

Issued July 5, 1916.

U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE GEORGIA STATE COLLEGE OF AGRICULTURE,  
ANDREW M. SOULE, PRESIDENT; DAVID D. LONG,  
IN CHARGE SOIL SURVEY.

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SOIL SURVEY OF POLK COUNTY,  
GEORGIA.

BY

DAVID D. LONG, OF THE GEORGIA STATE COLLEGE OF AGRICULTURE,  
AND MARK BALDWIN, OF THE U. S.  
DEPARTMENT OF AGRICULTURE.

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W. EDWARD HEARN, INSPECTOR, SOUTHERN DIVISION.

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[Advance Sheets—Field Operations of the Bureau of Soils, 1914.]



WASHINGTON:  
GOVERNMENT PRINTING OFFICE.

1916.

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## LETTER OF TRANSMITTAL.

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

*Washington, D. C., November 17, 1915.*

SIR: Under the cooperative agreement with the Georgia State College of Agriculture, Andrew M. Soule, president, a soil survey of Polk County was carried to completion during the field season of 1914.

I have the honor to transmit herewith the manuscript and map covering this work and to recommend their publication as advance sheets of Field Operations of the Bureau of Soils for 1914, as authorized by law.

Respectfully,

MILTON WHITNEY,  
*Chief of Bureau.*

Hon. D. F. HOUSTON,  
*Secretary of Agriculture.*

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## MAP.

Soil map, Polk County sheet, Georgia.

## SOIL SURVEY OF POLK COUNTY, GEORGIA.

By DAVID D. LONG, of the Georgia State College of Agriculture, and MARK BALDWIN, of the U. S. Department of Agriculture.

### DESCRIPTION OF THE AREA.

Polk County is situated in the northwestern part of the State of Georgia, on the Alabama State line, about 65 miles south of Tennessee. Its average length, east and west, is about 25 miles, and the average width, north and south, about 12 miles. The county has an area of 313 square miles, or 200,320 acres.

Polk County comprises parts of the Appalachian and Piedmont Plateau provinces, the greater part consisting of mountains and valleys belonging in the former division. Only the extreme southern portion of the county lies within the Piedmont province. Here the topography is undulating to rolling. The more level portions of this area are found around the stream heads, the topography becoming more broken as the streams develop deeper channels toward the south.

In contrast to the smoother topography of the Piedmont, that of the Appalachian Mountain division is decidedly broken and hilly. The higher elevations of this division are 300 to 400 feet above the valley to the north and west. This descent is accomplished within a horizontal distance of less than a mile, and such streams as head in the higher portions develop steep slopes and deep valleys, with corresponding narrow ridges between them. The rough topography of this division precludes cultivation, except in a very few small areas on the crests of ridges.

The Appalachian Valley section, occupying by far the greater proportion of the county, presents a considerable variety of topographic features. In the western part of the county Indian Mountain, rising to a height of over 1,600 feet, is the highest elevation in the county. In the eastern part there is a series of hills and ridges, the highest of which, Carnes Mountain, near Rock Mart,



FIG. 1.—Sketch map showing location of the Polk County area, Georgia.

rises to an elevation of 1,316 feet. Between these topographic features the county is characterized by a rolling to hilly surface, averaging 800 to 1,000 feet in elevation.

The larger streams of the county flow through well-developed valleys of level to undulating topography. In places these valleys are defined by steep slopes, rising in some instances 300 feet above the stream level. This is particularly well exemplified on the east side of Little Cedar Creek in the western part of the county, along Lime Branch in the vicinity of Berry, and on the south side of Hills Creek in the northeastern part of the county.

The chief valleys of the county are those of Cedar, Euharlee, Fish, Lake, Little Cedar, and Hills Creeks, and Lime Branch. Of these valleys the most important in Polk County is that of Euharlee Creek.

Drainage is generally well established. With the exception of the Piedmont section, in which the drainage is south into the Tallapoosa, the county lies within the drainage basin of the Coosa River. All the streams flowing in a general northward direction are direct or indirect tributaries of the Coosa, the waters of which eventually flow into Mobile Bay. Besides the water carried by the streams, a considerable part of the run-off finds its way into subterranean channels. Large springs are of common occurrence.

Most of the water supply for farm use is obtained from dug wells, 20 to 50 feet deep, and from streams and springs. In seasons of scant rainfall many of the wells become dry, and it is necessary to haul water often for some distance. This is especially true in the area occupied by the Knox dolomite.

Many large permanent springs furnish excellent water for domestic use and for stock. The present water supply of Cedartown is obtained from such a source.

The first permanent settlement of the area now included in Polk County took place about 1832, at which time the State surveyed the land and opened it to entry by lottery. The early settlers were from the central and southern parts of Georgia and were mostly of English descent. The county of Polk was created from Paulding and Carroll Counties in 1851. At a later date part of its territory was cut off for the formation of Haralson County. The present white inhabitants are practically all of English descent. The population, according to the 1910 census, was 20,203, showing an increase of 2,347 during the previous decade.

Cedartown is the county seat and the most important town in the county. It is on the main line of the Seaboard Air Line Railway and on the Chattanooga and Griffin division of the Central of Georgia. Its population in 1910 was 3,551. It is 97 miles from Chattanooga,

60 miles from Atlanta, and 106 miles from Birmingham. Cedartown has excellent streets, good water, electric lights, and other modern improvements.

Rock Mart is the second most important town in the county, with a population of 1,304. It is located 13 miles east of Cedartown and is the junction of the main lines of the Seaboard Air Line and Southern Railways and is the western terminus of the Cartersville and Rock Mart branch of the Seaboard. Large cement plants are located near the town. Aragon and Portland are small towns in the northeastern part of the county. Seney is located on the north county line.

Polk County is well provided with transportation facilities. There are five railroad lines. The Seaboard Air Line Railway between Washington and Birmingham passes through the county in an east-west direction, with important stations at Rock Mart, Fish, Cedartown, Akes, and Esom. The Cartersville-Rock Mart branch of the Seaboard traverses the county from Rock Mart through Aragon and Portland. The main line of the Southern between Chattanooga and Jacksonville passes through the eastern part of the county, with stations at Rock Mart, Aragon, and Seney. The branch of the Southern between Bristol, Tenn., and Meridian, Miss., traverses the northwestern corner of the county, with stations at Prior and Etna. The Chattanooga-Griffin branch of the Central of Georgia passes through the central part of the county from north to south through Lake, Cedartown, and Youngs.

The county possesses a good public-road system which reaches all parts of the county. The roads are well built and maintained. There is an abundance of good road material.

#### CLIMATE.

The climate of Polk County is characterized by long summer and short winter seasons, with moderately heavy precipitation, well distributed throughout the growing season. The summers are moderately hot, although a temperature of 100° F. is seldom reached. The winters are comparatively mild and do not necessitate the use of well-built barns to protect the stock. Cattle can be grazed during all the winter months. The average growing season extends from April 5 to October 27, a period of 6 months and 22 days.

*Normal monthly, seasonal, and annual temperature and precipitation at Adairsville, Bartow County, Ga.*

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.
	° F.	° F.	° F.	Inches.	Inches.	Inches.
December.....	42.2	72	5	4.86	6.89	5.22
January.....	40.6	74	-1	4.35	4.40	6.67
February.....	41.2	77	-8	5.41	4.91	.90
Winter.....	41.3			14.62	16.20	12.79
March.....	53.1	86	6	5.68	3.14	9.81
April.....	59.5	92	28	3.83	2.49	1.88
May.....	60.6	94	37	3.28	1.78	2.99
Spring.....	60.7			12.79	7.41	14.68
June.....	76.0	99	41	3.48	2.57	7.38
July.....	78.6	102	56	5.42	3.18	10.32
August.....	77.9	99	55	4.17	2.65	2.97
Summer.....	77.5			13.07	8.40	20.67
September.....	72.6	97	40	3.22	1.29	6.30
October.....	61.0	88	26	2.27	1.69	4.29
November.....	50.3	77	19	2.97	1.20	6.23
Fall.....	61.3			8.46	4.18	16.82
Year.....	60.2	102	-8	48.94	36.19	64.96

Average date of first killing frost in fall, Oct. 27; last in spring, Apr. 5. Earliest date of killing frost in fall, Oct. 11; latest in spring, Apr. 24.

#### AGRICULTURE.

In the development of agriculture in Polk County, valley lands and stream bottoms were the first to be farmed. Early systems of agriculture comprised the production of those products needed for self-sustenance. From 1800 to 1840 the chief crops were corn, oats, and barley, with some cotton. Cattle and hogs supplied meat, and sheep were kept for their wool, which was used in making homespun. As the population increased and as markets and trading points developed the production of those crops that could be more economically purchased was discontinued, and the farmers centered their efforts on crops that could be more conveniently and economically produced for sale.

Following the close of the Civil War the high price of cotton and the demand for a money crop promoted the general production of this staple. Later, about 1890, cotton production was stimulated further by increased facilities for transportation. As a result a type

of agriculture developed in which cotton was not only the money crop but also was produced almost to the exclusion of other crops. The amount of cereal production was insufficient for local consumption. The same general system prevails to-day, with the exception that grain and hay crops are grown to a greater extent, though still insufficiently to supply local needs or to allow the maintenance of a well-balanced rotation.

Cotton, corn, oats, and cowpeas are the chief crops produced. Dairying and stock raising are developed to a small extent. No special crops are grown.

As cotton is the money crop of the county, it occupies first place in its agricultural system. The crop occupies more than half the total cultivated land. According to the census of 1910 cotton occupied in 1909 29,034 acres. This figure represents an increase of 8,440 acres within the preceding decade and 1,226 acres over the acreage planted in 1879. During the last 40 years the production has ranged between 8,000 and 18,000 bales, that of 1909 being 10,419 and that of 1913 being 17,810 bales. The average yield per acre of the county is 0.36 bale, according to the census of 1910, while the census figures of 1880 show an average yield of 0.49 bale.

Replies received to letters addressed during the course of the survey to farmers operating their own farms show in a majority of cases that the yield per acre is gradually increasing. The chief reasons assigned for the increase are better preparation of the seed bed, the rotation of crops, and the keeping of more live stock on the farms. The tenants form a distinct group of farmers who in their farming methods do not seek to maintain the productiveness of the soils they till, and, consequently, yields are decreasing yearly as the soils deteriorate under careless cultivation. The methods of handling the crop vary in details from poor in the case of many tenants to excellent in the case of the more progressive owner operators. The better cultural methods employed are being gradually taken up by the farmers as a whole.

A number of different varieties of cotton are grown. Experience has shown that small-boll varieties are more desirable for planting on the valley lands, and that the big-boll varieties do better on the upland or ridge soils. Kings Improved and Broadwell are probably the most popular sorts in the valleys. Cleveland, Russell, and Cooks are the most common varieties on the ridges. Mortgage Lifter and Christopher are also commonly used in the county. The crop is grown on nearly all the soils, with the best yields on the strong limestone valley soils, such as the Hagerstown and Decatur.

Corn is the second crop of importance. In 1909 corn was planted on 19,296 acres, with a production of 204,367 bushels, or an average

yield of 10 bushels per acre. One cause of the low yield may be found in the fact that corn is grown on almost all the soil types of the county, many of which are not well suited to this crop. More common causes are the lack of proper cultural methods, failure to use fertilizers, and the use of the poorer fields for the production of corn. The more progressive farmers obtain from 25 to 60 bushels or more per acre on the valley and bottom-land soils, which comprise the best corn soils in the county. Probably the very best corn soils are the alluvial types of the Huntington, Congaree, Elk, and Holston series. Fertilizers are not required on these soils.

