-gray tough mottled gray and brown clay. A few areas, which lie from 6 to 18 inches higher than the typical soil, have developed a gray surface soil and a pale-yellow subsoil. These areas produce better pasture grasses than the wetter areas. An area near Gum Bottom contains some angular chert gravel in the surface soil and subsoil.

Guthrie silt loam occurs as small areas scattered throughout a large part of the limestone valley, principally in the northeastern part of the county. One of the largest areas comprises Gum Bottom which is flooded by Dry Creek during the wet seasons. The only outlet is an underground channel which often becomes clogged and retards run-off of surface water.

Guthrie silt loam is seldom used for farm crops. Its chief use is for growing timber, most of which is used as firewood for home use and for framing timbers for buildings. Sweetgum and black gum dominate the tree growth, and oaks, willow, elm, maple, swamp dogwood, sycamore, grapevines, poison-ivy, bamboo briers, rattan vines, and other water-loving flora grow luxuriantly. Native pasture, supporting a large variety of underbrush and vines, is fair on this soil. Carpet and Dallis grasses do well on the better drained areas. In its present condition the best use for Guthrie silt loam is pasture, or a combination of forestry and pasture.

Melvin silt loam.—Melvin silt loam is a gray poorly drained soil occupying the first bottoms along some of the streams in the limestone valley. It has color and structural characteristics very similar to Guthrie silt loam and differs largely in that the Guthrie soil occupies swales and depressions on the uplands. The surface soil of Melvin silt loam, to a depth of 5 or 8 inches, is gray floury silt loam underlain, to a depth ranging from 25 to 40 inches, by gray floury silty clay or silt loam mottled with rust brown and yellow. This is underlain by heavy and compact blue or gray clay.

The largest areas of Melvin silt loam are along Bear Creek between Margerum and Riverton, and other areas are near Georgetown Landing, along Pond Creek, and along Town Creek in the southeastern corner of the county.

This soil is used largely as forest and pasture land. The principal tree growth is black gum, sweetgum, willow, water oak, hickory, sycamore, and beech, together with a large amount of underbrush that is used for grazing purposes. Dallis grass, carpet grass, and lespedeza do well on the areas where drainage is naturally well estab-

lished or where deep drainage ditches have been cut. The best use for this soil is pasture or a combination of pasture and forestry.

Colbert silt loam, flat phase.—Colbert silt loam, flat phase, differs from typical Colbert silt loam in that it has flat relief and poor surface and internal drainage. The surface soil, to a depth ranging from 4 to 7 inches, is friable pale yellowish-gray silt loam, the upper one-half inch being leafmold. The subsoil, to a depth ranging from 24 to 30 inches, is yellowish-gray, mottled with light gray and rust brown, sticky silty clay. This layer is hard but fairly friable when dry but is sticky and plastic when wet. This grades into light-gray or bluish-gray sticky plastic clay mottled with pale yellow and rust brown. Small iron concretions are present throughout the soil.

A number of small areas, included with this soil in mapping, consist of light-gray friable silt loam to a depth ranging from 20 to 30 inches. Below this depth the material is very plastic. The principal areas of this variation are in the vicinity of Whiteoak School south of Leighton.

About 95 percent of Colbert silt loam, flat phase, is devoted to forest, consisting of laurel, water oak, post oak, white oak, hickory, maple, black gum, elm, cedar, sweetgum, and a few old-field pines. The rest is cultivated to sorgo, corn, cotton, and hay. Crop yields, crops grown, and fertilizer requirements on the cultivated areas are essentially the same as on typical Colbert silt loam. The best use for this soil is pasture and forestry.

MISCELLANEOUS SOILS AND LAND TYPES

The members of this group are Guin soils, undifferentiated, Colbert clay, and rough stony land. They comprise 167,616 acres, or 43.2 percent of the total land area of the county. They are characterized by hilly or broken relief ranging from steep to mountainous and being too broken for general farming purposes. Rain water runs off the surface rapidly, and internal drainage is dependent on the character of the subsoil or substrata. The relief is such that when they are denuded of their forest growth erosion becomes active and the greater part or all of the soil is washed down to bedrock or hard material. Rock fragments and rounded quartz and cherty gravel are strewn over the surface of a large part of these soils and in many places are embedded in them. Outcrops of limestone rock and solid ledges of limestone are numerous in Colbert clay and rough stony land.

