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.

SOIL SURVEY OF FLOYD COUNTY, GEORGIA.

BY

DAVID D. LONG, OF THE GEORGIA STATE COLLEGE OF AGRICULTURE.

W. EDWARD HEARN, INSPECTOR, SOUTHERN DIVISION.

[Advance Sheets—Field Operations of the Bureau of Soils, 1917.]

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., March 22, 1920.

SIR: I have the honor to transmit herewith the manuscript report and map covering the survey of Floyd County, Georgia, and to recommend that they be published as advance sheets of Field Operations of the Bureau of Soils, 1917, as authorized by law. This work was done in cooperation with the Georgia State College of Agriculture.

Respectfully,

MILTON WHITNEY,
Chief of Bureau.

Hon. E. T. MEREDITH,
Secretary of Agriculture.

[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.]

BUREAU OF SOILS.

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ALBERT G. RICE, *Chief Clerk.*

SOIL SURVEY.

CURTIS F. MARBUT, *In Charge.*
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SOIL SURVEY OF FLOYD COUNTY, GEORGIA.

By DAVID D. LONG, of the Georgia State College of Agriculture.—Area Inspected by W. EDWARD HEARN.

DESCRIPTION OF THE AREA.

Floyd County lies in the northwestern part of the State of Georgia, on the Alabama line and about midway between Chattanooga and Atlanta. The county is about 25 miles wide in the southern part and tapers to a point at its northern extremity. Its greatest length is nearly 35 miles. The total area is 502 square miles, or 321,280 acres.

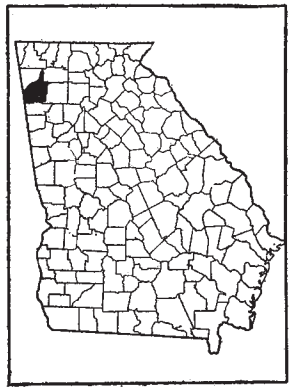

FIG. 1.—Sketch map showing location of the Floyd County area, Georgia.

Floyd County is situated in the Appalachian Valley, a broad physiographic region of the United States which lies between the Appalachian Mountains on the east and the Cumberland Plateau on the west. Although this is a valley in the broad sense, its features consist of a number of topographic forms which are well developed in Floyd County. The southeastern part of the county, or all the territory southeast of a line drawn from the northeast corner through Rome to the southwest corner, consists of a hilly to rolling dolomite plateau which ranges from 700 to 900 feet in elevation. It terminates on the northwest in a series of hills which rise to an elevation of 1,000 to 1,200 feet.

A ridge of sandstone and shale, about a mile northwest of this plateau, extends from the Gordon County line to Rome, thence to a point near Cave Spring, and westward to the Alabama line. This ridge lies just west of the line of the Southern Railroad to Atlanta Junction and then follows a branch of this system to Cave Spring. This ridge, which is rather broken and hilly, ranges in elevation from 700 to 1,000 feet above mean tide level. Between this ridge and the plateau there is a fertile limestone and shale valley.

The northwestern and northern part of the county includes a number of approximately parallel mountain ridges and intervening valleys. The mountains, such as Lavender, Simms, John, Horn, Turkey, and Turnip Mountains, are steep-sided ridges constituting remnants of anticlinal folds. Their northwestern slopes are somewhat steeper

than their southeastern slopes. These mountain ridges are broken, and except in a few places are not suitable for cultivation. They rise as high as 1,700 feet above sea level. Rocky Mountain, in the northwestern part of the county, is a steep-sided, flat-topped or mesalike high plateau. The mountains are composed chiefly of sandstone and shale.

Horseleg Mountain, lying southwest of Rome, in the Coosa Valley, is isolated from the general mountain region. It is rather steep and broken and rises to an elevation of 1,500 feet.

Between Rocky Mountain on the northwest and the ridges of sandstone and shale to the east, which cut the county diagonally from northeast to southwest, lies the Coosa-Oostanaula Valley. This valley, which averages about 8 miles wide, is generally undulating to flat, but includes some broken and eroded areas. It is locally called "flatwoods" and is underlain by shale and limestone.

Along the Coosa, Oostanaula, and Etowah Rivers there are large areas of alluvial or outwash plains. These plains are 100 feet or more above the rivers and often occupy the highest points in the so-called flatwoods section. They are gently undulating to level. There are also some low or younger river terraces which have a similar smooth, level surface. They lie 10 to 30 feet above the level overflow bottoms of the rivers.

Floyd County is included in the Coosa River basin. The Etowah River, flowing west from Bartow County, and the Oostanaula, flowing south from Gordon County, join at Rome to form the Coosa, which flows through the western part of the county into Alabama. Big Cedar Creek and its tributaries drain the southwestern part of the county. All the county except the flatwoods section is well drained by a complex system of streams. In the flatwoods the surface relief is not sufficient to afford good run-off, and rainwater remains in the flat places for considerable periods of time. In the dolomite-plateau region the precipitation is quickly absorbed by the porous soil, and issues from subterranean channels in the form of springs. Along the foot of this plateau large springs are very common. One of the largest is at Cave Spring.

This region was settled about 1830. Many of the first settlers came from North Carolina, Tennessee, and other parts of Georgia. According to the census the population in 1910 was 36,736. The average rural population is about 50 persons to the square mile.

Rome, the county seat, had a population in 1910 or 12,099. It is the most important town in northwestern Georgia, being an educational, railroad, and business center for a large surrounding territory. The city is situated midway between Atlanta and Chattanooga, on the Southern Railway. Cave Spring is the second town of im-

portance.[1] It is situated in the southwestern part of the county, 15 miles from Rome. The Georgia State School for the Deaf is situated here.

Floyd County is well provided with transportation facilities. Five railroad lines radiate from Rome, and traverse all parts of the county. A good system of public roads reaches all sections. The main roads are macadamized, while the second-class public roads are of earth. There is an abundance of good road material within the county.

CLIMATE.

The climate of Floyd County is characterized by long summers, short winters, and an abundance of rainfall quite evenly distributed throughout the year. A few short hot periods characterize an otherwise moderate summer. The mean temperature for June, July, and August is 78° F., but a maximum of 109° has been recorded. The coldest and most disagreeable winter weather occurs during January and February. Cold spells may continue for several days, followed by more moderate weather suitable for outdoor farm work. Hardy vegetables, such as cabbage, collards, and kale, can be grown during the winter months.

The mean rainfall is 48.2 inches per year. Heavy rains often occur during the winter months. The rainfall of the summer months is due chiefly to frequent storms, which tend to moderate the extreme hot weather. October and November are the driest months, and autumn weather is especially favorable for the harvesting of crops.

The average growing season extends from April 2, the average date of the last killing frost in the spring, to October 29, the average date of the first killing frost in the fall. Killing frost has been recorded as late in the spring as April 21, and as early in the fall as October 21.

The following table, compiled from the records of the Weather Bureau station at Rome, gives the normal monthly, seasonal, and annual temperature and precipitation.

[1] Since this report was written the preliminary announcement of the population of Floyd County and its civil divisions in 1920 has been issued by the Bureau of the Census, as follows: Floyd County, 39,841; urban, 16,346; rural, 23,485; Rome, 13,252; Lindale, 3,104; Cave Springs, 738.