Of the varieties of corn grown, the Marlborough, Hastings, and Shaw are the most popular. A big, red-cob sort is also used. Little attempt is made to select corn in the field for planting or to prevent it from becoming mixed, and much mixed seed is planted. In harvesting corn the fodder is pulled in August and the ears snapped some time in October or November, leaving the stalks standing in the field.

The acreage devoted to oats has fluctuated considerably in the past. In 1889 it was 6,434 acres; in 1899, 1,822 acres; and in 1909, 2,308 acres. The acreage is gradually increasing from year to year and oats are now probably the crop of third importance in the county. The average yield in 1909 was 12.3 bushels per acre. On the better farms the yield ranges from 30 to 40 bushels per acre. The Appler and different rustproof varieties are in most common use. The other small grains are unimportant in Polk County.

Dependence for winter roughage is placed upon corn fodder, pea-vine hay, native grass hays, and sorghum. Cowpeas are sowed between the corn rows or broadcast. In the former case they are usually grown for the seed. Where cut for hay they yield from one-half ton on the poorer soils to 2 tons on productive valley lands. The Whip-poorwill is the common variety. Bermuda is chiefly depended upon for pasture grass. Lespedeza and Japan clover thrive on all the soils of the county. These two plants furnish good pasturage for eight months in the year.

Garden vegetables are grown for home use and to supply the towns within the county. A sweet potato patch is found on every farm. No special truck industries have been developed. Sorghum grown for sirup is considered a profitable crop by many farmers.

Dairying and stock raising are undeveloped industries. A few Jersey herds are found which supply local needs. There are no established creameries and no dairy products are shipped from the county.

The county possesses soils which are naturally suited for the maintenance of large stock and dairy farms. The productive alluvial lands and the strong limestone soils are especially suited for stock

raising and dairying, as the soils produce large crops of grass and forage. The adjacent hill lands afford good grazing. The development of these branches of agriculture has been retarded by the presence of the fever tick.

No established rotation of crops is found. Many fields have been continuously cropped to corn or cotton for a period of over 50 years. Some of the better farmers appreciate the value of crop rotations and are endeavoring to adjust their cropping systems accordingly. Other farmers alternate corn and cotton as frequently as practicable.

The expenditure for fertilizer, according to the census of 1910, was \$83,121, an increase of \$44,811 over that reported ten years prior. In the 1910 census 84.7 per cent of the farms of the county reported an expenditure for fertilizer. Most of the fertilizer is used in the production of cotton; some is used for corn on the better farms.

The expenditure for labor, according to the authority quoted, was \$41,700, or an average of \$50 per farm reporting. Laborers for ordinary farm work receive from 50 cents to \$1 a day. By the month the ordinary wage ranges from \$20 to \$30, with board. Cotton is picked at standard rates of 50 to 75 cents a hundred pounds.

There are 2,226 farms in the county, ranging in size from 3 to 1,000 acres and over. There are 1,782 farms between 10 and 100 acres in size. In this tabulation each tenancy is classed as a farm. Individual holdings of land range from 10 to 10,000 acres and over. About two-thirds of the farms of the county are operated by tenants. Of the total area of the county there are 153,812 acres in farms, of which 81,746 acres, or 53.1 per cent, is improved.

In answer to a circular letter many good suggestions have been offered by leading farmers of the county for the improvement of agriculture. Among these may be mentioned deeper plowing, fall plowing, the more extended sowing of cover crops, the use of cow-peas as a soil renovator, and the production of less cotton, combined with increasing the number of hogs, cattle, and sheep, increasing the acreage in clovers, following crop rotations, applying lime, mixing fertilizers at home, increasing the organic supply of the soil, diversifying crops, and the more thorough and more frequent cultivation of the growing crops.

#### SOILS.

The soils of Polk County fall in three broad groups, namely, residual, colluvial, and alluvial. The residual soils represent material remaining from the disintegration of rocks in place. The colluvial soils are composed of material which has been moved slowly from a higher to a lower topographic position, mainly through the agencies of gravity and surface wash, and the alluvial soils are those composed of material washed from the upland and deposited by the streams in their flood plains.

The residual soils form the greater part of the area of the county. Various kinds of rock materials enter into these soils. In the following discussion of the soils of this group, statements concerning the geologic relations are taken from the Rome folio of the United States Geological Survey, by C. Willard Hayes.

The oldest rocks of the county are the greenish sericitic mica schists which are found in the Piedmont Plateau and in the Appalachian Mountain subdivision of the Appalachian province. The weathering of these rocks gives rise to the red clay of the Talladega series in the Appalachian province, and to the soils of the Louisa and York series in the Piedmont province. A great fault known as the Cartersville fault has caused these rocks and limestone to become mixed in some parts of the county. Here the weathered product of the rocks has given rise to variations in the Hagerstown soils.

The soils from mainly chert-free limestones are derived from the blue siliceous Beaver limestone of the Cambrian period and from the blue flaggy Chickamauga limestone of the Silurian period. Where the soils are of a reddish-brown color and have a subsoil of an intense red color, the Decatur series is mapped, and where they are grayish brown or brown, with dull-red or yellowish-red subsoil, the Hagerstown series is represented.

The cherty limestone soils are derived from the Knox dolomite, which is a somewhat crystalline, gray, magnesian limestone containing a large amount of silica in the form of dense or porous chert nodules. This rock gives rise to the Clarksville series, and in some low, flat areas to small bodies of Colbert, included with the Clarksville loam. The Decatur clay loam, ridge phase, is also derived from this formation.

In places the limestone is interbedded with sandstone or shale and sometimes with both. The weathering of this interbedded material gives rise to soils of mixed derivation. Two series comprise such material—the Shackelton when the subsoil is yellow and the Christian when the subsoil is red.

The Beaver limestone overlies the Weisner quartzite in places, and, where quartzite material has been mixed with the red clay derived from the Beaver limestone, minor variations in the Decatur soils are found.

The Rockmart slate is of Silurian age and consists chiefly of black slates which in the upper part weather into materials of yellowish, reddish, and whitish colors. This formation gives rise to a large number of soil series and types. In the valley areas the Conasauga and Armuchee series are formed, and on the high hills or low mountain areas the Dekalb and a part of the Hanceville series occur. Some Hanceville material is derived from quartzite rocks. The difference

between the former two series and the latter two is a matter largely of topography.

The colluvial soils of the county are inextensive and unimportant economically. The lower portion of the material is residual from the Rockmart formation, while the upper portion is colluvial from the Knox dolomite. Such material has been included with the Clarksville gravelly loam.

The alluvial soils form the fertile bottom lands along the stream courses and old stream bottoms or terraces. The terrace soils are derived from material carried down from sedimentary and crystalline rocks. The types with reddish-brown and reddish-yellow subsoils derived from limestone soils belong in the Elk series and those with yellow and mottled yellow subsoils derived from limestone, shale, and crystalline rocks are classed in the Holston series. In the first bottoms the material derived mainly from crystalline rocks forms types of the Congaree series, and material coming from sedimentary rocks gives the Huntington soils.

The following outline shows the relation between the rock formations and the soil series, gives condensed descriptions of the series, and enumerates the types in each series that occur in Polk County:

*Outline showing relation between rock formation and soil series.*

Soil group and kind of rock.	Formation.	Description of series.	Soil types.
Residual soils.	Pre-Cambrian.	Grayish-brown to brown soils, red subsoils with greasy feel, strongly rolling to mountainous topography.	Talladega slate loam. Talladega gravelly loam. Talladega clay loam.
	Pre-Cambrian.	Grayish-brown to brown soils, red subsoils, greasy feel, rolling or undulating Piedmont.	Louisa gravelly loam. Louisa silt loam.
	Pre-Cambrian.	Gray soil, yellow subsoil, greasy feel, undulating Piedmont.	York loam.
Mainly chert-free limestone.	Chickamauga and Beaver limestone, Knox dolomite.	Reddish-brown soils, intense-red subsoils, low valleys and high ridges.	Decatur clay loam. Decatur clay loam, ridge phase. Decatur stony loam.
	Chickamauga, Beaver, small amount Knox dolomite.	Grayish-brown to brown soils, dull-red to yellowish-red subsoils, undulating valleys.	Hagerstown gravelly loam. Hagerstown fine sandy loam. Hagerstown loam.
Chert limestone.	Chickamauga and Knox dolomite.	Gray soils, yellow subsoils, chert slopes, hills, and ridges, level valley depressions.	Clarksville gravelly loam. Clarksville stony loam. Clarksville loam. Colbert silt loam.
Limestone mixed with shales and sandstone or both.	Chickamauga, Knox dolomite, Rockmart slate.	Gray to grayish-brown soils, yellow subsoils, valleys and hills.	Shackelton loam. Shackelton stony loam.

## Outline showing relation between rock formation and soil series—Continued.

Soil group and kind of rock.	Formation.	Description of series.	Soil types.
Residual soils—Con.			
Sandstone or shale and limestone.	Chickamauga, Knox, Rockmart.	Brown soils, red subsoils, hills, ridges, and valleys.	{ Christian loam. Christian loam, hilly phase. Christian silt loam.
Shale and sandstone.	Rockmart.....	Gray soils, yellow subsoils, valley lands.	{ Conasauga sandy loam. Conasauga silt loam.
Shale and sandstone	Rockmart.....	Brown soil, dull-red shaly subsoil, rolling valleys.	Armuchee shale loam.
Slates, shales, and sandstones.	Rockmart.....	Gray soil, yellow subsoil, high ridges and mountains.	Dekalb shale loam.
Slate.....	Rockmart.....	{ Brown soils, red subsoil, high ridges, low mountain slopes.	{ Hanceville gravelly loam. Hanceville stony loam.
Quartzite.....	Weisner.....		
Alluvial soils:			
Material from limestone, shale, and crystalline rocks.	Terraces or second bottoms, well above overflow.	Brown soils, reddish-brown to reddish-yellow subsoils. Grayish-brown soils, yellow subsoils.	{ Elk silt loam. Holston silt loam. Holston silt loam, high-terrace phase. Holston gravelly loam.
Material from crystalline rocks.	First bottom.....	Brown soil, brown to reddish-brown subsoil.	Congaree silt loam.
Material from soils formed from shale, sandstone, and limestone soils.	First bottom.....	Brown soil, brown subsoils..	{ Huntington silt loam. Huntington gravelly loam.
Miscellaneous material.	Chickamauga.....	Rocks, not supporting any vegetation.	Rock outcrop.

The following table gives the names and the actual and relative extent of the various soil types mapped:

## Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Clarksville gravelly loam.....	65,856	33.0	Conasauga silt loam.....	3,904	2.0
Talladega slate loam.....	20,224	10.1	Holston silt loam.....	2,688	1.7
Decatur clay loam.....	8,448	8.3	High-terrace phase.....	576	
Ridge phase.....	8,192		Talladega clay loam.....	2,432	1.2
Hagerstown gravelly loam.....	11,456	5.7	Hanceville stony loam.....	2,432	1.2
Dekalb shale loam.....	9,600	4.8	Hanceville gravelly loam.....	2,432	1.2
Talladega gravelly loam.....	8,128	4.1	Shackleton loam.....	2,432	1.2
Louisa gravelly loam.....	7,296	3.6	Congaree silt loam.....	2,368	1.2
Huntington silt loam.....	7,296	3.6	Conasauga sandy loam.....	1,792	.9
Clarksville loam.....	6,272	3.1	Christian silt loam.....	1,600	.8
Armuchee shale loam.....	6,080	3.0	Elk silt loam.....	1,536	.8
Hagerstown loam.....	5,440	2.7	Holston gravelly loam.....	1,408	.7
Hagerstown fine sandy loam..	5,248	2.6	York loam.....	1,088	.5
Christian loam.....	3,456	2.0	Total.....	200,320	.....
Hilly phase.....	640				

## TALLADEGA SERIES.

The types included in the Talladega series have grayish-brown to reddish-brown surface soils and dull-red greasy, stiff, heavy clay subsoil. The series is derived chiefly from a micaceous schist and partly from semicrystalline slates. The soils are found in the Appalachian Mountain belt. Drainage is well established to excessive.