There are small areas of these soils scattered here and there which could be used for patch farming, for growing garden vegetables, or for pasture and fruit growing. Considered as a whole, the best use for the miscellaneous soils and land types under present economic conditions is for forest. In some locations rather large areas of the smoother part of these soils have been cleared and farmed. Erosion became active, and most of these areas have reverted to range land and forest.

Guin soils, undifferentiated.—Guin soils, undifferentiated, represent a soil condition rather than a definite soil type and comprise those soils on the mountains characterized by steeply escarped slopes, narrow meandering ridges, knolls, deep V-shaped ravines, and the absence of rock ledges. This soil classification is very intricately

mixed, consisting of coastal-plain material on the higher elevations, overlapping a narrow belt of weathered sandstone on the intermediate elevations, with some limestone on the lower elevations. The largest proportion of this soil is derived from coastal-plain material and has principally the characteristics of Atwood gravelly fine sandy loam, but in other areas the materials give rise to soils similar to those of the Savannah and Cuthbert series. Rounded chert gravel are very abundant, constituting from 10 to 60 percent of the soil mass. Most of the road-surfacing material comes from gravel pits in areas of this soil. Conglomerate rocks, composed of rounded gravel cemented with iron, are scattered throughout these areas. The intermediate slopes, which are of sandstone origin, are of material similar to the Hartsells soils, having platy sandstone and ferruginous rock fragments in the surface soil and subsoil. On the lower slopes the surface soil covering is sandy and gravelly material which has been translocated from the gravelly slopes and ridge tops of the higher elevations and deposited on Colbert clay material. The surface soil in such places ranges in thickness from 4 to 12 inches and is underlain by heavy bluish-gray clay. All these formations grade into each other, and no definite line can be drawn between them. The degree of influence of each formation differs throughout the area.

Guin soils, undifferentiated, comprise a large proportion of the southwestern part of the county, and smaller areas occur throughout the mountainous section, especially along the Franklin County line. A large area is in the southeastern part of the county near Roscoe Church.

Not more than 2 percent of this soil is in cultivation. In a few places narrow ridge tops and slopes were cleared and put into cultivation, but erosion has been so great that most of these areas have reverted to forest. The largest areas that are and have been cultivated are located in the Crooked Oak Community. A few truck and garden patches around home sites are still being farmed. Corn is grown along some of the stream bottoms that are too narrow to show on the map and along the bases of a few of the hills.

Most of this soil is held in large tracts by lumber companies. A number of farmers own small tracts of this land, in connection with tillable land, that supplies the wood and lumber for home purposes. The land was originally heavily forested but practically all of the large merchantable timber has been cut. Small portable sawmills are now being used to cut the smaller timber. At present the principal merchantable timber is second-growth rosemary pine, old-field pine, and some hardwoods, such as chestnut, red, white, Spanish, blackjack and post oaks and hickory, dogwood, elm, maple, ironwood, haw, and others. In addition, quail feeds, such as beggar lice, dogwood berries, French mulberries, acorns, quail berries, sensitiveplant seeds, and grass seeds, make this land valuable as quail preserves. Its best use is for forestry.

Colbert clay.—Colbert clay is gray sticky clay of limestone origin lying generally on the lower slopes of the mountainous and hilly areas. It is generally known as "gray waxy land" or "rabbitskin land." The slope ranges from 8 to 20 percent.

The 2- to 5-inch surface soil is grayish-yellow or yellowish-brown silty clay, underlain by yellow, mottled with gray and rust brown,

plastic clay which quickly grades into yellow stiff plastic clay mottled with gray. This layer extends to a depth ranging from 25 to 35 inches, where it rests on limestone or gray stratified calcareous shale. The subsoil is compact and impervious and contains small black and brown ferruginous concretions. It checks and cracks when dry but when wet is tenacious and sticky. In the vicinity of Spring Valley the soil material contains more red than usual, indicating slightly better drainage which increases the value of the soil to some extent. A fine sandy loam covering, 2 to 4 inches thick, overlies a narrow strip of this soil where it joins the sandy soils of the mountains.

Included with Colbert clay in mapping, are a few areas of Colbert stony clay, hilly phase, which has the same soil characteristics as Colbert clay but differs in that the stony clay contains large angular boulders on the surface and a few rock ledges of limestone. These areas are indicated by rock-outcrop symbols, and most of them are on the higher elevations. The stony condition lowers the value of the land to a considerable extent. Near Littleville, a few small areas of black calcareous shaly clay are included with this soil in mapping. These areas are used for the production of leguminous crops and corn.