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

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1910).	Total amount for the wettest year (1915).
	°F.	°F.	°F.	*Inches.*	*Inches.*	*Inches.*
December	44.2	73	10	4.65	3.78	6.61
January	42.7	75	8	4.68	3.17	4.21
February	44.0	77	10	4.80	4.58	5.71
Winter	43.6	77	8	14.13	11.53	16.53
March	53.5	87	18	5.69	1.82	3.47
April	61.3	91	29	4.13	2.76	.30
May	69.4	103	39	3.43	7.70	5.66
Spring	61.4	103	18	13.25	12.28	9.43
June	76.4	104	47	4.16	7.20	4.29
July	79.7	109	55	4.08	3.64	5.19
August	78.8	103	55	3.98	2.30	8.28
Summer	78.3	109	47	12.22	13.14	17.76
September	73.1	98	40	2.60	3.22	4.52
October	61.8	99	23	2.74	1.98	8.51
November	51.2	79	15	3.26	.76	3.10
Fall	63.1	99	15	8.60	5.96	16.13
Year	61.3	109	8	48.20	42.91	59.85

AGRICULTURE.

Agricultural development of this territory began when settlers, following closely upon the advances of the Indian traders, established themselves in the bottom lands along the streams and soon produced sufficient wheat, barley, rye, and buckwheat for home consumption. Cattle, hogs, and sheep were pastured on the open range, the sheep being depended upon to supply wool for the home making of clothes.

The agriculture continued upon a self-sustenance basis until about 1840, when cotton entered into the cropping system. Cotton growing developed rapidly with increased population, the establishing of trading points, and the improvement of marketing and railroad facilities. Crops which could be more economically purchased were discontinued and effort was gradually shifted more and more to cotton, which could be more conveniently and economically produced. At the close of the Civil War, owing to the great need for a source of ready income and to the high price of cotton, increased attention was given to the crop, until it came to be produced almost to the exclusion of all other crops. Not enough cereals were grown to

supply the local needs for human food and stock feed. The agriculture became a one-crop system, and has continued such until the present time. Under the present type of agriculture the production of cereals and forage crops and the raising of live stock are carried on mainly in order that cotton may be produced more economically and that a rotation shall be possible for the improvement of the soil. At present it is the aim of agricultural leaders of the county to make cotton a surplus crop, receiving attention after sufficient foodstuffs and feed materials are assured for local consumption. The production of a wide range of crops is made possible by the favorable climate and the diversity of soils.

The acreage devoted to cotton steadily increased until in 1909 it occupied a total of 38,150 acres, or 31 per cent of the total improved acreage of the county. The production in that year amounted to 13,955 bales, or 0.36 bale per acre. On many farms the yield of cotton is steadily increasing through better methods of culture and the keeping of more live stock. The opposite is true on the tenant farms, the land in which tends to decline in productiveness from year to year. This is especially true in a part of the county, over one-half its area, wherein the soils are easily depleted of their natural fertility.

A number of different varieties of cotton are grown. On the valley soils the King, a small-boll, early maturing variety, is preferred. The Half and Half, Cook's Improved, Cleveland, and Russell varieties are most common on the ridge farms. Mortgage Lifter and Christopher, with a few other varieties of minor importance, are grown to a small extent throughout the county. There is practically no seed selection, nor steps directed toward improvement of the varieties, and the seed is often badly mixed through ginning.

Corn is the second crop of importance. In 1909 it was grown on 27,291 acres, or 23 per cent of the improved farm acreage. The production was 305,431 bushels, or an average of 11 bushels per acre. The acreage of corn in 1909 shows a slight decrease since the preceding census. Corn is planted on many soil types which are not well suited to it, and this is one cause of the low yield per acre. The prolific varieties of corn, such as the Marlborough, Hastings, and Whatleys, are grown most extensively. Tennessee Red Cob is often planted on bottom-land areas. No attempt is made to keep the varieties pure. Much of the corn planted is of nondescript type. All the corn produced is used locally and the production does not suffice for local needs.

Oats are a crop of fluctuating importance. In some years the acreage is comparatively large, while in others it is small. In 1909 there were 4,203 acres seeded to oats, which produced a total of 50,530 bushels. Since that year the average area planted has been

considerably increased. Oats are grown for use on the farms; they are cut green for hay, allowed to mature, cut, and fed in the sheaf, or harvested and thrashed in the usual way.

The production of wheat decreased from a total of 40,930 bushels in 1899 to 5,517 bushels in 1909. The acreage has been extended in the last few years and now (1917) amounts to about 2,000 acres. Rye is produced in small patches to supply winter pasture. Cowpeas are in general use for the production of seed and forage and as a soil renovator. The crop is also used for pasturage, especially when seeded between corn rows. It is grazed down by cattle after the corn is harvested. The Unknown, Crowder, and Whippoorwill are the most common varieties.

Winter roughage for cattle consists of corn fodder, cottonseed hulls, peavine hay, native hays, and sorghum. Sometimes a mixture of cowpeas and sorghum serves this purpose.

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 trucking industries have been developed. Sorghum for sirup is considered a profitable crop by some farmers.

Stock raising and dairying are not of any considerable magnitude, not enough meat products being produced to supply local needs. Dairying is carried on to a small extent to supply the Rome market. The dairy stock is mostly Jersey grades, and the stock on the general farms ordinarily consists of scrub animals showing some Jersey blood. Some improvement of the cattle has taken place through the introduction of purebred sires of the Hereford, Shorthorn, and Angus breeds. A few purebred herds of these breeds are to be found. The number of hogs kept is increasing, although the local demand for pork products is not as yet supplied. Berkshire, Duroc-Jersey, and Poland-China are the chief breeds where the stock is purebred.

The wide difference in the soils of this county is reflected more or less in the agriculture. On some of the mountain soils, such as the Dekalb and Hanceville, farming is limited to small patches, except on Rocky Mountain, where a few level areas are favorable for farming on a more extensive scale. On the Colbert soils or in the flatwoods the crops are rather poor, except where the soil is especially well farmed and improved. In the eastern and southern parts of the county, on the Clarksville, Frederick, and Hagerstown gravelly loam types, crops are appreciably better. The highest yields and the best farms are found in the valleys and on the river terrace and bottom lands.

It is recognized that cotton is most productive on the Decatur, Hagerstown, Christian, Holston, and Greenville soils. The Huntington, Holston, Greenville, and Decatur are recognized as among the best soils for corn and for cowpeas grown for forage. On the

Clarksville soils cowpeas produce proportionately more seed than forage. Peaches and apples were formerly grown on the Hanceville gravelly loam, Dekalb stony loam, and Clarksville gravelly loam, but at present there are no commercial orchards in the county.

The methods of handling the different crops are quite variable. The tenant farmers, as a rule, do not prepare the land thoroughly, nor, in general, do they cultivate the crops as carefully as owner operators. Farmers cropping their own land give more thorough seed-bed preparation, cultivation, and fertilization. Ordinarily the land intended for cotton is plowed with a one-horse plow, after which it is bedded up, the fertilizer distributed, and the seed planted on the bed. The better farmers prepare the land by turning it broadcast, after which it is thoroughly harrowed or disked. The following spring the land is bedded and the seed and fertilizer distributed. The rows vary from 3½ to 5 feet apart, being farther apart on the more fertile land. Planting takes place between April 10 and the middle of June. The crop receives from four to six cultivations, including the chopping out and one hoeing.

The seed bed for corn does not receive as thorough preparation as that intended for cotton, except on the best farms. The land is generally turned in the spring instead of the fall. The rows are laid off 3 to 5 feet apart. When fertilizer is used it is distributed in the drill at the time of planting.

The prevailing method of seeding oats is to broadcast the seed and plow it under with a light plow. A common method is to drill in the seed with a 3-row drill between the cotton rows about the time picking is finished. It is generally desirable to get oats seeded as early in the fall as possible, although sometimes farmers are unable to seed before December. Some of the better farmers seed in the early part of October, after the land has been thoroughly plowed and harrowed. On these farms the best yields are obtained.