Three types of this series are found in Polk County, viz, Talladega slate loam, Talladega gravelly loam, and Talladega clay loam.

## TALLADEGA SLATE LOAM.

The interstitial material of the soil of the Talladega slate loam, which is 6 or 8 inches deep, consists of a grayish-brown silty loam or silt loam, passing quickly into a reddish-brown or red clay loam. The subsoil is a moderately stiff, crumbly clay of a dull-red color, with a greasy feel below a depth of 18 inches, the latter characteristic being due to the presence of flakes of mica. When wet the subsoil is rather tenacious and sticky. On the surface and throughout the soil mass are found thin, flat fragments of schist and large and small quartz stones, the quantity being sufficient to give a decidedly stony character to the type. The flat shape of the rock fragments rather than the kind of rock has given rise to the term "slate loam." Included with this type are areas of clay loam, silt loam, and loam which could not be separated on account of inaccessibility and irregularity of occurrence.

The Talladega slate loam is an extensive soil, forming 10.1 per cent of the area of the county. It occurs as a continuous belt, ranging in width from one-fourth mile to more than 2 miles, extending from the northeastern part of the county to the Alabama State line. It forms the steep escarpment between the Appalachian Valley and the Piedmont Plateau and is confined to the north and west sides of the watershed of Dugdown Mountain.

The topography is decidedly rough and broken, its surface features consisting of a complex system of steep, narrow ridges and deep, gorgelike stream channels. Erosion is active and drainage thorough to excessive.

The greater part of the original timber, which has been removed, consisted of hardwoods and yellow pine. A second growth of short-leaf yellow pine, various species of oaks, and some hickory is now found on the ridges, with black walnut, hickory, white oak, chestnut oak, maple, elm, and tulip poplar in the narrow valleys of the larger streams.

About one-half of 1 per cent of the type is cultivated, the cultivated areas comprising the smoother slopes. The yields of the various crops

are low. Much of the type is too broken even for pasture and should be allowed to revert to forest. Land values range from \$1 to \$5 an acre.

#### TALLADEGA GRAVELLY LOAM.

To a depth of about 8 inches the Talladega gravelly loam is a gray to brownish-gray silt loam or loam containing a relatively large proportion of fine sand or sand and carrying upon the surface a quantity of quartz gravel. The subsoil is a light-red to dull-red, friable, greasy silty clay or clay, usually becoming deep red in color as a depth of 3 feet is approached. The bedrock substratum is encountered at various depths, usually, however, below 3 feet, although in places, as on steep gully slopes, it outcrops.

The greater part of the Talladega gravelly loam is included in one continuous area, extending from the northeastern part of the county along the eastern county line to the south county line. Two smaller areas are mapped, one to the north of Hightower Mill, the other southwest of Fullwood Springs.

The topography of this type is rolling to broken and hilly, precluding profitable cultivation except on very small areas. Yields are low, ordinarily about one-fifth bale of cotton and 10 bushels of corn per acre. Less than 1 per cent of the area of the type is at present under cultivation, nearly all of it being in second-growth timber. The natural vegetation is similar to that on the Talladega slate loam.

The present value of the land is from \$1 to \$5 an acre, although in the more desirable area near Hightower Mill it is somewhat greater.

#### TALLADEGA CLAY LOAM.

The soil of the Talladega clay loam is typically a grayish-brown or brown clay loam. Although the immediate surface is of various textures, the heavy clay of the subsoil is sufficiently near the surface to make a typical clay loam texture when the type is plowed to a depth of 5 or 6 inches. The subsoil is a dull-red, moderately friable, schist, are scattered over the surface, but the quantity is not sufficient. Varying quantities of rock fragments, consisting of quartz and mica schist, are scattered over the surface, but the quantity is not sufficient to interfere seriously with cultivation. This type includes patches of silt loam and loam too small to be shown on the soil map as separate types.

The Talladega clay loam is not developed in large areas but occurs as a narrow strip along the base of the mountain escarpment. An important area is found about 3 miles southeast of Rock Mart. From the southwest of Rock Mart the type extends in a series of interrupted areas westward to the vicinity of Esom Hill. The type represents

smooth slopes or benches at the foot of the mountain areas. The drainage is well established but not excessive. Erosion is not serious, although terraces are used in some fields.

Originally the type was covered with a forest consisting of various species of oak, some hickory, and shortleaf pine. This timber has been removed, and approximately 80 per cent of the type is now farmed.

Fairly good yields are obtained. Cotton yields from one-third to one-half bale per acre in normal seasons, with an application of 200 to 300 pounds of medium-grade fertilizers. Corn yields from 10 to 20 bushels without the use of fertilizers. Oats average 20 bushels, and wheat has yielded from 10 to 25 bushels per acre. The soil is regarded good for small grains. Some of this type has been farmed since the earliest days of settlement.

The land has been farmed for some time by tenants and is in a poor condition. It especially lacks organic matter. The type has been found productive for cotton, corn, small grains, grasses, and clovers, and for alfalfa, when the crop is properly handled.

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

*Mechanical analyses of Talladega clay loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
253705.....	Soil.....	4.2	5.4	2.2	5.3	4.0	54.8	23.8
253706.....	Subsoil.....	2.7	4.4	1.9	4.6	3.3	43.6	39.2

#### LOUISA SERIES.

The soils of the Louisa series have gray to brownish-gray surface soils and dull-red, stiff, greasy clay subsoils. They are related to the Cecil soils from which they differ principally in having a greasy subsoil. The rocks giving rise to this series consist of talcose and micaceous schists and imperfectly crystalline slates. In Polk County they are derived chiefly from mica schists. The series is confined to the Piedmont. Drainage is thorough. Two types are found in Polk County, viz, the Louisa gravelly loam and the Louisa silt loam, the latter being shown by inclusion symbols.

#### LOUISA GRAVELLY LOAM.

The Louisa gravelly loam is a gray to brownish-gray loam, 6 or 8 inches deep, underlain by a yellow, smooth silt loam to a depth of 10 inches, where it grades into a yellowish-red silty clay, and this

in turn at 15 inches into a light-red, crumbly and friable, greasy clay. Over the surface of the type is found a large quantity of angular and subangular quartz fragments, ranging from 1 to 2 inches in diameter. In some cases fragments of the parent micaceous schist are also found. The surface soil in places approaches a silt loam in texture, but it usually has sufficient fine sand in the immediate surface to produce a true loam texture when plowed. In eroded spots along the brows of slopes a clay loam is sometimes developed, but such areas are too small to show on a map of the scale used in the present survey. Areas of loam and silt loam are also found within the areas of this type, but these, too, are not separated, for the reason stated above.

The Louisa gravelly loam is the predominant soil of the Piedmont section, occupying 3.6 per cent of the area of the county. It forms a large area beginning in the southeastern corner of the county and extending irregularly westward along the county line to a point about  $1\frac{1}{2}$  miles west of Dugdown. In the vicinity of Treat, in the southwestern corner of the county, occurs another area of this soil.

This type has a gently undulating to rolling surface. It is generally smooth along the summit of the divide between the waters flowing north and those flowing south, but becomes more rolling and broken, with frequent steep slopes, along the lower courses of the streams. This condition is found in the southeastern part of the county or in the corner adjoining Paulding and Haralson Counties. The drainage is everywhere complete. Terraces are necessary to prevent erosion in the more rolling areas and along brows of slopes surrounding the heads of streams.

Fair yields of cotton, corn, and oats are obtained on the Louisa gravelly loam. Cotton yields one-fourth to one-half bale per acre when fertilized with about 200 pounds of a 10-2-2 fertilizer. Corn yields from 10 to 25 bushels and oats from 15 to 30 bushels per acre. Yields considerably higher are obtained where better methods of handling the soil are employed. The type has been successfully used in the production of cotton, corn, small grains, and grasses. Peaches and apples also do well.

The original forest growth consisted of oats, hickory, and short-leaf and yellow pine. The greater part of this timber has been removed.

Agricultural conditions on this type are fair to good. A number of well-equipped farms and substantial buildings are found. Where farmed by tenants the conditions are rather poor.

#### LOUISA SILT LOAM.

Certain areas shown by Louisa gravelly loam color but marked with inclusion symbol represent Louisa silt loam, and would have been separated and shown by a distinct color had their extent warranted.

The soil consists of a smooth, flourlike, light-gray silt loam, which changes to a yellowish-gray color within 4 or 5 inches. The subsoil, beginning at an average depth of 8 inches, is a lemon-yellow silt loam, gradually changing with depth into a yellowish-red silty clay, and at 12 inches passing into a heavy though friable, light-red, greasy clay.

This type is not extensively developed. It is found in several areas of small size in the southeastern corner of the county near Pleasant Hill Church.

The smooth, silty nature of the surface soil of this type permits easy breaking and subsequent tillage of the land. The lack of gravel prevents the usual hardening of the surface as in the gravelly loam. The type is productive when properly handled. It is used to good advantage for the production of cotton, corn, small grains, and grasses. The soil is somewhat more productive than the associated gravelly loam, but is usually included in fields of the latter, and thus its individuality is lost.

#### YORK SERIES.

The York series comprises those soils which, derived from imperfectly crystalline mica and talcose schists, have a gray surface soil and a yellow silty clay to clay subsoil. The subsoil generally has a greasy feel. This series has been mapped in Georgia for the first time in this county. It is developed in the Piedmont region. Only one type is recognized in this county, the loam.

#### YORK LOAM.

The surface soil of the York loam consists of 7 to 10 inches of a smooth, friable, gray to yellowish-gray silty loam or loam. The top soil, to a depth of 1 or 2 inches, contains a relatively large quantity of fine sand. The subsoil is a smooth lemon-yellow silt loam, which at about 18 inches changes into a heavy, stiff, and greasy, light-yellow clay. The lower part of the subsoil may have a brownish-yellow color. Angular quartz gravel is found in some areas of the type, and veins of quartz exist in the subsoil. This type in some places approaches the Louisa soils in characteristics, and small areas of the latter may be included. Spots of silt loam are developed along the foot of the mountains in several places about 3 miles east of Van Wert and there is another about a mile southeast of Esom Hill. This variation occupies hilly and broken topography.

Only a small acreage of York loam is mapped, practically all of it lying in one area in the southeastern part of the county, in the vicinity of Pleasant Hill Church. Other small areas occur in this general region.

The York loam is not considered as strong as the Louisa soils. The yields in some instances are as high, but the soil does not maintain its productiveness as long.

The crop adaptations, value of the land, means of improvement, and agricultural conditions are about the same as in the case of the Louisa gravelly loam.

#### DECATUR SERIES.

The Decatur series comprises types with reddish-brown to red soils and an intensely red clay subsoil. The series is derived from the weathering of chert-free limestone. It includes some of the most durable and fertile soils of the limestone valleys of the eastern part of the United States. The soils have a level to rolling surface and are well drained. The clay loam and stony loam types are mapped in Polk County.