Colbert clay occupies comparatively narrow but continuous bodies surrounding the base of the mountains at an elevation between 550 and 700 feet. In the vicinity of Evening Shade Church this soil lies on a secondary position at an elevation of about 800 feet.

Approximately 95 percent of Colbert clay is forested, and the rest is used for lespedeza and grass pastures, in addition to a few small cotton patches. The forested areas are generally used as open pasture range in connection with the adjacent soils. Old-field and rosemary pines and the hardwoods grow especially well in a few locations, but the principal areas are forested largely with spruce pine, cedar, some old-field pine, and hardwoods. The best use for Colbert clay is forestry. Pasture grasses suffer from lack of moisture during dry seasons.

Rough stony land.—Rough stony land includes the rough stony mountainous land in the county. It is most easily recognized by its deep gorges, high rock ledges, and large boulders. This land comprises the most broken and rugged relief in the county and occurs in close association with Guin soils, undifferentiated. It differs from these soils in that it is more steeply escarped, including vertical rock ledges in many places; is closer to the streams, occupying the slopes adjacent to the stream channels; does not occupy ridges and knolls; and is derived from sandstone and limestone. The sandstone overlies the limestone and has given rise to the largest proportion of this land. The limestone influence is marked chiefly by deep gorges and vertical walls along the streams. This is especially true around the headwaters of Cane Creek where some of the walls are 90 feet high. Small areas of Hartsells stony loam around a few drainage heads are included with this classification of material. One area joins Franklin County.

The forest growth is not so good as that on Guin soils, undifferentiated. Spruce pine, hardwoods, dogwood, cedar, and old-field and rosemary pines constitute the greater part of the tree growth. This

soil like the associated Guin soils, undifferentiated, should remain in forest and quail preserves. Beggar lice, dogwood berries, acorns, grass seeds, quail berries, and French mulberries supply a large amount of feed for quails. Erosion would be so great if the land were cleared that not only this land would be ruined, but the agricultural lands on the lower slopes would be injured by onrushing water carrying stone fragments and debris.

The largest areas of rough stony land are around the headwaters of Spring, Little Bear, Cane, Buzzard Roost, and Rock Creeks in the south-central part of the county. Some areas circle the mountain ranges and peaks overlooking the limestone valley, and other areas are along Tennessee River in the form of high bluffs, some of which are marked by large caves.

LAND USES AND AGRICULTURAL METHODS

The Dewey and Decatur soils have been used largely for the production of cotton since cotton was first grown in the county. These soils always have been considered by the farmers as the most fertile and productive of the upland soils.

Abernethy silt loam and Huntington silt loam are the premier soils for corn, and large yields are produced annually without the use of commercial fertilizers. They are continually being refreshed by the deposition of new soil material at each overflow of the streams.

The Dewey and Decatur soils are deep over the limestone bedrock, and when the surface soil is washed off more of the subsoil is incorporated to form a new soil. Such land can withstand considerable sheet erosion and still be good agricultural soil.

On the mountains, the Savannah, Atwood, and Hartsells soils have comparatively shallow subsoils over the parent material, and can suffer very little sheet erosion without causing much deterioration of the soil. These soils are devoted mainly to a subsistence type of agriculture, with cotton as the main cash crop.

The large areas of Guin soils, undifferentiated, rough stony land, and Colbert clay are used mainly for forestry, although small areas here and there throughout these soils can be cultivated or used for the production of fruits or for pasture.

Practically all the soils are deficient in organic matter. They contained only a small quantity when the land was cleared of the native vegetation, and most of this has been lost through clean cultural practices, leaching, oxidation, and erosion. Therefore, the greatest needs of these soils are the incorporation of large amounts of vegetable matter and mineral plant nutrients.

The ultimate aim of each farmer is the economical production of crops. This cannot be obtained on land on which the removal of plant nutrients has been continuous and no additions made to keep the soil productive. Considerable experimenting on different crops, fertilization, and combination of crops is necessary in order to know the best method of improving the soils. Therefore, the Alabama Agricultural Experiment Station at Auburn has come to the aid of the farmers by conducting these experiments. A central experiment station with five subexperiment stations and a number of experimental fields and farmer cooperative plots are located over the State

on different types of soil. Results obtained at the subexperiment statons at Belle Mina and at Crossville should be applicable to the soils of Colbert County. Results from the former station should be applicable to the limestone valley part of the county, and results from the latter station should be applicable to the plateaulike areas of the southern part of the county.