Cowpeas for forage are sown after the oats are harvested. The land is sometimes disked, and sometimes the seed is sown broadcast and disked under. Where grown for seed or as a soil renovater cowpeas are sown between the corn rows at the time of the last cultivation. Wheat and rye are sown after the first frost in the fall.

Mules are the chief work stock on all the farms. A few tractors are in use for plowing. The common plows are of 1-horse type, although the number of 2-horse plows is large and is increasing. Harrows, cultivators, and grain drills also are increasing in number. The barns are small, but adequate under the present system of farming.

Fertilizers are used over the entire county. According to the census, there was expended for fertilizer in 1909 a total of $92,758, or an average of $39.19 for each of the 2,367 farms reporting an ex-

penditure. Fertilizer is used chiefly on cotton. The application ranges from 200 to 400 pounds per acre. The grades used vary considerably. They analyze 8 tc 10 per cent of phosphoric acid, 2 to 4 per cent of nitrogen, and 2 to 4 per cent potash. When large quantities are used for cotton, a part is generally applied at the time of seeding and the remainder later as the crop develops. Corn does not receive as large amounts of fertilizer as cotton, but the same grades are used. Some farmers apply fertilizer at the time of planting and others during the development of the crop. Very few farmers use fertilizer for oats or cowpeas.

There is no well-established rotation of crops in this county. Many of the farmers try to change the land as often as possible, but some fields have been continuously cropped to corn or cotton for as many as 50 years. A rotation of corn, cotton, and oats, followed by cowpeas, is used by a few farmers.

The aggregate expenditure for labor in 1909, according to the census, was $110,244. Labor at the time of making this survey was scarce. For general farm work 75 cents to $1.50 a day is paid. By the month the ordinary wage ranges from $20 to $30. Cotton is picked at standard rates of 50 cents to $1 per hundred pounds, the rate depending on the character of the crop.

The total number of farms in the county in 1909 was 3,092 and the average size was 81.5 acres per farm.[1] The majority of the farms are between 20 and 50 acres in size. The census of 1910 shows that 1,941 farms, or 62.8 per cent of the total number, are operated by tenants. Most of the tenanted farms are operated on a share basis.

SOILS.

There is a great diversity of soils in Floyd County, the various types having a wide range in mode of formation, color, texture, structure, topography, and drainage. Upon the basis of mode of accumulation, the soils can be classed in four groups, residual from consolidated rocks, sedimentary or residual from unconsolidated rocks, colluvial, and alluvial. The residual soils are most extensive. The colluvial soils consist of material carried from higher situations to lower positions through creeping or in part by washing. They have not been acted upon by moving water to such an extent as the old alluvial soils, but the action which has taken place is sufficient to distinguish them from the residual and sedimentary soils. The alluvial types along the streams may be divided into two groups, depending upon the age of the material. The older alluvium comprises the bench lands, terraces, or second bottoms, which now lie well above overflow, and the recent-alluvial soils occupy the first bottoms or

[1] Each tenancy is tabulated as a "farm" by the census.

overflow areas of the streams and receive additions of material with each inundation.

The residual soils vary with the widely differing character of the rocks from which they are derived. The nature of the rock from which a soil is formed clearly affects its chemical and physical composition, and the classification of the soil types of this county rests primarily upon the source of the material from which they are derived. The rocks are all of sedimentary origin. Geological classification of the rocks is based upon their age, but from a soil standpoint the lithological character of the rocks is the most important feature. The formations include limestones, shales, and sandstones. The residual soils may be separated into several groups.

The first group of residual soils consists of those derived from the limestone rocks. The Decatur series, consisting of soils with intense red top soils and intense red subsoils, is derived from hard blue limestones, which represent two formations. In the valley positions, as between Rome and Cave Springs and between Rome and Nannie, the material has come from the thicker beds of limestone in the Conasauga formation. On the ridges which are high above the valleys it has been formed from the Knox dolomite formation, but its exact derivation from this formation is not fully understood. It may be derived from purer beds within the formation, or may be due to some peculiarities of weathering and oxidation.

The Knox dolomite formation gives rise to soils of the Clarksville, Frederick, and Hagerstown series. This formation consists of a massive-bedded, cherty magnesium limestone, the beds of which are seldom seen but which in weathering leave behind a mass of angular chert fragments. The formation has a wide extent in the eastern and southeastern parts of the county, and from it the extensive gray gravelly soil of the Clarksville series is derived. This series has gray to yellowish-gray surface soils, and a pale-yellow silt loam subsoil which with depth grades into a yellow silty clay loam. Chert fragments give rise to the gravelly loam type, or, where the pieces are large, to the stony loam type. The loam type of the series is apparently derived from the more or less chert-free beds of this rock.

The Frederick series differs from the Clarksville in having a red silty clay loam or compact and tough silty clay in the lower part of the subsoil, and this material may lie within 12 inches of the surface. The soil also has a more brownish cast than the Clarksville. The Armuchee chert and Fort Payne formations also give to the Frederick soils.

The Hagerstown gravelly loam is one degree removed from the Frederick in that the soil has a brownish-red color and the subsoil is brownish-red to dull-red friable silty clay to silty clay loam. The

Hagerstown silty clay loam is derived to a small extent from the Knox dolomite, but the largest areas come from the pure limestone beds in the Conasauga formation.

The second group of residual soils comprises those derived from interbedded shale and limestone belonging to the Conasauga and Floyd formations. The former consists of beds of argillaceous and calcareous, thinly laminated shales of olive-green color, which weather into a brown to brownish-red color, alternating with beds of varying thickness of hard, bluish limestone, marked by many veins of white calcite. The Conasauga formation is developed to some extent north of Rome, but the largest area is found south of the Coosa River in the southwestern part of the county. A phase of the formation, developed in close proximity to the Rome formation, carries a large quantity of siliceous material. The Floyd formations consist of fine-grained argillaceous and calcareous shales of a dark color, which upon weathering appear very similar to the shale of the Conasauga formation. Limestone is thinly interlaminated through the shale, but develops in thicker lenses at some places. From the standpoint of soil formation the Conasauga and Floyd formations are very similar. From these two formations four different soil series are developed.

The Colbert series is represented by gray to yellowish-gray surface soils and by a subsoil which in the upper part is pale yellow and compact, and in the lower part brownish yellow or mottled yellow and gray, tough, sticky, and plastic.

The Montevallo series is characterized by brownish-gray to brown soils and by heavy, stiff, tough to plastic clay subsoils which have a reddish color with much mottling of shades of red, yellow, and gray. They are chiefly developed where the underlying shale is near the surface or well up within the subsoil, so as to impart the coloration of the partly weathered shales to the soil mass. In the shale loam type the rock occurs throughout the subsoil and in many places on the surface. In the gravelly phase of the shale loam there is an appreciable amount of rounded gravel, which comes from higher areas of another formation. In the silty clay loam type the shale is not so abundant through the soil and upper subsoil but may be found in the lower part of the 3-foot profile in association with thin lenses of limestone. In the gravelly loam of this series, which is derived from a siliceous phase of the Conasauga formation, the shale weathers into angular or small blocklike fragments. This type also has a very hilly topography in contrast to the other types occurring in the flatwoods section of the county.

In the Shackelton series the soils are gray to yellowish gray, and the subsoil is a pale-yellow to yellow, friable and compact silty clay

to silty clay loam. The Shackelton soils are more deeply weathered, and consequently not as plastic as the Colbert, although the two series are derived from the same class of rocks and are closely associated in the field.