#### DECATUR CLAY LOAM.

The surface soil of the Decatur clay loam is a brownish-red to red, friable silty clay loam to clay loam, underlain at a depth of 6 to 8 inches by a subsoil of deep-red, stiff, heavy clay, moderately friable when dry and sticky when moist. Eroded areas, in which nearly all the surface material has been removed, are included with the type. Such areas are in reality Decatur clay, but could not be shown consistently on the map on account of their small extent. In some places the soil is a mellow silt loam or there is a surface veneering of fine sandy loam. Such areas were included with the clay loam because the heavy clay subsoil lies sufficiently near the surface to be turned up in ordinary plowing, the resulting texture being clay loam. Rock outcrops are found occasionally, but the surface is remarkably free from chert fragments.

Most of the Decatur clay loam is found in the valley of Cedar Creek over a belt extending from a point about 2 miles south of Cedartown northward for a distance of 5 miles. Another development lies along the Rock Mart road about  $1\frac{1}{2}$  miles west of Gray and extends northward to within a short distance of the Floyd County line. Smaller areas are scattered over the county in the vicinities of Esom Hill, Oremont, Aragon, and Rock Mart. Areas are also found in the northwest corner of the county, the largest being in the vicinity of Jones Church.<sup>1</sup> A small body is located at Prior and also one to the west of Hematite.

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<sup>1</sup> The material forming these areas in the northwest corner of the county and those located at Prior and west of Hematite differs somewhat from the typical Decatur clay loam. The material, while derived chiefly from the Beaver limestone, is in part derived from the Weisner quartzite. The residue from the Beaver limestone seems to overlie closely the quartzite formation and the disintegration products of the two rocks have become more or less mixed. The bedrock of the limestone and quartzite formations is not exposed. Both formations belong to the Cambrian period

The Decatur clay loam is found in valleys or in positions which are lower than the general level of the county as a whole. It is generally level to undulating in its topography and has good drainage. On some of the more sloping areas terraces are required to prevent erosion.

Originally the type supported a heavy growth of hardwoods and shortleaf pine. Nearly all the timber has been removed. This is one of the most desirable soils in the county. It is naturally productive and durable, and has been farmed since the earliest days of settlement. Though often poorly farmed, it is still capable of producing the largest yields in the county. It is used principally in the production of cotton, which yields 1 bale or more per acre when fertilized with 250 to 300 pounds of 10-2-3 or 10-3-3 commercial fertilizers. Corn yields from 20 to 25 bushels per acre without the use of commercial fertilizer and 30 to 40 bushels with moderate applications. Yields of 60 to 100 bushels are obtained where the best methods are followed. Oats yield from 20 to 40 or more bushels per acre. Cowpeas have produced from  $1\frac{1}{2}$  to  $2\frac{1}{2}$  tons of hay. This type is primarily a grass and small-grain soil, forming the basis for a profitable stock or dairying type of farming. Bermuda and lespe-deza, valuable for grazing, make a good growth. Timothy and red-top are a valuable hay crop near Cedartown. In addition to the crops mentioned, red and alsike clover and alfalfa occupy small acreages.

Owing to the heavy nature of the soil, heavy draft animals and implements are required to handle it successfully. Incorporating organic matter and deeper plowing are two means of improving the tilth of land of this character.

Land composed of the Decatur clay loam brings from \$40 to \$100 an acre, depending upon the improvements. The improvements and agricultural conditions are better on this type than on any other in the county.

*Decatur clay loam, ridge phase.*—The surface soil of the Decatur clay loam, ridge phase, is a dark brownish red to dark-red, mellow and friable silty clay loam or clay loam. The subsoil is a stiff, compact, dark-red clay. Eroded areas occur quite frequently in which most of the surface soil has been removed, leaving the red clay subsoil exposed.

Some areas are nearly free from chert fragments. In other cases they are found in such quantities as to give rise to a chert loam type. Here the type closely approaches the Hagerstown gravelly loam, and, in fact, includes a considerable acreage of the latter type, which could not be separated on account of the intricate arrangement and inaccessibility of the areas. This phase in its physical characteristics is similar to the typical development, but differs from it in point of topography, drainage, and, in part, origin.

Areas of various sizes occur along the western and northern parts of the county, with smaller, scattered areas in the central section. Some of the most typically developed areas occur in the northwestern corner of the county and north of Lake Creek. The soil lies chiefly on the crests of ridges, which rise to elevations of 1,000 feet or more and which may be as much as 300 feet above the adjoining lowlands. The slopes of these ridges are often very steep. The soil seldom occurs on slopes, but forms the smoother areas of the ridge crests. In general the topography is gently rolling. In the vicinity of Fearing the topography is more like that of the Clarksville loam, and here the type forms the slopes as well as the crests of ridges. The drainage in many places is excessive and the crops suffer from drought. Areas on slopes become badly eroded unless protected by terraces.

The yields obtained on this phase are about the same as obtained on the typical soil. The agriculture also is in general similar. The greater part of the phase is under cultivation. Very few farmsteads are located on it, the houses in most instances standing along the main thoroughfares in the valleys. Transportation of the crops from the ridge tops is often difficult and adds materially to the cost of production.

Below are given the results of mechanical analyses of samples of the soil and subsoil of the typical Decatur clay loam:

*Mechanical analyses of Decatur clay loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
253743.....	Soil:.....	0.1	5.6	6.4	13.0	11.6	34.4	28.8
253744.....	Subsoil:.....	1.0	5.7	5.2	10.0	8.4	33.3	36.5

DECATUR STONY LOAM.

Included in the Decatur clay loam is an area, near Prior, marked by stone symbols. This is the Decatur stony loam, which, being of relatively small extent and low agricultural value, is not of sufficient importance to be shown on the map with separate color.

The surface soil in this area is a grayish-brown to brown loam or fine sandy loam, with a depth of 8 or 10 inches. The subsoil is a reddish-brown to brownish-red silty clay loam, which gradually becomes heavier with depth, passing into a silty clay or clay at a depth of 24 to 30 inches. The soil is generally loose and friable and the subsoil is also friable, but becomes sticky when wet. Large blocks of a sandy quartzite are scattered over the surface and disseminated

through the soil mass. This quantity of stone interferes seriously with cultural operations.

The yields on this area are moderate. It is utilized chiefly for cotton and corn.

#### HAGERSTOWN SERIES.

The types included in the Hagerstown series have brown soils and reddish-brown, dull-red or reddish-yellow clay subsoils. The series is derived from limestone in the limestone valley areas extending from southern Pennsylvania to northern Alabama. In Polk County the gravelly loam, fine sandy loam, and loam are developed.

#### HAGERSTOWN GRAVELLY LOAM.

The interstitial material of the Hagerstown gravelly loam is a grayish-brown to brown loam to silty loam, passing at a depth of 6 to 12 inches into a reddish-brown silty clay loam, which in turn grades into a silty clay at 20 to 30 inches. The type carries from 20 to 30 per cent of angular chert fragments varying from small gravel to particles 5 or 6 inches in diameter. These are scattered over the surface and mixed throughout the soil mass. In some places this material is so abundant that it is difficult to bore into the soil. There are also small areas where the cherty material is lacking. Locally quartz fragments 3 or 4 inches in diameter are present. As mapped the type includes small areas of Clarksville gravelly loam and Decatur clay loam, ridge phase, which could not be separated on a map of the scale used in this survey.

The Hagerstown gravelly loam is developed in rather irregular, winding areas in the northwestern and north-central parts of the county. Typical areas are found in the vicinity of Etna, Hematite, and Lovvorn Mill and along the Floyd County line north of Lake Creek. It is generally associated with areas of the Clarksville gravelly loam and Decatur clay loam, ridge phase, and in many instances lies between the two. It is also developed from Antioch Church westward to within a short distance of Esom Hill.<sup>1</sup> A body also occurs about 1 mile south of Youngs, and between Fullwood Springs and Dugdown.

The Hagerstown gravelly loam is a residual soil derived from the Knox dolomite. It corresponds to the Clarksville gravelly loam, but

<sup>1</sup> The material forming the developments of this type from Antioch Church westward to within a short distance of Esom Hill, the area about 1 mile south of Youngs, and between Fullwood Springs and Dugdown, differs somewhat from the typical Hagerstown gravelly loam. The material is derived from crystalline and limestone rocks which have been thrown into close association through faulting. As a result of weathering of both these formations the subsoil lacks uniformity. Where the crystalline rocks predominate the subsoil resembles the Talladega and where the limestone rocks predominate the subsoil is more like the Hagerstown.

differs from it in having a brown soil and red subsoil. The reason for these differences is obscure, but they are believed to be due to differences in weathering or to differences in the character of the rock within the same formation.

This type is found almost exclusively on slopes. It is very seldom developed on the smooth crests of ridges or over extended areas. The surface is rolling to hilly, and the drainage is good to excessive. Erosion is active.

A forest of shortleaf, loblolly, and longleaf pine, with some oaks and hickory and other hardwoods, formerly covered this soil. Where the pine has been removed and the land not cultivated a thick growth of blackjack oak has sprung up. A large part of the land is under cultivation. The crops are the same as on the Clarksville gravelly loam, but the yields are noticeably larger. To the south of Youngs and between Fullwood Springs and Dugdown most of the type is cultivated to corn, oats, and cotton, and fair yields are obtained. Wheat formerly produced from 8 to 20 bushels per acre, but the type is not used extensively for this crop at the present time. Agricultural conditions on the type range from poor to fair.

#### HAGERSTOWN FINE SANDY LOAM.

The typical soil of the Hagerstown fine sandy loam consists of brown, friable fine sandy loam, changing below to reddish brown. The subsoil, encountered at 6 to 8 inches, is a brownish-red, friable fine sandy clay, grading at 18 inches into a heavy, dull-red silty clay to clay, generally crumbly when dry but sticky and plastic when wet. The subsoil becomes noticeably heavier and stiffer as the depth increases.

A variation mapped with this soil shows a surface soil of yellowish-gray, friable fine sandy loam, 8 inches deep, underlain by brownish-yellow fine sandy clay, extending to 36 inches without change, though in small areas the subsoil may be a heavy fine sandy loam.

The typical soil forms a large area in the northeastern section of the county along the Southern Railway, about 1½ miles northwest of Aragon and extending northward to the Floyd and Bartow County lines. The variation described occurs in the valley of Cedar Creek in the vicinity of Cedartown.

The topography of this soil is generally level to very gently undulating, and its entire area can be farmed. The use of heavy farm machinery is feasible. The type is well drained by surface and underground channels.

A dense forest of hardwoods, chiefly oaks and hickory, with some shortleaf and loblolly pine, originally covered this soil. Nearly all

this was removed in clearing the land for settlement in the early history of the county. Nearly all the type is now under cultivation.

The Hagerstown fine sandy loam is naturally productive. It has been farmed for more than 60 years and still produces heavy yields. Cotton is the chief crop. The yields range from one-half to 1 bale per acre, depending upon the fertilization and cultural methods. Corn yields from 20 to 80 bushels, oats 20 to 40 bushels, and cowpeas 1 to 2 tons of hay per acre. The highest yields are obtained on those farms on which a large number of cattle are maintained and where the management includes the rotations of crops and other improved practices.

The type is an excellent general farming soil, being adapted to the production of grains, forage, and hay crops. For this reason it is desirable for dairying and stock raising. It is also suited to the production of some truck crops. Apples and peaches have also been produced with success.

The agricultural conditions on this type are the best found in the county. Many substantial buildings and well-improved farms are located on it. Land values range from \$40 to \$80 an acre, depending upon the location and the character of improvements. Practically none of the type is for sale.

#### HAGERSTOWN LOAM.

The Hagerstown loam is a mellow brown loam to silty loam, 8 to 12 inches deep, underlain by brown or reddish-brown, moderately friable silty clay loam, which usually passes below a depth of 24 inches into a silty clay or clay of about the same color. In some low-lying areas the subsoil consists of yellow silty clay and contains numerous black iron accretions. In areas lying above the general level of the type the subsoil is redder and heavier in texture, approaching closely the Decatur clay loam.