The experiment station has found that a farmer must know the crops or combinations of crops to which his soil is best adapted, the quantity and quality of fertilizers required for each crop, the rotation of crops and the type of rotation that fits into his farming practices, the variety of crops best suited to his soil and locality, the proper spacing of crops, and the proper use of abandoned areas from which he no longer derives an income. The experiment station and the extension service at Auburn, or the county agricultural agent at Tuscumbia can furnish the farmer this information. Part of this information is discussed in general in subsequent pages of this section and under each soil type in the section on Soils and Crops, but for more complete and up-to-date information, it is suggested that one of the three agencies mentioned above be consulted.

The first requirement for economical crop production is a productive soil. To obtain this, the soils subject to erosion should be terraced with broad-based terraces and a crop rotation used in which a legume crop may be included to be turned under. On the soils that are adapted to general farm crops, the following 2-year rotation is recommended: First year, cotton, followed by vetch, Austrian Winter peas, or crimson clover; second year, corn, which may or may not be interplanted with soybeans, cowpeas, velvetbeans, or peanuts. Corn yields have been increased from 15 to 20 bushels an acre by this system. This rotation may be lengthened to a 3-year rotation by following the corn with oats, which, in turn, is followed with cowpeas or soybeans. Crotolaria, a summer legume, may be used in the farming program with success, its greatest asset being its ability to reseed itself.

As the soils in the bottoms and swales are especially adapted to corn and hay and the red soils of the uplands to cotton, legumes, and oats, the crop rotation must be developed to fit the individual farm, depending on the acreage and character of each soil on the farm. Any clean cultural farming system on the upland soils should be developed around a legume crop. On the soils especially adapted to cotton, the county agent states that a rotation consisting of 2 or 3 years of Kobe, Korean, or Tennessee 76 lespedeza followed by 2 to 4 years of cotton has proved very satisfactory. This method is shifting the agricultural program from continuous cotton growing to a combination of cotton growing and beef-cattle production. As an alternative, a winter cover crop every 2 years worked into the farming program should give satisfactory results. The bottoms and swales seldom need fertilization.

Kudzu, a fast-growing perennial legume, has a place on practically every farm, it being well adapted to all well-drained sandy upland soils. Adjacent to the barnyard, a large proportion of the farms have a small to large idle area. If these areas were planted to kudzu, the appearance of the landscape would be improved, and at the same time green feed as a supplement for pasture would be produced. It is also a valuable plant for stopping erosion when

set along ditches and on badly eroded areas. In feeding value it compares favorably with other legumes. Kudzu is propagated by the use of root crowns, and extreme care must be taken in the setting of these crowns, and then 2 or 3 years' growth is necessary for it to develop and become well established. It may be cut and used as a hay crop, for temporary grazing, or cut and fed in the feed lot as a supplement to pasture during the summer.

Due to the fact that cotton is the principal cash crop for this section of the State and that practically all the farmers grow from a small to a large acreage of it, more study has been made by the experiment stations as to its fertilizer needs than of all other crops. Results show that the best fertilizer for cotton on Dewey loam, Dewey silt loam, and Decatur clay loam is one that supplies at least 36 pounds of nitrogen, 48 pounds of phosphoric acid, and 24 pounds of potash an acre. To supply these quantities of plant nutrients, 225 pounds of nitrate of soda or the equivalent of nitrogen, 200 pounds of superphosphate (acid phosphate), and 48 pounds of muriate of potash, or a 6–8–4 fertilizer applied at the rate of 600 pounds an acre are required. This quantity of plant nutrients may also be supplied by an application of 600 pounds of a 4–8–4 fertilizer and a side dressing of 75 pounds of nitrate of soda, or the equivalent. Where the farmer uses a 3–10–3 fertilizer under cotton at the rate of 600 pounds an acre, it should be side-dressed with approximately 112 pounds of nitrate of soda, or the equivalent. The cotton varieties recommended as being the best producers and growing a good staple are D. P. L. 4–8 and Cook 1627, the former being the more popular. These varieties are used by probably 50 percent of the farmers and are gaining in popularity.