The Christian series usually has a brown to reddish-brown surface soil and a brownish-red to red, friable, silty clay subsoil. Shale and limestones are found through the subsoil material.

In the above series of soils, derived from interbedded shale and limestone, the Colbert series is mostly influenced by limestone, while the Montevallo series is least affected by this rock. In the Shackelton and Christian series the influence of the two classes of rocks is nearly equal, or slightly in favor of the shale as contributing soil material.

In the third group of residual soils the effect of limestone in the formation of the types is entirely lacking, as the soils are derived entirely from sandstone and shale. Several formations of this class of rocks are found in Floyd County. The most extensive is the Rome formation, of Cambrian age, which consists of white, gray, yellow, and purple sandstone and shale. Next in extent is the Rockwood formation, which, in this county, consists mainly of brown sandstone, although on Horseleg Mountain the color of the rock is white. The Oxmoor standstone is white and brown in color, and contains some conglomerate. The Lookout formation is restricted to the top of Rocky Mountain and consists of conglomerate, sandstone, and shale. The Dekalb and Hanceville series are developed from the rocks of these formations.

In the Dekalb series the soils are gray to yellowish gray, and the subsoil is a yellow, friable, fine, sandy clay to silty clay. The stony loam, which is covered with angular sandstone fragments, occupies much of the steep mountainous region of the county. The fine sandy loam type occupies smoother areas which may consist of high plateaus and ridges or may lie at lower elevations.

In marked contrast to the Dekalb series the types in the Hanceville series have brownish surface soils and a dark-red to red subsoil. The stony loam occupies the rougher mountain sections. In the shale loam type the underlying shale lies well within the soil profile, and in many places outcrops. The fine sandy loam and clay loam are found mainly on the smoother parts of ridges and on the mountains, but a small proportion of these types is mapped in the valley.

The sedimentary soils are derived from unconsolidated deposits of fine sand, silt, and gravel of Neocene age, which are contemporary with more extensive deposits in the Coastal Plain region of the State. From these deposits are derived the Norfolk, Greenville, and Orangeburg series.

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In the Norfolk series the soils are gray to yellowish gray, and the subsoil pale yellow to yellow in color and a friable fine sandy clay in texture. The gravelly phase of the Norfolk fine sandy loam is developed from lower beds of the deposits, in which there is an abundance of waterworn rounded gravel. The Greenville series is characterized by brownish-red soils and a friable, red sandy clay subsoil. The Orangeburg series differs from the Greenville in having a brownish-gray surface soil and a yellow upper stratum of the subsoil above the typical red sandy clay.

The third broad group of soils comprises the colluvial types which have been washed down from the mountains and spread over the valleys below. The material is found overlying formations of rocks which would naturally give rise to entirely different soils. The Allen and Jefferson series consist of colluvium transported from regions of the Hanceville and Dekalb soils. The soils of the Murrill series have been washed from areas of the Clarksville types.

The Allen series has soils of a brown to reddish-brown color and red subsoils of friable, fine sandy clays to silty clays.

The Jefferson series is characterized by gray to yellowish-gray soils and yellow subsoils that may become reddish in the lower part of the 3-foot profile.

The Murrill series also has gray to yellowish-gray soils and a pale-yellow subsoil like the Jefferson, but it differs in origin.

The fourth broad group of soils comprises the alluvial types. The old alluvial or terrace soils belong to the Cumberland and Holston series.

The Cumberland series has a reddish-brown soil and subsoil, the latter being friable though somewhat compact in structure. This series represents material coming largely from limestone.

In the Holston series the soils are brownish gray, and the subsoil bright yellow. This series represents material which has been washed principally from areas of sandstone and shale.

The recent alluvial soils, occurring in the first bottoms of the various streams and subject to overflow, are classified in the Huntington and Pope series.

The Huntington series includes brown to dark-brown soils, and subsoils of about the same color or in places a more yellowish brown. These soils are derived largely from materials washed from limestone soils.

The Pope series is much like the Huntington, but is differentiated on account of a different source of material, which has come from regions of sandstone and shale.

In the following pages of this report the several soils of Floyd County are described in detail, and their relation to agriculture dis-

cussed. The table below gives the name and the actual and relative extent of each soil:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Clarksville gravelly loam	56,640	17.6	Dekalb stony loam	5,056	1.6
Colbert silt loam	30,400	9.7	Rough stony land	4,928	1.5
Stony phase	768		Pope fine sandy loam	4,480	1.4
Hanceville stony loam	18,304	5.7	Jefferson stony fine sandy loam	4,416	1.4
Montevallo shale loam	12,544	5.6	Hanceville shale loam	4,416	1.4
Gravelly phase	5,440		Shackelton gravelly loam	4,288	1.3
Huntington silt loam	15,616	4.9	Clarksville loam	4,224	1.3
Dekalb fine sandy loam	14,976	4.7	Jefferson fine sandy loam	3,904	1.2
Decatur clay loam	10,304	4.5	Christian clay loam	3,712	1.2
Ridge phase	4,160		Huntington fine sandy loam	3,584	1.1
Montevallo gravelly loam	13,440	4.2	Montevallo silty clay loam	2,688	.8
Allen stony loam	12,288	3.8	Hanceville fine sandy loam	2,688	.8
Clarksville stony loam	10,560	3.3	Allen fine sandy loam	1,984	.6
Hagerstown gravelly loam	10,496	3.3	Murrill silt loam	1,472	.5
Norfolk fine sandy loam	6,464	3.0	Cumberland clay loam	1,472	.5
Gravelly phase	3,392		Hanceville clay loam	1,408	.4
Frederick gravelly loam	5,952	3.0	Frederick clay loam	1,280	.4
Heavy-subsoil phase	3,776		Hagerstown silty clay loam	1,152	.4
Shackelton silt loam	7,552	2.3	Pope silt loam	1,152	.4
Holston fine sandy loam	7,040	2.3	Orangeburg fine sandy loam	576	.2
Deep phase	384				
Huntington gravelly loam	6,656	2.1			
Greenville clay loam	1,600	1.6	Total	321,280	
Gravelly phase	3,648				

DECATUR CLAY LOAM.

The Decatur clay loam in the surface portion consists of a dark brownish red to intense-red, friable, heavy clay loam. The subsoil, beginning at an average depth of 7 inches, is an intense-red, heavy, stiff silty clay to clay. The strong red coloration of this type is the characteristic distinguishing it from the types which surround it. The surface soil varies locally from a deep-red clay in eroded spots to a brown mellow silty clay loam in other places. The subsoil is generally uniform, but in one or two local areas it is deep reddish brown silty clay loam to a depth of about 20 inches. In most places the type is free from rock outcrops, chert, or other stony material, but a few local areas contain small chert fragments.

The Decatur clay loam is well developed in a number of areas. The most prominent are found in the southern half of the county. The most important begins south of Six Mile and extends along the Southern Railway to Cave Spring. Another area is found along the Rockmart Road from Donahue School south to Byrd. Smaller areas are scattered over the southeastern section of the county, notably at Six Mile and Lindale and south of Reynolds Bend on the Etowah

River. In the northeastern part of the county there are prominent areas in the vicinity of Nannie and Waters Store and about 1 mile east of Berwin. There are a few small scattered areas in the northwest corner of the county between Early and Sardis Church.

The Decatur clay loam is derived from beds of more or less chert-free, pure limestone. The areas between Cave Spring and Rome and between Rome and Nannie are derived from beds of limestone within the Conasauga formation.