Included with this type are small bodies of the Hagerstown silt loam, which usually lie in low areas along small streams and in sinks. In these the surface soil is a mellow silt loam 10 or 12 inches deep. One of the largest areas of this kind is about  $1\frac{1}{2}$  miles northwest of Cedartown. These areas were included on account of their small extent and their close relationship to the loam.

The Hagerstown loam is not developed in large areas in Polk County. It usually is developed in long, narrow strips in the stream valleys, generally associated with the Decatur clay loam or Clarksville gravelly loam. Typically developed areas are found between Rock Mart and Aragon in the eastern part of the county, and in the vicinity of Cedartown in the west-central part. Important areas are also found in the neighborhood of Grady and Fish.

The topography is gently undulating to level or flat, and drainage well established, though not as thoroughly as in the Decatur clay loam. This fact partly accounts for the difference in intensity of color between the subsoils of the two types.

This soil is generally regarded as a strong, productive soil for the staple crops. Good yields of cotton, corn, and oats are obtained. The type is especially adapted to the production of forage, grain, and hay crops, and offers good locations for dairying and stock raising. A large proportion of the fertile bluegrass country of Tennessee, Kentucky, and other parts of the Limestone Valley province is of this type of soil.

A friable structure and the absence of stone render preparation of the seed bed and cultural operations easy. For the most efficient use of the soil heavy work stock and implements should be used. Improvement of the type can be accomplished by the rotation of crops, the use of barnyard manure, plowing under cowpeas or other green-manuring crops to increase the organic-matter content of the soil, and by the use of lime.

The agricultural conditions on the type are generally good and the soil includes many highly improved farms.

#### CLARKSVILLE SERIES.

The Clarksville series includes types with gray soils and yellow or reddish-yellow subsoils. The gray, gravelly lands of northwest Georgia, Tennessee, Kentucky, Alabama, and Missouri belong to this series.

The series is derived from the Knox dolomite, a cherty, magnesian limestone. The gravelly loam, stony loam (shown by stone symbol), and the loam of this series are found in Polk County. This is an extensive series, covering 36.1 per cent of the county.

#### CLARKSVILLE GRAVELLY LOAM.

The fine-earth material of the soil of the Clarksville gravelly loam, to an average depth of 7 inches, consists of a friable silty loam or loam, gray in the upper part and yellowish gray in the lower part. The subsoil in the section between 7 and 15 inches is a pale-yellow, friable silt loam. This material grades into a light-yellow silty clay, compact and stiff, especially in the lower part of the profile. The substratum is a reddish-yellow to dull-red silty clay to clay. Occasionally, especially on slopes, the material of this substratum occurs within the 3-foot section, and where this is the case the type closely approaches the Hagerstown gravelly loam. Some of these areas would have been separated on a map of larger scale.

The gravel in the type consists of angular fragments of chert, which in places form from 30 to 50 per cent of the soil mass. The

individual fragments vary from small particles to pieces a foot or more in diameter. The fragments are larger and more abundant on the crests of the higher ridges and where the topography is most broken, than elsewhere. As a general rule the quantity of gravel on this type is not so great in this county as in other surveyed counties of Georgia.

The Clarksville gravelly loam is the most widely distributed and most extensively developed soil in the county, covering large areas almost to the exclusion of other types. From the Alabama line it extends eastward as far as the Chattanooga-Brunswick line of the Southern Railway. From the Floyd-Polk County line it reaches southward to the foot of Dugdown Mountain. Its development, however, is broken by other soils occurring in the valleys and on the crests of some of the ridges.<sup>1</sup>

Undulating ridges, low rounded hills, and some rather steep rough hills are topographic features of this soil. The surface in general is that of a rolling plateau interrupted by valleys. The faces of the valley walls are generally steep and hilly. The rougher topography is in the northwestern corner of the county, where the ridges are rather narrow and the slopes steep and broken, and in the area about 2 miles south of Berry, where there is a series of narrow steep-sided ridges. Only in these and a few local areas is the topography unfavorable to cultivation, although even the rougher parts could be cultivated. Along the Central of Georgia Railway the surface is level to gently rolling. The drainage is thoroughly established. The quantity of chert in the soil renders it rather porous and open and the absorbed rainfall passes readily to subterranean channels which later issue as springs in the valleys below. On this account the crops suffer during protracted dry spells. The supply of water for stock and domestic purposes is also scant during long droughts. Erosion is not a serious factor, on account of the porous nature of the material and the surface covering of chert fragments.

Probably 50 per cent of this type is cleared and cultivated. The original timber consisted chiefly of longleaf pine, with some shortleaf pine, oaks, and hickory. The pine was removed for timber and charcoal burning. The uncleared areas support a growth of black-

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<sup>1</sup> The material forming these areas in the strip beginning along the Central of Georgia Railway and extending westward to within 2½ miles of Esom Hill, as well as the area about 1½ miles northwest of Fullwood Springs, differs somewhat from the typical Clarksville gravelly loam. It is a residual-colluvial soil composed of material from two different sources. The upper portion consists of limestone material, derived from the Knox dolomite, which has been carried down from adjoining hills by colluvial wash and creep. The lower portion is residual clay derived from the Rockmart slate. The upper part of the soil is the same as that of the typical Clarksville gravelly loam while the lower part corresponds to the subsoil of the Conasauga silt loam. This soil occurs as an intermediate type between the Clarksville and Armuchee soils, the former occupying the ridges and the latter the lower or valley positions. The colluvial material is deeper, reaching to about 30 inches, along the line of contact with the Clarksville areas. It gradually decreases in depth as the slate formations are approached.

jack, red, black, white, and other species of oak, with a scattered growth of hickory and longleaf, shortleaf, and loblolly pine.

The Clarksville gravelly loam is used chiefly for the production of cotton, with a small acreage in corn, oats, and cowpeas. It is for the most part farmed by tenants who grow relatively little grain and hay. The soil seems better suited to the production of cotton than of corn under the prevailing cultural methods. Cotton yields from one-third to one-half bale per acre with applications of 200 to 300 pounds of fertilizer. Big-boll varieties are preferred. Corn yields 8 to 15 bushels per acre. Fertilizers are not always used with this crop. Cowpeas give relatively good yields of seed on this soil, but the yields of hay under the prevailing methods of farming are low, ranging from one-fourth to three-fourths ton per acre. Sweet potatoes produce fair yields.

This type of soil is profitably used in the production of peaches in other parts of northwest Georgia. In Chatanooga County strawberries, particularly the Lady Thompson, Klondike, and Early Michael varieties, have been a profitable crop. Tomatoes, cantaloupes, watermelons, and other truck crops have been successfully produced on this soil. Bermuda grass makes a luxuriant growth, as well as lespedeza, and together they afford valuable pasturage.

After a few years' cultivation the Clarksville gravelly loam becomes more difficult to till. The soil has a tendency to run together and to become hard and compact. When it contains a good supply of organic matter this tendency is greatly reduced. The great need of much of the type is the restoration of organic matter which has been depleted through long years of continuous clean cultivation. This can best be done by the turning under of green-manuring crops.

#### CLARKVILLE STONY LOAM.

Areas in Clarksville gravelly loam color with stone symbols represent Clarksville stony loam. The interstitial material in these areas is similar in both the soil and subsoil to that of the gravelly loam. The essential difference between the two types is in the quantity and character of the stone content, the fragments ranging larger and often being abundant enough to make cultivation of the stony land extremely difficult. The larger stones are generally chert nodules. In addition to the very stony character, the topography is steep and hilly, practically precluding farming.

The Clarksville stony loam as it occurs in two narrow areas about 1 to 2 miles south and southwest of Berry represents the steep face of the south wall of the valley of Lime Branch. A third area lies just west of Rock Mart and a fourth about  $3\frac{1}{2}$  miles north of Fish.

The Clarksville stony loam should be utilized for pasture and forestry. Bermuda grass and lespedeza afford valuable grazing. The forest growth is similar to that of the Clarksville gravelly loam

## CLARKSVILLE LOAM.

The Clarksville loam consists of a gray loam or silty fine sandy loam, 8 inches deep, underlain by a yellow, friable silt loam, gradually becoming heavier with depth and passing into a light-yellow, friable silty clay at a depth of 15 inches. The surface material locally consists of 4 inches of a gray fine sandy loam and the lower 4 inches a light yellowish gray silt loam. The two form, when plowed and mixed, a loam or silty fine sandy loam. Included in this type are small areas of silt loam which have about the same agricultural value as the loam type. A few chert fragments are found on the surface and in the soil mass over most of the type.

The most extensive area of the Clarksville loam is found about 3 miles northeast of Cedartown and extending between and on both sides of the Cartersville and Rock Mart Roads. In the south-central part of the county areas of importance are found in the vicinity of Walthrall and between Youngs and Antioch Church. Several small areas are situated in the vicinity of Live Oak Church and one about 2 miles south of Fish.

The type occurs on smooth, rounded ridges, gentle slopes, and level areas at the base of slopes, the topography being level, gently undulating or gently rolling. The topography is considerably smoother than that of the gravelly loam of the series. The topographic features, as well as a somewhat porous subsoil, favor good drainage. In places slight erosion takes place, and slopes should be protected by terracing.

This soil supported a virgin growth of longleaf pine, with scattered trees of shortleaf pine, various oaks, and hickory. This timber has been removed and the land cleared and farmed. Cotton is the chief crop grown. The yield ranges from one-third to one-half bale per acre, or about the same as on the gravelly loam of the series. Corn yields slightly more, the average yields being from 12 to 18 bushels per acre. Cowpeas make somewhat better growth than on the Clarksville gravelly loam and probably yield as much as a ton of hay per acre.

## COLBERT SERIES.

The surface soils of the Colbert series are grayish and the subsoils yellow and frequently of plastic structure. The series is derived from pure limestone or limestone mixed with sandstone. The soils are typically developed as flat to undulating valley lands. Both surface drainage and underdrainage are frequently poorly established. In Polk County only one type is recognized, the silt loam.

## COLBERT SILT LOAM.

Areas in the Clarksville loam marked with the inclusion symbol indicate Colbert silt loam, the areas of which are of insufficient importance to be shown by a distinct color. The surface soil is a gray or yellowish-gray silt loam of a smooth and mellow structure, 6 to 10 inches deep, underlain by pale-yellow, friable silt loam, changing at about 12 inches into a yellow silty clay. Below 24 inches and extending to 36 inches the subsoil is a dull-yellow or brownish-yellow silty clay, mottled with brown, drab, white, and various shades of yellow. This clay is usually rather stiff, sticky, and plastic. A few small patches of compact, white silt loam, underlain by a rather plastic, whitish or yellowish silty clay or clay, occur.

Most of the Colbert silt loam lies in the north-central part of the county. The areas are small, low, and flat and occur along small stream courses. They are poorly drained, and for the most part covered with forest consisting mainly of shortleaf and loblolly pine, with some longleaf pine, gum, and oak. Much of the type is used for pasture. Where cultivated the best crops have been cowpeas for hay, grasses, and lespedeza for pasture. Yields of cotton and corn are low. The soil is generally decidedly acid and requires heavy liming.

## SHACKELTON SERIES.

The types included in the Shackelton series are characterized by gray to yellowish-gray soils and yellow subsoils. The series is residual from interbedded shales, sandstones, and limestones. It is found wholly within the Appalachian Valley. Two types—the loam and the stony loam—occur in Polk County.