Nitrogen is the principal fertilizer ingredient needed for the production of corn. The cheapest and most economical form is obtained as organic nitrogen by turning under a winter cover crop that has been fertilized with lime or basic slag, or by the use of barnyard manure. Should these organic forms not be available, sodium nitrate applied at the rate of 100 to 150 pounds an acre as a side dressing when the corn is about knee high is recommended. A small part of the corn grown is fertilized with commercial fertilizers. The overflow bottoms and swales are the principal soils used for the production of corn and are naturally fertile, having very little need of additional fertilization, but some of the higher bottoms that are less subject to overflow need the above-recommended fertilization. On recently cleared land on the mountains or land that has never received any phosphate, the use of some phosphate in addition to the nitrogen is profitable.

The corn varieties recommended for the county are Neal Paymaster, Douthit, Whatley Prolific, Indian Chief, Mosby Prolific, and Hastings Prolific. The Prolific varieties and Neal Paymaster are particularly well adapted to the sandy mountain soils.

Wheat is not commonly grown in this county due to the more economical production of cotton. The crop is recommended under certain conditions as a combination winter cover and pasture crop. Alabama Bluestem is the most popular variety.

Abruzzi rye grows faster in the fall than other varieties and is probably the most satisfactory variety for winter grazing and is better for winter grazing than either oats or wheat.

The fall-grown oats recommended are Red Rustproof and Fulghum varieties. Some Winter Turf oats are grown. These varieties are much higher producers than the spring varieties, but they frequently winter-kill. They should be fertilized with 100 pounds of sodium nitrate in the spring. The principal reason for the low acreage of this crop is because its time of harvest interferes with the preparation of cotton land.

The soybean varieties recommended are Mammoth Yellow, Otootan, and Laredo, Otootan being the most popular. The Mammoth Yellow variety is particularly well adapted to the first bottoms and swales, as it survives short overflows. Otootan and Laredo produce a smaller stalk than the Mammoth Yellow, making them more digestible. An acre application of 200 to 400 pounds of basic slag is recommended.

The Whippoorwill cowpea is a very popular variety and is highly recommended. It is particularly well adapted to follow early potatoes or oats, as it has a shorter period of maturity than soybeans. Fertilization is the same as for soybeans.

Alfalfa plays a small part in the agriculture of Colbert County. It can be grown on the Dewey and Decatur soils, but a heavy application of basic slag or lime and acid phosphate is required.

Kobe, Korean, Tennessee 76, and common lespedeza are recommended for the soils of Colbert County. An acre application of 300 to 400 pounds of superphosphate or the lime equivalent of basic slag has proved very profitable. The ability of lespedeza to thrive on extremely poor soils and the high quality hay obtained have made it very popular. The common lespedeza (Japan clover) is the basic pasture crop in most of the native pastures.

According to results obtained at the Tennessee Valley Experiment Station, the limestone valley soils when properly treated, seeded, and cared for will make good pastures. Pasture recommendations by this station for acre seedings are 10 pounds of orchard grass, 15 pounds of Kentucky bluegrass, 3 pounds of white clover, and 10 pounds of common lespedeza, unless already present. Dallis grass may be sown, but livestock prefer bluegrass and orchard grass. This should be fertilized with 1,500 to 2,000 pounds of basic slag an acre, every 3 or 4 years. Considerable care is required in growing Kentucky bluegrass.

The Triumph is the most popular variety of potatoes, and the Nancy Hall and yams are the more popular sweetpotatoes. They are grown chiefly for home consumption and a small quantity for the local markets. An acre application of 500 to 800 pounds of commercial fertilizer analyzing 4–10–7 is recommended. The ratio of potash is higher than that used for general crops.

A large amount of revenue has been realized in past years from the mountainous section of the county through the marketing of timber, but the present tree growth is small and returns little revenue. In some sections of the county small trees are being cut and sold to the paper mills to the extent of deforesting the land. According to the State extension forester, the more merchantable timber, such as pines, white and red oaks, hickory, poplar, ash, and cedar, should be protected from forest fires to insure more economical returns, and most of the trees should be allowed to reach maturity.

MORPHOLOGY AND GENESIS OF SOILS

Colbert County is in the limestone valley section of northwestern Alabama, in the Tennessee Valley. The county lies in the Red and Yellow soils region, only a short distance south of the Gray-Brown Podzolic soils region. About 40 percent of the county is in the limestone valley proper, has undulating to gently rolling relief, ranges in elevation from about 400 to 500 feet above sea level, and is naturally well drained. The rest comprises the mountains and has an elevation of about 900 feet and is well drained. The soils on the higher part show some podzolization.