This type occupies a valley position, or at least lies lower than the surrounding soils. The topography is gently undulating and sufficiently smooth for the use of gas-engine tractors and improved implements. The area between Donahue School and Byrd is undulating to gently rolling, occupying small valleys and a well-rounded low ridge. Drainage is well established and terracing is necessary to prevent erosion on some of the steeper positions.

All the Decatur clay loam has been cleared of the native vegetation, which consisted chiefly of hardwoods, with some shortleaf pine. The type is now used for the production of all the staple crops, and, exclusive of the river bottoms, is considered the most valuable type in the county for general agriculture. It supports some of the best farms in the county, most of them being operated by the owners. Cotton is the chief crop. Its yield averages about three-fourths bale per acre. One bale per acre is a common yield. Corn yields 20 to 40 bushels per acre, depending upon the fertilization and preparation of the land. Oats yield an average of about 25 bushels, but 40 bushels or more are produced under the best methods of farming. Cowpeas yield 1 to 2 tons of hay.

The Decatur clay loam is naturally a productive soil, being one of the strongest and most durable in the State. It is well adapted to all the general crops, and is especially suited for grain and grass farming in combination with stock raising and dairying. Owing to the heavy nature of the type, heavy draft animals and implements are necessary to obtain the best results. The type can only be handled under a narrow range of moisture conditions, as it clods badly and is otherwise injured if plowed when it is too wet. An increase of fertility which is fairly lasting accompanies the use of stable and green manures on this type. Deep plowing and subsoiling also are beneficial.

Improved farms on the Decatur clay loam are valued at prices ranging from $60 to $100 an acre.

Decatur clay loam, ridge phase.—The soil of the ridge phase of the Decatur clay loam is a dark brownish red to reddish-brown, friable mellow clay loam. The subsoil begins at an average depth of 7 inches and consists of a deep-red or intense-red, friable silty clay to clay which extends beyond a depth of 36 inches. This phase

is not as uniform in its characteristics as the typical Decatur clay loam found in the valleys. In many places the soil is more brownish, and the subsoil also is brownish red. In this respect the phase grades close to the Hagerstown gravelly loam, from which it is arbitrarily separated in many places. Areas of the Hagerstown gravelly loam are unavoidably included with the type in some places. The ridge phase of the Decatur clay loam carries with it a variable quantity of chert fragments, in which respect it differs from the typical soil. Sometimes the quantity is sufficient to produce a cherty phase.

The Decatur clay loam, ridge phase, is not an extensive soil. It occurs in widely separated areas of various sizes. The most important are found in the vicinity of Cave Spring, representing the northern extremity of a larger development in Polk County. Several appreciable areas are found in the vicinity of Lindale and Six Mile, and along Boyd Creek, just south of Etowah River. A few small areas are found in the northeastern corner of the county.

This soil is separated on account of its occurrence on the crests of some of the highest ridges in the region of the limestone soils. It is found at elevations 200 to 300 feet above the stream valleys below. It is restricted to the crests or highest elevations, and very seldom is found on the steep-sided slopes. The ridge tops are generally undulating to rolling, but in some places the surface is so irregular that cultivation is carried on with difficulty. Drainage is excessive, and considerable erosion takes place unless the top soil is protected by terraces. Crops suffer in times of drought.

This soil is most probably derived from beds of limestone purer than those which give rise to the Clarksville gravelly loam.

All of this land has been cleared and farmed. The native vegetation consisted chiefly of hardwoods and shortleaf pine. The phase is considered quite desirable, notwithstanding the difficulty in the transportation of crops and implements from and to the ridges. It is planted chiefly to cotton, which averages about one-half bale per acre. A yield of 1 bale per acre is common on fields which are well cared for. Yields of other crops are somewhat lower than on the typical Decatur clay loam.

Land of this phase sells for $15 to $20 an acre, depending upon the location and improvements.

CLARKSVILLE STONY LOAM.

The soil and subsoil of the Clarksville stony loam are the same as those of the Clarksville gravelly loam except for an abundance of stony material found on the surface and through the subsoil. In additon to the stones, there is also a topographic difference. The stony material in this type consists of chert fragments ranging from

the smallest particles to pieces as much as 2 feet in dimension. In some places, where the stones may be comparatively small, they occur in such abundance that practically the entire surface is covered by 2 or 3 inches of sharp, angular fragments. The stone content typically is sufficient to make farming extremely difficult. Included with the larger areas are small tracts in which stones are not much more abundant than in the Clarksville gravelly loam, but they were not separated, on account of their close and intricate association.

The Clarksville stony loam is mapped in large and well-defined areas. The largest is found northeast of Rome in the vicinity of Hermitage, where it occurs in a strip about 5 miles long and averaging about 1 mile in width. This area represents the ridge crest which terminates the dolomite plateau in this region. A number of smaller areas are scattered throughout the eastern and southern parts of the county in the region of the Knox dolomite. Appreciable areas are found around Horseleg Mountain southwest of Rome. The type is also mapped in long, narrow strips on the sides of Turnip, Lavender, Simms, John, Horn, and Turkey Mountains. In some places on these mountains the type becomes more or less indefinite in boundary and can not be mapped in close detail on account of the inaccessibility and rough topography. A few strips of this soil on some of these mountains are not shown on the map, on account of their extreme narrowness and irregular occurrence.

The Clarksville stony loam is derived from either the Knox dolomite or chert beds of the Fort Payne chert formation. The areas mapped in the cherty regions of the southeastern and southern parts of the county are from the Knox formation, while the narrow areas around the mountains are from the Fort Payne chert.

This type is distinct in topography from the other soils of the Clarksville series, being rough or mountainous. In fact, some of the roughest areas of the Clarksville gravelly loam type are included with it on the map, not so much on acocunt of the presence of stones but chiefly because of the rougher topography and relatively lower agricultural value. Drainage is thoroughly established as a result of the surface relief and the porous subsoil.

Practically none of this type is cleared and farmed. The small area in cultivation consists of clearings in the smoother and less stony regions. Yields here are about the same as on the Clarksville gravelly loam. The natural forest growth consists of hickory, chestnut oak, and other oaks, ash, gum, and shortleaf yellow pine. There is a thick growth of native grasses over the type. Land values on this type are low, ranging from $5 to $15 an acre.

The Clarksville stony loam on account of its stoniness and rough topography is more suited for forestry and pasturage than for general farming.

CLARKSVILLE GRAVELLY LOAM.

The soil of the Clarksville gravelly loam is a light-gray, mellow, friable loam to silt loam, which becomes yellowish gray in the lower part. The subsoil begins at an average depth of 7 inches and consists of a smooth, friable, pale-yellow silt loam which gradually becomes heavier until a depth of 15 to 24 inches is reached, where the material becomes a brighter yellow friable silty clay. The lower subsoil is often compact and dense, but very seldom sticky. In many places the substratum is a reddish silty clay which sometimes comes within the 3-foot section, the type here approaching the Frederick gravelly loam. There are small spots of this latter type included. In an area of about 30 square miles in the southern part of the county there is more fine sand in the surface material and the type grades toward a fine sandy loam. This fine sand apparently comes from a sandy chert rock or from beds of fine-grained sandstone included in the parent rock. A few brown sandstone blocks are mingled with the sandy chert or chert fragments.

An abundance of angular, light-colored chert fragments covers the surface and extends through the soil mass. The fragments range from the smallest particles to pieces 1 foot or more in diameter. The cherty material comprises from 30 to 50 per cent of the soil mass. In some places the chert fragments are sufficiently large for the areas to be classed with the stony loam of this series, and they would have been mapped as such on a map of larger scale. The chert gravel is not uniformly distributed, as it is more abundant on narrow ridges, steep slopes, high knoblike hills, and generally wherever the surface is more broken or irregular.