## SHACKELTON LOAM.

The Shackelton loam is a grayish-brown, friable, mellow loam, 6 to 8 inches deep, underlain by a yellow silty clay to clay of a friable, compact nature, which becomes heavier as the depth increases. In small areas and spots the lower subsoil is a reddish-yellow to red, heavy clay. Although these areas are of frequent occurrence, it is impracticable to separate them on a map of the scale used in this survey. Small areas of silt loam included are not separated for the same reason. A few fragments of quartz, chert, and shale are scattered over the surface.

This type is found in small areas throughout the Appalachian Valley section of the county. A typical, and the most extensive, area is found at Esom Hill. Bodies of this soil occur to the east of Rock Mart and southeast of Aragon. In the south-central part of the county at Antioch Church is a small area. This area has a loam structure from the presence of a large quantity of small "shoe-peg" shale fragments such as occur in the Conasauga silt loam.

The Shackelton loam occurs as level valley areas in the western part of the county and as undulating to gently undulating lands, intermediate in position between the valleys and the hills, in the eastern areas. The drainage is well established.

Most of the original forest of shortleaf pine, oak, and hickory has been removed, and almost all the type is under cultivation. Cotton, corn, oats, and cowpeas are the important crops. The yields are ordinarily larger on the smooth valley areas than on the more rolling areas. Cotton yields from one-third to two-thirds bale; corn, 12 to 36 bushels; oats, 15 to 35 bushels; and cowpeas, one-half to 1 ton of hay per acre. The type is regarded as a desirable soil for general farming. It is mellow and can be worked into good tilth. It lacks organic matter, which should be supplied by turning under vegetable matter, as rye, oats or preferably cowpeas.

The agricultural conditions on this type are only fair, although some well-established farms are located on it.

#### SHACKELTON STONY LOAM.

About 3 miles east of Rock Mart is an area in Shackelton loam color marked on the map with stone symbols. This represents Shackelton stony loam. None of this area is under cultivation and little of it is fit for use, except for grazing.

The surface soil is a gray silt loam, about 4 inches deep, and is underlain by yellow silty clay. Over the surface and to a less extent in the subsoil are scattered gravel and stones, ranging in size from small particles to pieces 15 feet in diameter. These consist largely of quartz and chert, with some hematite, and, more rarely, sandstone and slate. On the steeper slopes rock outcrops occur.

#### CHRISTIAN SERIES.

The types included in the Christian series have grayish-brown to reddish-brown surface soils and a friable red clay subsoil. The series is derived from beds of sandstone or shale and limestone. In Polk County the loam and silt loam types are mapped.

#### CHRISTIAN LOAM.

The Christian loam is a light-brown to reddish-brown, mellow loam 6 to 8 inches deep, underlain by a brownish-yellow to brownish-red, friable clay to about 24 inches, where it passes into a deeper red and somewhat heavier clay. Scattered over the surface are usually a few small fragments of shale, chert, and quartz, with some pebbles of iron oxide. Included in this type are many small areas of silt loam. These are mostly found in the slight depressions and in the areas of more nearly level topography.

Relatively large areas of Christian loam occur north and north-east of Rock Mart, extending thence to the Bartow County line.

Smaller areas are found in the southwest part of the county between Esom and Fullwood Springs.

This type lies in the valley belt, and has a nearly level to gently rolling surface. Drainage is well established, and is entirely ample for general agricultural purposes.

The Christian loam is a productive type of soil, well adapted to grain and hay crops, and therefore for stock raising and dairying. Cultivation is easy, as the surface soil is comparatively light, friable, and free from stones. General agricultural conditions on this soil type are good.

*Christian loam, hilly phase.*—The surface soil of the Christian loam, hilly phase, to a depth of 4 or 5 inches, is a red clay loam or heavy sandy clay loam. The subsoil is a red, friable, heavy clay. Upon the surface in places occur numerous small, flat slate fragments, such as are found on the Rockmart slate loam, and ledges of Chickamauga limestone or Rockmart slate outcrop in many places, especially on the steeper slopes.

This phase is found on the high ridges and hills to the north of Aragon. Drainage is good to excessive.

Owing to the hilly topography and the numerous outcrops of the underlying rocks cultivation is impracticable. The areas are used for pasture or left in forest, which is composed chiefly of oak, hickory, shortleaf and loblolly pine, and cedar. The limestone underlying this soil is used for the manufacture of Portland cement, and the value of the land is based on this rather than on its use for agriculture. It is thus higher than strictly agricultural uses would warrant.

Mechanical analyses of samples of soil and subsoil of the typical Christian loam gave the following results:

*Mechanical analyses of Christian loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
253775.....	Soil.....	1.2	7.2	5.4	11.9	15.3	48.0	11.1
253776.....	Subsoil.....	1.4	4.6	3.2	6.2	8.2	56.4	20.1

CHRISTIAN SILT LOAM.

The surface soil of the Christian silt loam is a yellowish-brown to brown, friable silt loam. This is underlain at 6 to 8 inches by a brownish-red to dull-red, friable silty clay extending to a depth of about 20 inches, below which there is a rather stiff, dull-red clay. In some small areas included with this type there are numerous small

shale fragments scattered about over the surface and disseminated throughout the soil and subsoil. Small areas of red clay loam are included.

The Christian silt loam occupies level to gently undulating valley lands and rolling areas of good drainage. Areas of this type lie in the immediate vicinity of Rock Mart and Van Wert, northeast of Aragon, and southeast of Grady.

It is considered one of the better farming soils of the county, similar in its agricultural value and crop adaptations to the Hagerstown loam.

The greater part of it is under cultivation, being used for the production of the staple crops, of which cotton is the most important.

The Christian silt loam is generally included with one or more other types in the same fields, and no definite valuation can be assigned to it.

Results of mechanical analyses of samples of the soil and subsoil of this type follows:

*Mechanical analyses of Christian silt loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
253793.....	Soil.....	0.9	2.6	2.0	4.2	9.2	52.3	28.9
253794.....	Subsoil.....	1.0	2.2	1.6	3.2	7.4	49.3	35.2

CONASAUGA SERIES.

The soils of the Conasauga series have grayish-brown to gray surface soils and a yellow subsoil. They are derived from shales and sandstones. The topography is gently undulating to gently rolling and the drainage is good. The silt loam and sandy loam types are mapped in Polk County.

CONASAUGA SILT LOAM.

The surface soil of the Conasauga silt loam is a gray to yellowish-gray, rather compact silt loam. The subsoil, beginning at an average depth of 6 inches, is a pale-yellow silty clay loam, grading at 15 inches into a bright-yellow clay, which passes in turn into soft, partially decomposed slate at 24 inches. Not infrequently the underlying rock lies within a few inches of the surface. In some low-lying areas the soil is a whitish silty clay and the subsoil whitish clay. The subsoil of the type in general is dense and compact, resembling that of the Colbert soils, from which it differs in being less stiff and plastic. Small slaty fragments are found scattered spar-

ingly over the surface. Small areas of Conasauga loam occurring east and southeast of Aragon, southeast and southwest of Rock Mart, and south of the Seaboard Air Line Railway were included with this type.

The Conasauga silt loam is not extensively developed in this county. It is found in areas of various sizes from Cedartown southwestward to a point about  $2\frac{1}{2}$  miles beyond Berry. It is also found in small scattered areas between Cedartown and Walthrall. Owing to its small extent, the type exerts little influence on the agriculture of the county.

The topography is comparatively smooth and level. The drainage is ample, except in a number of low-lying areas, where water may remain on the surface for a day or two after heavy rains.

Nearly all the type is cleared of its native vegetation and is utilized for farming. The yields are light. Cotton is the principal crop, yielding about one-fourth to one-half bale per acre with applications of 200 pounds of 9-3-3 fertilizer. Corn without fertilization yields 12 to 15 bushels and oats 15 to 18 bushels per acre. The relatively low yields are probably due to the shallow soil and to the indifferent methods of cultivation employed by the tenant farmers.

This soil has been found productive in other areas of this State when properly handled. The heavy, dense nature of the soil has been modified by deep plowing and the turning under of green manuring crops. Tests have shown the soil to be very acid. Liberal applications of lime should be made to correct this condition.

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

*Mechanical analyses of Conasauga silt loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
253757.....	Soil.....	5.2	7.0	2.3	5.7	6.5	57.6	15.4
253758.....	Subsoil.....	2.2	3.4	1.2	3.2	3.1	45.2	41.3

CONASAUGA SANDY LOAM.

The Conasauga sandy loam consists of a loose, light-gray loamy sand to sandy loam, underlain at 8 inches by a pale-yellow, friable sandy loam, quickly passing into a sandy clay. Somewhere between 8 and 30 inches this material passes abruptly into a stiff, heavy, yellow clay, which forms a comparatively impervious layer.

This type includes a few patches of grayish-brown fine sandy loam underlain by yellowish-red sandy clay, which grades at 18 inches into a red clay. Such areas represent the Armuchee fine sandy loam. Shale fragments are scattered over the surface.

Several areas of Conasauga sandy loam were mapped in the county, the larger bodies lying immediately north of Antioch Church and others in the vicinity of Van Wert. Another area is found in the southwestern part of the county, midway between Fullwood Springs and Walthrall. Included with this type are small areas of Shackleton gravelly loam, which were of insufficient importance to show separately.

The topography is gently rolling, the drainage good, and the soil is of moderate agricultural value. Cotton yields from one-fourth to one-half bale, corn 12 to 18 bushels, oats 15 to 20 bushels, and cowpeas from one-half to three-fourths ton of hay per acre. The soil is greatly in need of organic matter.

Results of mechanical analyses of samples of the soil and subsoil of the Conasauga sandy loam are given below:

*Mechanical analyses of Conasauga sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
253719.....	Soil.....	0.6	16.4	12.9	35.4	13.9	17.2	3.2
253720.....	Subsoil.....	.4	3.8	2.8	6.9	3.0	40.0	43.2

**ARMUCHEE SERIES.**

The types included in the Armuchee series have reddish-brown soils and yellowish-red, dull-red or red subsoils. They are derived from shale and sandstone and form gently undulating to rolling valley areas. One type of this series was mapped in the survey of Polk County.

**ARMUCHEE SHALE LOAM.**

The fine-earth material of the surface soil of the Armuchee shale loam is a grayish-brown, yellowish-red or red loam, about 7 inches deep. The interstitial subsoil material is a yellowish-red to light-red silty clay loam, which at a depth of 12 to 15 inches changes into a dull-red, friable clay. Many thin, platy shale fragments are scattered over the surface and in the subsoil. Over a large proportion of the type the lower section of the profile is mainly fragmental shale, and outcrops of the bedrock occur in many places. Included with this type are small areas in which the subsoil is yellow. Such areas really represent the Conasauga shale loam, but it was impracticable to separate them.

The Armuchee shale loam is well developed in the southwestern part of the county, south of Cedartown, and between the Seaboard Air Line and Central of Georgia Railways. It also occurs as a high

ridge in the western part of the county, north of Etna. This ridge parallels Indian Mountain.

The Armuchee shale loam generally occupies low, rounded knolls and gently undulating areas. The type is developed in valley areas and also on ridges. The ridge in the northwest part of the county ranges in width from one-fourth to four-fifths mile and rises 400 feet above the valley. Drainage is good to excessive. The land here is not suitable for cultivation. The variegated red, yellow, purple, and gray shales come near the surface and outcrops are frequent.

Over most of the type the original forest has been removed. It consisted of shortleaf pine, loblolly pine, post oak, red oak, and blackjack oak, with hickory and some other deciduous trees. The trees are smaller than on the limestone soils.