All the soils of the county are light in color, ranging from light gray to red or reddish brown in the surface layers. They are prevailingly silty in texture, although they range from clay to fine sandy loam. They have developed under a forest cover dominantly of deciduous trees, although some conifers grew in the southern part. The forest growth, together with a long summer season and high rainfall, has not been conducive to the accumulation of organic matter in the soil. In the forested areas a thin veneer of leafmold is generally on the surface and a small quantity of organic matter in the topmost 1- to 3-inch layer of the soil.

A common characteristic of the soils is that the A horizon does not contain so high a content of mineral plant nutrients as the B horizon. In this section of heavy rainfall and moderately warm temperature, leaching and erosion continue throughout the year, as the ground is seldom frozen and then for only short periods, and they have been important factors in the removal of the soluble plant nutrients. Carbonate of lime has not accumulated in the solum, although many of the soils are derived from almost pure limestone. The soils of the county range from slightly acid to strongly acid, as shown by the pH determinations given in table 4. The soils nearest the neutral point are the Huntington, whereas the most acid soils are the Guthrie and Savannah. Guthrie silt loam in Lauderdale County has a pH value ranging from 4.3 to 5.

TABLE 4.—*pH determination of three soils from Colbert County, Ala.*[1]

Soil type and sample no.	Depth	pH	Soil type and sample no.	Depth	pH
Decatur clay loam:	*Inches*		Huntington silt loam:	*Inches*	
417801	0– 5	5.8	417824	0– 8	6.1
417802	5– 15	5.4	417825	8–25	7.0
417803	15– 25	5.1	417826–27	25–52	5.1
417804	25– 35	4.5	417828	52–62	5.9
417805	35– 45	4.7	Savannah very fine sandy loam:		
417806	45– 55	4.4	417833	0– 2	5.1
417807	55– 65	4.5	417834	2– 5	4.9
417808	65– 80	4.5	417835	5–30	4.7
417809	80–105	5.2	417836	30–40	5.2

[1] Determinations made by E. H. Bailey, Bureau of Chemistry and Soils, with the hydrogen electrode.

In the normally developed soil profiles, the A horizon shows eluviation and the B horizon illuviation. Where the soil has been poorly managed, both sheet and gully erosion have in some places removed part or all of the A horizon, destroying the normal soil profile. The solum of the various soils of the county ranges in thickness from about 3 to more than 15 feet. Some angular chert material is con-

spicuous in some places throughout the soils underlain by limestone in the valley, whereas small rounded chert or quartzite gravel are generally present in the soils on the mountains, and outcrops of solid limestone and sandstone occur near the base of the mountains or on the escarpment.

In many areas of the Dewey and Decatur soils the different horizons grade into each other, and no definite line of contact as regards color, texture, structure, and consistence can be drawn between the A and B horizons or the B and C horizons. As the chief factors responsible for soil development—vegetation and climate—vary but little, a close relationship exists between the soils and the parent materials and relief within the county. This similarity is revealed by comparing the soil map with a map showing the geological formations in the county.

All the soils, except those developed in the first bottoms and those on the second bottoms, or terraces, are developed in place; that is, the underlying rock formations or unconsolidated beds of sands and sandy clays have disintegrated and weathered, and the soil-forming processes have acted on these materials to produce a large number of different soils.

The principal underlying formations [4] in the valley part of the county are the Tuscumbia, St. Genevieve marl, and asphaltic Gasper shale. The Tuscumbia, which is also known as Warsaw and St. Louis, underlies the greater part of the valley. It is a comparatively pure limestone having a low chert content, although some areas throughout this formation consist of impure (chert) limestone. As the chert is more resistant to weathering than limestones, the resultant relief is somewhat rougher and consists chiefly of stony ridges and knolls that stand prominently above the surrounding undulating to rolling valley country.

The Dewey and Decatur soils are underlain by and derived from weathered limestones of the Tuscumbia formation. The red color of these soils signifies a high degree of oxidation and also of soil maturity.