The Clarksville gravelly loam has a wide distribution, and it is the most extensive type in the county. It occurs chiefly on the Knox dolomite plateau, which lies east and south of Coosa Valley. The areas here lie practically east and south of a line drawn from the northeastern corner, through Rome, to the southwestern corner of the county. In this region the type occupies large areas. Within the Coosa Valley there is a small area on Horseleg Mountain. A fairly large area begins at Huffaker and extends southwest for 3 miles. In this area the subsoil is a somewhat stiff and slightly sticky silty clay. Northwest of the Coosa Valley the type is found in narrow strips along the base of Simms Mountain and at the eastern end of Lavender Mountain. A rather large area is also mapped just northeast of Crystal Springs.

The Clarksville gravelly loam in the southern and eastern parts of the county, and at a few points in the northwestern corner, is derived from the Knox dolomite, a bluish-gray cherty magnesian limestone. The abundant chert is the residue of the weathering of

this rock. The remaining areas of the type are derived from the Fort Payne chert.

The soil occupies undulating to gently rolling stream divides, rounded hills, narrow rounded ridges, steep slopes or valley walls, and low rounded hills at the foot of the mountains. The rougher topography occurs along the northwestern edge of the dolomite region. Here the elevation is higher and the areas are cut by many streams, which produces a decidedly rough topography. The irregularity is increased by the steep-sided stream valleys. Toward the eastern boundary of the county and in the southeastern corner the topography becomes smoother and there are many undulating interstream areas with long, rounded slopes to the streams.

In the southwest corner of the county and in local areas along Big Cedar and Lake Creeks there are areas which are too rough for general farming, but with these exceptions most of the type can be farmed. Drainage is well established. Many wet-weather streams cutting back into the hills carry the surface run-off and sink holes are common. On account of the porous nature of the soil much of the water falling upon the surface passes to subterranean channels. This same porosity of the soil is responsible for more or less damage to crops in dry seasons. Best yields are obtained when there is an abundance of showers during the growing season.

About 70 per cent of this type is cleared and farmed, the common crops of the county being grown. The type originally supported a growth of shortleaf pine, oak, and hickory, with some longleaf pine in the southern part of the county. Much of the original pine has been used for charcoal purposes. In the wooded areas the growth is chiefly blackjack, red, black, white, and other oaks, scattered hickory, loblolly pine, and shortleaf pine.

The Clarksville gravelly loam is used chiefly for the production of cotton, but there is 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-fourth to one-third bale per acre with applications of 200 to 300 pounds of fertilizer. Farmers who follow improved methods obtain a yield of three-fourths bale. 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 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 for the production of peaches in other parts of northwest Georgia. In Chattooga County, straw-

berries have been a profitable crop. Tomatoes, cantaloupes, watermelons, and other truck crops also have been successfully produced. Bermuda grass makes a luxuriant growth, as does also 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 become hard and compact. When it contains a good supply of organic matter, this tendency is greatly reduced. The great need of much of this type is the restoration of the supply of organic matter which has been depleted through years of continuous clean cultivation. This can best be done by turning under green-manuring crops. Land values on this type range from $15 to $30 an acre.

CLARKSVILLE LOAM.

The surface soil of the Clarksville loam consists of a mellow, friable loam which typically is light gray in the upper part, and changes to yellowish gray in the lower part, of the 7 or 8 inch surface-soil section. Over the greater part of the type the upper soil is a fine sandy loam, which becomes more silty in the lower section, but after plowing the mixture of the two sections produces a typical loam texture. The subsoil from about 8 to 20 inches is a friable, mellow, pale-yellow silty clay loam, while below a depth of 20 inches it is usually a more compact and dense silty clay of a brighter yellow color. A small quantity of angular chert fragments is found in places, but the quantity nowhere approaches that in the case of the associated Clarksville gravelly loam.

Within the areas of this type there are small patches in which the soil is typically a silt loam. These are most numerous in the low, depressed areas, but they are too inextensive and too similar in agricultural value to separate as a distinct type. Slight variations are also found in the subsoil, which in small areas becomes more reddish yellow than typical, approaching the Frederick series.

The Clarksville loam is found chiefly in two developments, with smaller areas scattered throughout the eastern and southeastern parts of the county. One of the principal regions of its occurrence is in the eastern part of the county, north of Etowah River, in the vicinity of Johnson School. The second development is in the southeastern part of the county, where an irregular strip about a mile wide extends from Seney to the vicinity of Flint Hill Church. Smaller areas occur in the vicinity of the larger ones. An area of scarcely typical soil is found just north of Armuchee.

This type is derived chiefly from the Knox dolomite formation, as is also the Clarksville gravelly loam. The lack of chert fragments is probably due to its derivation from chert-free beds. The sandy

material is in all probability derived from a more sandy chert or from inclusions of sandstone or quartzite, as fragments of these rocks are sparingly found throughout the type. The area of this soil mapped near Armuchee is derived from the Fort Payne chert formation, which is made up of cherty limestone and beds of chert.

The Clarksville loam occurs on slopes, knolls, and ridges, and has a smoothly undulating to gently rolling topography. The greater part of the type is found on the dolomite plateau, but it is considerably smoother than the Clarksville gravelly loam. The area mapped near Armuchee occurs in a valley position and has a smooth, level surface. The surface relief and the more or less porous subsoil insure good drainage.

Practically all of this type has been cleared of the native forest growth and is used for farming. Its freedom from stones in a general region of very gravelly or stony soils make it highly esteemed. The trees remaining in places indicate that the original forest was chiefly pine, with some oak and hickory and other hardwoods. Longleaf pine was conspicuous in the native forests.

The common crops of the county are produced on this type, and yields are slightly higher than on the Clarksville gravelly loam. It can be handled with greater ease, but otherwise its management and uses are about the same.

Land of the Clarksville loam is valued at about $25 to $30 an acre, depending upon the location and improvements.

FREDERICK GRAVELLY LOAM.

The Frederick gravelly loam is intermediate between the Clarksville and the Hagerstown gravelly loams, and represents gradational features between the two types. In its typical development it consists of about 7 inches of mellow, friable, brownish-gray loam to silt loam in which the color is not as gray as in the Clarksville series nor as brown as in the Hagerstown. The subsoil is typically developed in two sections. The upper part, beginning at an average depth of 7 inches is a pale-yellow friable silty clay loam which becomes heavier and more reddish yellow to an average depth of about 18 inches, where there is encountered a dull-red, friable silty clay which continues to a depth well below 3 feet. The upper section of the subsoil is very irregular in thickness, varying from 6 to 24 inches. Where it is thinnest the soil is influenced by the red subsoil and has a more brownish color, while the lower subsoil often becomes decidedly more reddish than typical; where the yellow upper subsoil is thickest the soil is more grayish in cast and the lower subsoil does not develop the typical red color, but is more reddish yellow. This variation in coloration of the type represents the gradation from the

Hagerstown gravelly loam to the Clarksville, and all degrees of this gradation are found in the various areas of the Frederick. Areas of each of the related types are necessarily included on account of their close and intricate association. A few areas of Frederick gravelly loam are chiefly a mixture of the Hagerstown and Clarksville gravelly loams.

The sharp, angular, chert fragments found over the surface and through the subsoil make up about 30 per cent of the entire soil mass. Most of the chert pieces are less than 5 inches in greatest dimension. There are only a few acres in which the soil is not gravelly; they would be mapped as Frederick loam if their extent would warrant their separation.