This soil is only moderately productive. Cotton ordinarily yields from one-fourth to one-half bale per acre; corn 10 to 18 bushels; oats 10 to 20 bushels; and cowpeas about one-half to three-fourths ton of hay. Owing to the presence of the shale beds so close to the surface in many places, the plowing is shallow and preparation of a good seed bed difficult. Every attempt should be made to incorporate organic matter in the soil. In the northwest corner of the county on the ridge the soil is naturally thin and incapable of producing even fair yields. The greater part of this area should be allowed to remain in forest, or when cleared used for pastures. Land in this ridge area is held in large tracts by mining companies and has a low agricultural value.

The agricultural conditions over this soil type are generally poor. No large or well-equipped farms are found on it. Land values for the valley areas range from \$15 to \$40 an acre, depending upon location.

#### DEKALB SERIES.

The Dekalb series includes types with a gray to grayish-brown surface soil and a yellow subsoil. The series is derived from shale and sandstone. The topography is usually mountainous, and the drainage good to excessive. In Polk County the Dekalb shale loam is the only representative of this series.

#### DEKALB SHALE LOAM.

The fine earth of the soil of the Dekalb shale loam is a gray to yellowish-gray silty loam, with a depth of about 6 inches. In the subsoil the interstitial material is a yellow to yellowish-red, friable silty clay, which usually grades into disintegrated slate or shale at some depth within the 3-foot section. Upon the surface and throughout the soil and subsoil occur large quantities of flat, angular fragments of slate, derived from the Rockmart slate formation of which

this soil type is a residual product. Most of these shale fragments are between 1 inch and 3 inches in diameter, and rarely interfere materially with cultivation. A few fragments of sandstone are also found, especially on and near the tops of the higher hills and ridges. Locally small angular fragments of a peculiar cellular quartz are found scattered about over the surface.

The Dekalb shale loam is rather extensively developed in the eastern part of Polk County east of Euharlee Creek. These areas are high rolling to hilly ridges rising 100 to 500 feet above the valleys. Smaller areas are mapped in the same general section of the county and south of Grady.

The Dekalb shale loam, though comparatively extensive in Polk County, is not important agriculturally. In some areas, where the bedrock is below 18 or 20 inches and the topography is favorable, farming may be carried on successfully. The physical condition of the soil is good, the slate fragments rendering it loose, open, and porous. At the same time the drainage is not excessive, and in spite of rather steep slopes there is little or no damage from erosion. Over a great part of the type, however, the rough topography and shallow soil render profitable cultural operations difficult. Such areas are at present in second-growth timber, consisting of shortleaf, spruce, and some longleaf pine, blackjack oak, red oak, white oak, hickory, tulip poplar, and other deciduous species.

#### HANCEVILLE SERIES.

The types included in the Hanceville series typically have brown surface soils and a red subsoil. The series is derived from sandstone and quartzite. It is developed in mountainous regions. The Hanceville gravelly loam and stony loam were mapped in Polk County.

#### HANCEVILLE GRAVELLY LOAM.

The fine earth of the soil of the Hanceville gravelly loam, to a depth of 5 to 8 inches, is a reddish-yellow or yellowish-gray loam or silt loam. The subsoil consists of a reddish-yellow to dull-red, friable silty clay. Over the surface and throughout the soil and subsoil are numerous fragments of shale or slate, sandstone, and quartz, ranging from small particles to pieces 5 or 6 inches in diameter. These rock fragments are chiefly undecomposed particles of the underlying rock, but in some cases, on valley slopes, waterworn gravel is found, indicating the presence in such localities of terrace remnants, too narrow, however, to be indicated as separate areas upon the soil map.

The type occupies one area of 3.8 square miles in the northeastern part of the county. The topography is hilly to mountainous, with slopes too steep in most cases for profitable cultivation. Farming is

limited to very small areas of smoother topography, and the greater proportion of the type is in second-growth timber, chiefly oak, hickory, and shortleaf pine.

#### HANCEVILLE STONY LOAM.

The surface soil of the Hanceville stony loam is a grayish to brown fine sandy loam or loam, with a depth of 6 or 8 inches. The subsoil is a red, friable fine sandy clay, which gradually becomes heavier with depth and passes into a stiff, friable clay at depths between 15 and 18 inches. In a few small areas there is a reddish-yellow fine sandy clay immediately underlying the surface, but this quickly grades into the typically red subsoil material.

The type carries varying quantities of blocklike fragments of a sandy quartzite, together with large rock outcrops of this same material. In some places rock fragments are so abundant that they entirely cover the surface. This condition exists particularly along the slopes and in low-lying areas along small drainage ways leading from higher Hanceville areas. On the mountain tops the stones are larger than elsewhere.

In the northwestern corner of the county, about a mile north of Etna and also about 2 miles west of Hematite, are small areas of brownish-gray sand underlain by a yellowish-red, friable sandy clay. These are developed as parts of the lower slopes of Indian Mountain. The topography is undulating to rolling. The type is of small extent. The greater part of the area lies above the 1,000-foot contour, while the highest point has an elevation of 1,967 feet about one-half mile west of the Georgia-Alabama line. The topography is decidedly mountainous, with little or no land sufficiently level for cultivation.

The type is in forest consisting of shortleaf pine, with an occasional yellow pine, and various species of oaks. Hickory and tulip poplar are also found. Part of the timber has been removed by lumbermen. The chief use of this soil is for forest and pasture land.

The land is held in large tracts by mining companies. The relative land value is low. On the more sandy areas the yields of cotton range from one-third to one-half bale, and corn from 10 to 15 bushels per acre. The stony character renders farming operations somewhat difficult, although the fine material is loose and mellow.

#### HOLSTON SERIES.

The Holston series typically comprises types with gray soils and a yellow, or in some places a mottled yellow and gray, subsoil. This series is derived from materials brought down by the streams from limestone, shale, and crystalline-rock areas and deposited at times of overflow. It is developed as terraces and alluvial-colluvial fans. The gravelly loam and silt loam types are mapped in this county.

## HOLSTON GRAVELLY LOAM.

To a depth of 6 to 10 inches the fine earth of the Holston gravelly loam is a gray to yellowish-gray sandy loam or fine sandy loam. The subsoil is a yellow silty clay loam to clay but departs somewhat from the typical and varies in color from reddish yellow to red. Rounded and subangular quartz and sandstone gravel, apparently waterworn, is scattered over the surface and throughout the soil and subsoil. Within the 3-foot section there usually occurs a stratum of rounded gravel of varying thickness. Beneath this is a reddish-yellow, friable clay. Bedrock is exposed in a few places.

Near the areas of Dekalb shale loam and Talladega slate loam, which border the Holston soils on the south, there is included a narrow band of mixed material, partially derived by colluvial action from the adjacent hills. This soil is similar to the Holston gravelly loam, but contains a higher percentage of silt, and over the surface are scattered numerous angular fragments of slate.

The Holston gravelly loam represents old alluvium modified by colluvial wash and locally by material from the underlying slates.

The Holston gravelly loam is confined to the northeastern part of Polk County. It occupies a rolling to gently rolling plain, or high-terrace area, which begins at the foot of the mountains on the south and east and extends north into Bartow County. Its continuity on this plain is broken only by areas of Holston silt loam, high-terrace phase, and by the valley lands of streams flowing from the mountains. The natural drainage of the type is good.

The greater proportion of the Holston gravelly loam is under cultivation, being used chiefly for the production of cotton. A yield of one-half bale to the acre, with an application of 200 pounds of 10-2-2 fertilizer, is considered a good average crop.

Areas of the type have been under cultivation for 70 years. The original vegetation consisted of longleaf and shortleaf pine, oak, hickory, and other hardwoods.

## HOLSTON SILT LOAM.

The Holston silt loam is a light-gray silt loam, with an average depth of 8 inches, changing into a pale-yellow silt loam, which extends to depths varying between 12 and 18 inches. At this point a bright-yellow silty clay loam is encountered, and this continues to depths of 36 inches or more. The soil is generally smooth and friable, and the subsoil friable in the upper part but compact and dense in the lower part. In many places the soil to a depth of 3 inches contains sufficient fine sand to give it the texture of a loam, but immediately below this surface layer the soil is generally a true silt loam in texture. In the areas lying close to the mountains it is not uncommon to find in the lower part of the subsoil considerable quan-

tities of finely divided mica, the proportion in some places being sufficient to impart a greasy feel. Very little gravel is found on the type, except along the contacts with the Clarksville gravelly loam. Here chert fragments have been carried down upon the silt loam by colluvial wash. The type includes spots of clay loam underlain by mottled yellow and gray silty clay. Such soil is noticeable near Berry.

The type is well developed along the upper reaches of Euharlee, Cedar, and Fish Creeks and Lime Branch. Many of the streams along which it is found are intermittent. The type is not subject to overflow, except in a few places and during times of extraordinarily high floods.

The Holston silt loam, as mapped, includes small areas of Huntington silt loam, forming overflow land immediately along the streams. These were not of sufficient importance to be shown on the map. The type is well drained, with the exception of small areas of an acre or less in extent, which include spots of heavy land which occupy slight depressions. In these low spots the subsoil is a mottled bluish-gray and yellow, stiff, plastic clay, and the soil sometimes has a drab or bluish-gray color. These areas represent the Holston silty clay loam, but are too small to show on the map.

The Holston silt loam has been farmed since the earliest settlement of the county. Cotton produces an average yield of one-third to one-half bale per acre, with a 200-pound application of low-grade fertilizer. Yields as high as 1 bale per acre are obtained when the land is properly handled. Corn yields from 15 to 25 bushels per acre without fertilizers. Cowpeas and oats also produce well.

While the type is naturally a good soil for general farm crops, it is in great need of organic matter. It responds quickly to the use of commercial fertilizers. Besides its value for production of the staple field crops, it could also be used for certain truck crops, where favorably situated with respect to shipping stations.

*Holston silt loam, high-terrace phase.*—The surface soil of the Holston silt loam, high-terrace phase, to a depth of 5 to 8 inches, is a yellow to yellowish-gray silt loam. The upper subsoil consists of yellow silty clay or clay loam, extending to depths of 18 to 24 inches, and resting usually on a stratum of rounded gravel. The thickness of this gravel bed is variable, but it is generally only a few inches thick and is underlain by a yellow or mottled light-gray and yellow, friable clay.

This phase occurs in the northeastern part of the county, where it is associated with the Holston gravelly loam. It occupies old, high terraces with nearly level to gently undulating topography. Probably a part of the material in this soil is of recent alluvial and colluvial origin. The areas of this phase are well drained.

Because of its small extent the Holston silt loam, high-terrace phase, is of little agricultural importance. Its texture and topography make it an excellent general farming soil, but it is almost entirely devoted to the production of cotton. Cotton is reported by farmers to yield about one-half bale per acre where an application of 200 pounds per acre of 10-2-2 fertilizer is used.

Below are given the results of mechanical analyses of samples of the soil and subsoil of the typical Holston silt loam and of the high-terrace phase:

*Mechanical analyses of Holston silt loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
Typical:		<i>Per cent.</i>						
253795.....	Soil.....	0.3	0.7	0.6	3.2	4.8	65.4	25.0
253796.....	Subsoil....	1.2	2.4	1.2	3.6	4.2	50.9	36.4
High-terrace phase:								
253777.....	Soil.....	3.8	4.0	1.6	4.9	10.4	62.8	12.5
253778.....	Subsoil....	2.4	2.6	1.2	9.4	6.8	62.7	14.9

#### ELK SERIES.

The types included in the Elk series have brown soils and brown to reddish-brown subsoils. The series is alluvial in origin and formed of material washed from limestone areas. It occupies second bottoms or high first bottoms no longer subject to overflow, in which respect it differs from the otherwise closely related Huntington series. Only the silt loam is recognized in Polk County.