Dewey loam may be considered a mature or normally developed soil of the valley and a cultivated area shows the following profile:

A. 0 to 4 inches, light reddish-brown mellow loam.
B_1. 4 to 15 inches, reddish-brown friable granular clay loam.
B_2. 15 to 72 inches, brownish-red clay which is firm and slightly stiff but moderately friable and easily crushed into a fine angular granular mass.
C. 72 inches+, reddish-brown, mottled with yellow and gray, sticky clay, intermixed with partly weathered chert fragments which increase with depth.

In some places small soft iron or manganese concretions are present in the soil profile.

Dewey silt loam was evidently the normally developed soil in the valley, and the solum is generally deeper than in the loam. Dewey cherty loam contains angular chert gravel or fragments throughout the soil profile and on the surface. Decatur clay loam is closely related to and associated with Dewey loam but differs from it in that the A horizon is reddish-brown clay loam or silty clay loam to a

[4] ADAMS, G. I., BUTTS, C., STEPHENSON, L. W., and COOKE, W. GEOLOGY OF ALABAMA. Ala. Geol. Survey Spec. Rept. 14, 312 pp., illus. 1926.

depth ranging from 3 to 8 inches, and the B horizon is dark brownish-red clay having a high colloidal content. Decatur clay loam is apparently derived from a purer limestone than the Dewey soils.

The St. Genevieve marl and asphaltic Gasper shale of the valley and lower mountain slopes, together with the shaly Bangor limestone of the southern part of the county and the Golconda marls of the southwestern part, give rise to the Colbert soils. These formations have weathered very slowly, owing to the heavy character and shaly nature of the materials, consequently the Colbert soils have not developed mature soil profiles.

A virgin area of Colbert silt loam as observed 1 mile south of Spring Valley shows the following profile:

A_1. 0 to 4 inches, light yellowish-gray floury silt loam.
A_2. 4 to 10 inches, grayish-yellow friable silty clay.
B_1. 10 to 18 inches, yellow plastic clay faintly mottled or splotched with gray and yellow. On drying it breaks into irregular-shaped cubes and becomes very hard.
B_2. 18 to 45 inches, light yellowish-gray plastic and sticky clay, highly mottled and marbled with gray, brown, and some red.
C. 45 inches+, steel-blue plastic clay, mottled and streaked with yellow, which grades into soft shaly limestone fragments.

In the southern and western parts of the county lies a chain of high hills, which are remnants of the Appalachian Plateau and upper coastal plains. Tennessee River and its tributaries, through many centuries, channeled out the broad limestone valley, leaving the rounded and badly dissected hills and plateaus which lie about 250 feet higher than the valley proper. In this section the Harstells sandstone, which is a thin-bedded medium-grained sandstone, and some basal limestone are covered from a few feet to 50 feet with the Tuscaloosa formation, consisting of a mantle of old coastal-plain material. The soil-forming processes, acting on the beds of unconsolidated marine sands, gravels, and clays of the Tuscaloosa formation, give rise to the Savannah and Atwood soils.

These soils are normally well developed and show some indications of post maturity. A virgin area of Savannah very fine sandy loam as observed 3 miles east of New Smyrna School shows the following profile:

A_1. 0 to ½ inch, leafmold intermixed with very fine sand and silt.
A_2. ½ inch to 2 inches, gray friable very fine sandy loam, the upper part being darkened by the presence of a small quantity of organic matter.
A_3. 2 to 5 inches, pale-yellow friable loam or very fine sandy loam.
B_1. 5 to 30 inches, brownish-yellow friable clay loam.
B_2. 30 to 40 inches, splotched and mottled gray and yellow compact very fine sandy clay which is firm and hard in the natural state. It is brittle and fairly easily crushed into a friable mass.
C. 40 inches+, gray tough clay, mottled with yellow and rust brown and underlain at various depths by sand and gravel.

Dickson silt loam has a color profile very similar to that of the Savannah soils but differs mainly in soil associations and in parent material. Dickson silt loam is closely associated geographically with the Dewey soils. The Savannah soils are of old coastal plain origin and occur on higher elevations. Both Dickson silt loam and the Savannah soils are characterized by the development of a hard, compact layer between depths of 18 and 30 inches.

The Atwood soils differ from the Savannah soils in that the A horizon is light brownish gray, the B horizon is reddish brown or brown, and the compact layer is not so well defined.

The Hartsells soils differ from the Savannah soils in the absence of a hardpan layer in the B horizon and also in the character of the material of the C horizon. The Hartsells soils are underlain by light-colored sandstone, and the material of the C horizon is a mottled yellow, brown, and gray friable fine sandy clay which grades, at a depth between 3 and 5 feet, into the soft disintegrated sandstone.