The Frederick gravelly loam is mapped in many irregular-shaped areas of various sizes throughout the eastern and southeastern parts and to a small extent in the western part of the county. It does not occur in large continuous areas as do many other types. Some of the largest areas are mapped less than 6 miles southeast of Rome, especially in the vicinity of Boyd and Spring Creeks. Many small areas are mapped throughout the southeastern section of the county. North of the Etowah River there are fairly large areas in the vicinity of Turner School, Eves, and Dykes. In the western part of the county north of the Coosa River there are a number of areas near Sardis Church and Prospect School. Here the subsoil is somewhat more compact and heavier than in the typical areas.

The Frederick gravelly loam is an upland residual soil derived through the weathering of the cherty magnesian limestone of the Knox dolomite formation.

The type has a generally rolling to hilly topography, being found on smooth divides, the crests of high ridges, knolls, and high hills as well as on slopes. It is not confined to any one topographic situation.

The surface relief and the more or less porous subsoil insure adequate drainage in all parts of the type. There are no low or depressed areas. In some places erosion has caused more or less damage, but the presence of the gravel helps considerably to prevent more serious damage through erosion.

The greater part of the Frederick gravelly loam has been cleared of the original forest, which consisted of shortleaf pine, various species of oak and hickory, with some longleaf yellow pine in the southern part of the county near the Polk County line. The cleared areas are used in the production of the common crops of the county. Cotton, the chief crop, averages between one-third and one-half bale per acre, with an application of 200 pounds per acre of a low-grade fertilizer. Three-fourths of a bale per acre is generally obtained on

well-managed farms, especially where leguminous crops or stable manure are turned under. Corn yields from 5 to 25 bushels per acre, depending upon the management of the crop and the season. The average yield is about 12 bushels. Cowpeas produce from one-half to three-fourths ton of hay per acre. Oats average about 12 bushels per acre.

The Frederick gravelly loam is not one of the strongest soil types in the county, but a number of well-established farms are found upon it. In the general region where it occurs it is preferred to the Clarksville gravelly loam.

Land values range from $20 to $35 an acre, depending upon the location and improvements.

This type of soil quickly loses its native fertility and is readily depleted of organic matter. It is improved most readily by turning under leguminous crops and stable manure.

Besides the general farm crops, the type can be used for the production of peaches and such truck crops as watermelons, cantaloupes, and tomatoes. Alfalfa has proved successful where grown in an experimental way in a few places. Liming has been found essential, however, in its production.

Frederick gravelly loam, heavy-subsoil phase.—In the Frederick gravelly loam, heavy-subsoil phase, the surface soil consists of a friable mellow, gray to brownish-gray loam which in many cases grades into a silt loam. The average depth of the soil is about 7 inches. The subsoil is typically developed in two sections. The upper section usually extends from 7 to 15 inches and consists of a yellow, friable silty clay loam which gradually becomes heavier in the lower part and changes to a reddish-yellow color. The lower section, from 15 inches to a depth well below 3 feet, consists of a dull-red to reddish-yellow clay which is decidedly tough, stiff, and plastic, and often mottled with streaks of yellow and shades of red. Through the soil mass and over the surface there is found a variable quantity of angular chert fragments, which are usually less than 3 inches in greatest dimension. In some places the gravel is quite abundant, while in others it is either lacking or found only in small quantities. The gravel-free areas are usually small and irregular in occurrence, so that their separation is not feasible.

Variations within this phase are chiefly in the thickness of the upper or yellow silty clay loam section of the subsoil. This section may vary from 2 to 20 inches in thickness. Where it is thinnest the soil has a more brownish color than the average, and the heavy subsoil, being closer to the surface, affects cultural operations and drainage. On the other hand, where this silty clay loam section is thickest, and the heavy red clay subsoil is found at lower depths, the soil has a gray color, and closely approaches the Clarksville gravelly loam. A

few patches of Clarksville gravelly loam may be included with the Frederick. Small areas of the Frederick clay loam found on knolls also are included.

The Frederick gravelly loam, heavy-subsoil phase, is not an extensive soil. Its principal development is in a number of areas in the central part of the county, beginning near Huffaker and extending southwestward to the Coosa River. The type is well developed in the vicinity of Payne School. Several areas are mapped within a 2-mile radius of Armuchee.

This phase has been derived through the weathering of the Fort Payne chert formation, which is described by Hayes as consisting of "bedded chert with some limestone and shale." Practically no limestone or shale is developed within the limits of this type. The chert gravel is very dense, hard, and vitreous, and fractures with a glassy surface. Considerable dark-colored and banded fragments also are found.

This soil is found on ridges which have a generally rolling topography. On some of the slopes erosion is very active, and terracing is necessary to prevent damage. Surface drainage is thorough, but underdrainage is retarded by the heavy, plastic subsoil, and when this heavy part of the subsoil approaches the surface within 8 or 10 inches crops are said to suffer in wet seasons.

The greater part of this phase is cleared of the native forest, which was made up of different species of oak, hickory, and shortleaf pine. The type is used in the production of cotton, corn, cowpeas, and oats, all of which return fair yields. Cotton averages somewhat less than one-half bale per acre, corn 12 to 15 bushels, cowpeas one-half to three-fourths ton of hay, and oats about 15 to 18 bushels. A large part of the phase is farmed by tenants. Much of it is lying out of cultivation or used for pasture. The prevailing price of this land is about $25 an acre.

FREDERICK CLAY LOAM.

The surface soil of the Frederick clay loam averages 2 or 3 inches of brown silt loam, which either becomes heavier with depth or passes abruptly into the heavy clay subsoil. The surface veneering of silty material is just sufficient to produce a clay loam type when it is mixed with the heavy clay beneath, as is done in ordinary plowing. In many places the soil is a heavy, reddish-brown clay loam extending to a depth of 6 or 7 inches without much change. The subsoil is rather uniformly a dull-red stiff, tough, and compact clay, which becomes quite plastic when wet. In the lower part of the subsoil there are fine mottlings or streaks of faint yellow or red. In eroded spots and in road cuts the heavy nature of the subsoil is exhibited by the cracking of the material.

This type of soil is not extensive in Floyd County, but the areas are conspicuous. A number of the largest ones are found in the neighborhood of Armuchee while smaller areas are mapped 1 mile west of Rosedale, and near Payne School.

This soil is derived from beds of chert which belong to the Fort Payne chert formation. In a number of places the beds of blocklike chert are seen in road cuts.

The Frederick clay loam occupies valley positions and has a smooth, undulating topography with sufficient relief to afford good surface drainage. The heavy texture and compact structure of the subsoil prevent proper internal drainage.

Practically all of this type is cleared and a large part of it under cultivation. The common crops of the county are grown with various results, the average yields being about the same as on the gravelly loam of this series. Best results are obtained where there is an appreciable layer of silty material on the immediate surface, in contrast to those areas which are a heavy clay loam from the immediate surface down to the subsoil. The type must be handled within a narrow range of moisture conditions. If it is plowed when dry it is too hard to turn, and when it is wet injurious results are obtained. It is primarily a small-grain and grass soil, but it is also well suited for cotton.

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

Mechanical analyses of Frederick clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
255238	Soil	1.9	5.0	2.1	8.9	12.8	49.7	19.4
255239	Subsoil	1.2	2.5	1.1	4.4	8.0	42.6	40.2

HAGERSTOWN GRAVELLY LOAM.