#### ELK SILT LOAM.

The Elk silt loam, though variable, is usually a brown, mellow silt loam, underlain at a depth of 8 to 12 inches by a yellowish-brown to reddish-brown, friable silty clay loam. In some small areas there is scarcely any difference between the soil and subsoil.

In the northwestern part of the county, on the west side of Cedar Creek, there is an area of this type in which the surface material is a reddish-brown silt loam and the subsoil, from 8 to 15 inches, is a reddish-brown friable silty clay, in turn underlain by a dull-red stiff clay. This area closely approaches in character the Cumberland silt loam. In the vicinity of Prior there is along Little Cedar Creek another area in which the subsoil is a dense, impervious silty clay or clay of pale yellow, mottled with brown, gray, and various shades of yellow. It contains a quantity of black iron accretions. The soil of this variation is less productive than the typical soil.

Certain areas along Fish Creek and Lime Branch are shown on the map by gravel symbol. The fine earth in these areas is similar to the typical silt loam areas, the essential difference being the content of fragmental rock—rounded and subangular quartz and chert. If

these areas had been more extensive, they would have been mapped as the gravelly loam of the series.

Only a relatively small acreage of Elk silt loam is mapped in Polk County. The areas are found chiefly in the western part. Typical, well-developed areas lie near Fullwood Springs and Prior, and between Esom Hill and Berry. Two areas of little importance lie in the south-central part of the county, along Euharlee Creek, about  $2\frac{1}{2}$  miles south of Fish.

The areas of Elk silt loam are generally level and are fairly well drained, although after heavy rains the run-off from surrounding uplands may remain on the surface for a short time.

Originally the Elk silt loam supported a heavy growth of hardwoods. This was removed during the early development of the county, and all the type is now under cultivation. The soil is very productive, easy to till, and holds water well. It is especially valuable for corn and forage crops. Corn, the leading crop, yields from 30 to 50 bushels per acre without fertilizers. Cotton yields from one-half to 1 bale per acre. Cowpeas yield from 1 to 2 or more tons of hay per acre.

The Elk silt loam is valuable for dairying and stock raising in connection with the surrounding hill lands, which make good pastures. Farms which contain a considerable acreage of this type are generally well equipped and improved with substantial buildings. The soil is easy to till.

#### CONGAREE SERIES.

The types included in the Congaree series have brown to reddish-brown soils and subsoils, there being comparatively little difference in texture, structure, and color from the surface downward. Occasionally grayish and yellowish mottling is encountered in the subsoil of poorly drained areas. These soils are alluvial in origin, derived from material washed from the Piedmont and Appalachian Mountain regions and deposited in the first bottoms of streams which flow through or issue from those regions. Drainage is inadequate in many areas, the bottoms where this series occurs being subject to periodical overflows. In this county only one type is mapped, the silt loam.

#### CONGAREE SILT LOAM.

To a depth of 8 to 10 inches the Congaree silt loam is a reddish-brown, smooth, slightly greasy silt loam. The subsoil shows little difference in color and texture to a depth of about 24 inches, but from this depth to 36 inches it may be slightly heavier, and, in poorly drained areas, mottled with reddish yellow and drab. Pockets and strata of fine sand are frequently encountered in the soil and subsoil, and many small areas of fine sandy loam are included with the

type. As developed in Polk County there is nearly everywhere a relatively large admixture of divided mica in the soil and subsoil.

The Congaree silt loam lies chiefly in the stream bottoms in and near the foot of the escarpment face known as Dugdown Mountain. In the southwestern part of the county it is the first-bottom soil along Terrapin Creek and the upper courses of Lime Branch. In the southeastern and eastern parts it occurs chiefly along the streams which form the headwaters of Euharlee and Hills Creeks. In the extreme southeastern corner the type is mapped as the bottom soil of two small streams which flow southward through the Piedmont.

In the mountains the bottoms in which the Congaree silt loam occurs are generally narrow and are bordered by steep valley slopes. On emerging from the mountains the bottoms broaden and the slopes to the upland become much gentler. Probably all of the areas are at times subject to overflow, but not at sufficiently frequent intervals to interfere very seriously with farming. Although the topography is level, drainage over most of the areas is good, only a few small spots being too wet to cultivate. The conditions in Polk County are in this respect more favorable than in some other sections of the State. Subirrigation from the streams keeps the soil from being droughty.

The principal use of this type at present is for the production of corn, to which it is nearly all planted. The yields, according to information obtained from farmers, vary from 20 to 60 bushels per acre. This soil is also excellent for cowpeas, 2 tons of hay per acre being obtained. Good Bermuda-grass and lespedeza pastures can be maintained without difficulty. The type thus seems to be better suited to stock raising than to cotton farming. On the sandier variations of the type excellent watermelons are produced.

#### HUNTINGTON SERIES.

The Huntington series includes brown to reddish-brown soils, with subsoils of similar color. There is little change in the texture from the surface to the lower limits of the 3-foot profile. The types are alluvial in origin and derived from materials washed mainly from limestone areas, but in part from regions of metamorphic and igneous rocks. The areas are subject to overflow, but are otherwise comparatively well drained. The Huntington silt loam and gravelly loam are mapped in this county.

#### HUNTINGTON SILT LOAM.

The surface soil of the Huntington silt loam is a smooth, mellow, chocolate-brown silt loam, with a depth of 8 or 12 inches. The subsoil has a somewhat lighter brown color, but otherwise has the characteristics of the surface soil. Owing to the method of formation

of this soil, there are many variations from the typical development. Along the smaller streams it is influenced by colluvial wash and its characteristics are influenced by the varying materials forming the upland soils from which such wash comes. Along the headwaters of Cedar Creek and Lime Branch the type closely resembles the Congaree silt loam, as the material is derived from the crystalline rocks. Such areas were not separated, because limestone and shale material are added before any extensive development of the Congaree is formed. Gravel is not conspicuous in the type, except where the streams forming the Huntington flow through areas of gravelly soils. The type includes spots of gray silt loam underlain by mottled yellow and gray or white silty clay. Such spots occur locally along Little Cedar Creek and also about  $1\frac{1}{2}$  miles north of Cedartown. The soil here is wet, cold, and less productive than the true Huntington silt loam.

Nearly all of the larger streams of the county have a narrow strip of Huntington silt loam along their courses. In many cases the strip is too small to show on the map. Along Euharlee Creek north of Rock Mart large areas of this type occur. Important areas also lie along the main branches of Cedar Creek south of Cedartown. Other typical areas lie on Fish Creek and on Lake Creek near the Floyd County line.

The original forest was a heavy growth of tulip poplar, sycamore, various species of oak, maple, hickory, ash, walnut, other species of hardwood, and shortleaf pine.

The Huntington silt loam is a very productive soil, though its value is impaired by overflows. It was one of the first soils in the county to be cleared and cultivated. All of it is now farmed. The crop uses of this soil are restricted. Cotton is not grown, on account of its rank growth, relatively few bolls, and frequent failures to mature. The soil is best suited to the production of corn, which yields from 20 to 60 bushels per acre without the use of fertilizers. Cowpeas grow luxuriantly and produce as much as  $2\frac{1}{2}$  tons of hay per acre. Redtop, lespedeza, Bermuda grass, and white clover with other native grasses, make good hay or pasturage crops.

Since the earliest days of settlement this soil has been considered one of the most productive and fertile in the county.

#### HUNTINGTON GRAVELLY LOAM.

Areas in Huntington silt loam color shown on the map with gravel symbols represent Huntington gravelly loam. The soil in these areas consists of a gray to brown, friable loam or silt loam to a depth of 6 or 8 inches, underlain by a brownish-yellow to light-brown silty clay loam. Both soil and subsoil contain angular and rounded chert gravel ranging in size from minute particles to fragments 2 inches in diameter.

This type is found almost exclusively as narrow strips along the courses of streams which flow through areas of the Knox dolomite formation. The largest areas are in the western part of the county. It is also developed in various other places along Lake Creek, in the north-central part of the county, and along a branch of Fish Creek, about 1 mile south of Biggers School.

It comprises flat to level areas, subject to overflow during periods of heavy precipitation. Under ordinary conditions it is well drained. The type has been cleared of a heavy growth of hardwood and is utilized chiefly in the production of corn, though some of the higher areas are used in growing cotton. The soil is moderately productive. Corn yields from 18 to 25 bushels and cotton from one-third to two-thirds bale per acre. No commercial fertilizer is used in growing these crops. The abundance of chert fragments makes preparation of the seed bed and cultivation of the crops difficult, especially where the fragments are rather large. Land values and agricultural conditions are generally about the same as on the surrounding Clarksville gravelly loam type.

#### MISCELLANEOUS MATERIAL.

##### ROCK OUTCROP.

Rock outcrop, as indicated on the soil map by symbol, represents exposures of massive Chickamauga limestone, occurring on the steep slopes. In some places the rock stands in perpendicular walls, but more generally the outcrops are in the form of large boulders.

#### SUMMARY.

Polk County is situated in the northwestern part of Georgia. It comprises parts of the Appalachian and Piedmont Plateau Provinces, the greater area lying in the Appalachian Valley division of the former province. The greater part of the county is rolling to hilly. A part is mountainous. The area of the county is 313 square miles, or 200,320 acres.

The greater part of the county lies within the drainage basin of the Coosa River, the waters of which eventually flow into Mobile Bay.

Settlement began in the county about 1832. The population, according to the 1910 census, was 20,203. Cedartown is the county seat and the town of first importance. Rock Mart is next in size.

Transportation is afforded by five railroad lines. The wagon roads are well built and generally maintained in good condition.

The climate of the county is characterized by long summers and short winters. The average growing season covers a period of 6 months and 22 days.

Cotton, corn, oats, and cowpeas are the leading crops, ranking in order as named. Dairying and stock raising are carried on to a small extent. No special crops are produced.

Exclusive of Rock outcrop, there are mapped 31 types and 3 type phases. The soils fall in three classes—residual, alluvial, and col-luvial.

The soils of the Talladega series are chiefly mountain soils. They are generally unimportant, on account of their rough topography, which in most places precludes farming. The clay loam type is not extensive, but comprises some good agricultural land.

The York loam is found in the Piedmont Plateau. It is moder-ately productive.

The Louisa soils are also Piedmont types, and are fairly productive.

The Hagerstown and Decatur series comprise the most productive upland soils in the county. They are strong limestone soils, espe-cially well suited for stock raising and dairying, as they are natural forage-crop soils. The best developed farms of the county are on these soils.

The soils of the Clarksville series form the greater part of the area of the county. They occur on gravelly ridges from Rock Mart westward to the county line. The loam type is not extensive but is the most productive of the series. The gravelly loam is exten-sive, but only moderately productive. The stony loam is too rough for farming.

In the Shackelton series the loam is fairly productive.

With the exception of the hilly phase of the Christian loam, the soils of this series are desirable for general farming.

The soils of the Conasauga series are fairly productive for the staple crops of the region. The same is true of the Armuchee shale loam.

The Dekalb shale loam is an extensive soil, but of little agricul-tural importance, on account of its mountainous topography.

The Hanceville gravelly loam is a mountain soil of little value, except for forestry and pasture.

The Holston gravelly loam and the Holston silt loam are terrace or alluvial-fan soils, containing more or less rounded quartz gravel. The soils are found principally in the northeast part of the county, have a level to gently rolling topography, and yield fair returns of the staple crops.

The Elk silt loam type is a productive terrace soil. It occurs in small areas along the main streams of the county and is especially valuable for the production of corn and forage crops.

The Huntington and Congaree are first-bottom soils. They are preeminently suited to the production of corn.

[PUBLIC RESOLUTION—No. 9.]

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

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

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

Approved, March 14, 1904.

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

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