Old alluvial deposits are along most of the larger streams of the county. The soils developed from these materials lie above normal overflow and have lain in this position a sufficient length of time to have developed a normal soil profile. These soils are represented by members of the Etowah, Cahaba, and Kalmia series. The Etowah soils are brown soils developed on the terraces and derived mainly from material from the limestone soils. The Cahaba and Kalmia soils are brown and yellow, respectively, and are derived largely from materials washed from soils of the coastal plains, with an admixture of material from sandstone and limestone.

The Abernethy, Guthrie, Huntington, Ochlockonee, and Melvin soils have not developed normal profiles. The materials from which they are derived are young and are being more or less modified by the deposition of new material from time to time. The Abernethy and Guthrie soils occupy swales and depressions of the limestone valley. They differ in that the Abernethy soils have from 6 to 18 inches of alluvium deposited from the surrounding red soils, and the Guthrie soils represent a poorly drained condition, the surface soil being modified very little by alluvial material. The Huntington, Ochlockonee, and Melvin soils owe their origin to recently deposited alluvial materials. The Huntington soils are derived largely from limestone materials and the Ochlockonee soils mainly from old coastal-plain material with some sandstone and limestone influence. The Melvin soil is largely of limestone origin but is gray in color owing to poor drainage.

SUMMARY

Colbert County lies in the limestone valley adjacent to Tennessee River and Bear Creek. It comprises a total area of 606 square miles. This area is characterized by an undulating to gently rolling relief and lies from 20 to 120 feet above the stream banks of Tennessee River. The southern part of the county comprises the mountainous section characterized by broken relief consisting of narrow ridges, steep slopes, and narrow V-shaped stream valleys.

Drainage is excellent to excessive, except in a few small areas of the valley. Sheet erosion in the limestone valley and gully and sheet erosion in the mountains are very detrimental to the soils, reducing their natural fertility.

The climate is generally pleasant, although short cold waves during the winter and hot dry spells during the summer and early fall are rather unpleasant. Oats and winter cover crops are seldom killed if well rooted, and hardy fall vegetables generally survive until late in the winter. The rainfall is generally ample and fairly equally distributed throughout the year, the greatest amount falling in the winter and spring and the lightest in early fall.

The agriculture is confined to the limestone valley and ridge tops of the mountains. Probably 95 percent of the valley is in cultivation or open pasture, but only a comparatively small part of the mountains is suitable for farming. Cotton is the principal cash crop and is grown almost to the exclusion of the subsistence crops in the limestone valley, except along the streams and swales, where corn and hay are grown. The farms of the valley range in size from 100 to 2,000 acres, except along Bear Creek where they are much smaller, ranging in size from 40 to 200 acres. On the mountaintops and plateaulike areas the farms are small, and a diversified or subsistence type of farming is practiced, with cotton as the primary cash crop.

Two important groups of soils are those occurring in the valley and those on the mountains. The valley group is composed principally of red soils underlain by and derived largely from limestone, whereas the soils in the mountains are mainly gray soils derived from unconsolidated coastal-plain material and sandstone and shale of the Appalachian Plateaus and, in addition, a large acreage of rough broken and stony land which is used almost exclusively for forestry.

Decatur clay loam, Dewey loam, Etowah silt loam, Cahaba fine sandy loam, Cahaba gravelly fine sandy loam, and Kalmia fine sandy loam, which are located in the valley, are used largely for the production of cotton, and probably 95 percent of it is grown on these soils. Huntington silt loam, Abernethy silt loam, and Ochlockonee fine sandy loam are used almost exclusively for the production of corn and hay crops, with the areas most subject to flooding being used for pasture. Dewey silt loam of the valley and Atwood very fine sandy loam and Savannah very fine sandy loam of the mountainous section are used for the production of cotton and corn, being about as well adapted for one as the other. Sorgo, sweetpotatoes, peanuts, cowpeas, fruits, and vegetables are grown.

At the foothills of the mountains and adjacent to the red soils of the limestone valley lies Colbert silt loam which is only a fair general farm soil. It is inferior to the red soils.

On the mountains, steep bluffs, and rock ledges along the river are large areas of soils which cannot be farmed economically, except in small patches, and the best use of such soils is for forestry, woodland pasture, and game preserves.

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Areas surveyed in Alabama shown by shading.

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