The surface soil of the Hagerstown gravelly loam is typically a friable, mellow loam, grading into a brown to brownish-red silt loam. The average depth of the soil is about 7 inches. The subsoil begins as a friable, brownish-red silty clay loam and at an average depth of 15 to 18 inches changes into a brownish-red silty clay, which continues to a depth of 3 feet or more. A characteristic of the type is the 20 to 40 per cent of small angular stones found on the surface and through the soil mass. These stones are mainly under 5 inches in greatest dimension, and consist of either porous or dense chert fragments which represent the more resistant rock of the parent formation.

This type shows some variation in color and texture. In places it grades toward the Frederick gravelly loam, which is a soil of grayer color. In other places there are included small areas in which the soil is a dark-red, silty clay loam closely approaching the Decatur clay loam. The type, in its lowest positions, as on slopes and at the foot of slopes, has a brown, mellow silt loam surface soil and a reddish-brown, friable, mellow silty clay loam subsoil, the heavier texture being due chiefly to fine material, washed down from higher positions. This soil is more properly a colluvial phase, but as it occurs in only narrow areas it is not shown separately on the map.

The Hagerstown gravelly loam is a residual soil, derived through the weathering of the Knox dolomite formation, from which the Clarksville and Frederick series also are derived. The red color in this type may be ascribable to different rocks in the formation or to differences in weathering. A significant fact is that its chief development is along the northwest face of the dolomite plateau or on the narrower high ridges which terminate this plateau. Within the broad development of the Knox dolomite it occurs only in small areas.

The largest areas of Hagerstown gravelly loam are found in the vicinity of Lindale, where it is mapped in rather narrow elongated areas following the crests or slopes of ridges which mark the termination of the Knox dolomite region. Large areas occupying a similar position are mapped in the vicinity of Cave Spring, along the face of the hills bordering the valley. The areas become less extensive to the east, as Cedar Creek is approached. A number of smaller areas are mapped northeast of Rome along the Rome fault. They are found on the steep slopes from the crests of the ridges down to the valley floor.

The surface of this type is decidedly rolling to hilly. It is developed on the crests of ridges, slopes, and knolls. A large part of its area can be farmed, but on some of the steeper slopes operations can only be carried on with difficulty. Drainage is well established, and the steeper slopes are damaged by erosion.

About 40 per cent of this type has been cleared of the native growth, which was principally oak, hickory, and shortleaf pine, and cultivated. In the hilly region where it is found it is usually selected for cultivation in preference to the Clarksville and Frederick gravelly loam types. Access to the areas, however, is sometimes difficult.

The common crops of the county are produced on this type of soil with varying degrees of success. Cotton, the most important crop, averages about one-half bale per acre, and ranges from one-third to as much as three-fourths of a bale. The average yield of corn is about 12 bushels per acre, but yields of 20 bushels have been reported. Oats

yield 12 to 20 bushels per acre, and cowpeas produce from one-half to 1 ton of hay. The best seasons are those having abundant rainfall well distributed. The average price of land of this type is from $25 to $30 an acre.

HAGERSTOWN SILTY CLAY LOAM.

The Hagerstown silty clay loam has a surface soil of brown to reddish-brown, friable, mellow silty clay loam, with an average depth of 7 inches. The subsoil is rather distinctly demarked from the soil. It typically consists of a reddish-brown, heavy, friable silty clay which becomes somewhat heavier and more reddish in the lower part of the 3-foot profile. The type is generally free from stony material. It includes small areas in which the surface soil is a smooth, mellow silt loam to a depth of 4 or 5 inches, underlain by the heavy typical subsoil, and in plowing to a proper depth sufficient heavy material is mixed with the upper portion to form a silty clay loam. In the lower situations there are small areas of a true silt loam, while on knolls small patches of clay loam occur.

This type is derived through the weathering of more or less pure beds of limestone. Occasional outcrops of hard, blue limestone are found.

The Hagerstown silty clay loam is not an extensive soil, although the areas are conspicuous in relation to the surrounding types. Two areas are mapped northeast of Rome along the Calhoun Road, one between Zuba and Dozier Creeks and the other near Pinson. South of Rome there is one area near Atlanta Junction and another west of Lindale. A number of small areas are found in the southwestern part of the county.

The type occupies smooth, undulating valley positions. It is lower lying than the Decatur clay loam, with which it is associated. It is not as flat as the Colbert silt loam, and good drainage of all the areas is assured by the surface relief. The run-off, however, is not so rapid as to cause erosion.

All of this type is cleared and under cultivation. It is held in fairly high esteem and supports a number of well-equipped farms. The type is used for the production of the general farm crops. With light applications of fertilizer, cotton will average over one-half bale per acre, and yields range as high as 1 bale per acre. Corn will average 20 or more bushels per acre in favorable seasons, while oats yield 20 to 25 bushels. Cowpeas return about 1 ton of hay per acre.

Land of this type sells at $40 to $60 an acre, depending upon the location and improvements.

The Hagerstown silty clay loam is naturally a strong, productive soil and is recognized as such in Alabama, Tennessee, and Kentucky.

Its natural fertility and durableness has given it the reputation of a first-class stock-raising type. While it is well suited to the general farm crops, it can also be used to advantage for a grain and grass type of farming. Clovers and alfalfa are successfully produced on this type in other States. In some cases this type has been farmed for over 100 years, with continuous high yields, by using stable manure and lime in liberal applications. Tobacco is produced on this type in Kentucky and Pennsylvania. The soil plows readily into a good tilth.

COLBERT SILT LOAM.

The surface soil of the Colbert silt loam consists of a smooth, compact, floury silt loam whose color is gray in the upper 2 inches but changes to a yellowish gray, which continues down to the average depth of the soil, about 7 inches. Where the soil has been cultivated for a few years it has become very light gray to almost white on the surface and light yellowish gray below. The subsoil typically begins as a pale-yellow, compact silty clay loam which at an average depth of 15 inches passes into a heavy, sticky, plastic silty clay, yellow to yellowish brown in color, with mottlings of gray, shades of yellow, and red. The material generally increases in plasticity with increase in depth.

The type is generally free from stony material, except in small areas which are differentiated as a stony phase. Throughout the type as mapped there occur variations which represent degrees in weathering and coloration, and there are also some included areas of other types which could not be separated on account of their small extent and intricate association. In some places the subsoil is more completely weathered and more friable; the soil here represents areas of the Shackelton silt loam. In other places a reddish cast appears in the subsoil and becomes more conspicuous on small knolls or slight undulations; it grades into a mottled red subsoil which represents the Montevallo silty clay loam. The Montevallo soils and the Colbert silt loam are very intricately associated, especially in the northern extent of the type. They are so mixed in some places that in an area of 1 acre there may be 20 or 30 patches of each type, and the areas consequently are mapped as the predominating type. Low places occur within the Colbert silt loam, which have a gray to drab, heavy, compact silty clay loam soil and are underlain by a heavy, plastic, mottled gray and yellow subsoil. These areas closely resemble the Guthrie silty clay loam, which is not sufficiently extensive in this county to be mapped. Along some of the narrow drainage ways similar material may occur. Areas of small extent are noted in which the underlying rocks, either shale or limestone, may closely

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approach the surface. The shale may outcrop in small spots and give rise to a shady soil. This is especially true in an area mapped north of Fosters Mills.

The Colbert silt loam is found in large areas throughout the county. It is restricted to the level or flat section, or to the valley between the mountains on the northwest and the dolomite plateau on the southwest. The most extensive area is found between Lavender Mountain and the Oostanaula and Coosa Rivers, beginning near Robinson and extending northeast to Armuchee Creek near where it empties into the Oostanaula River. This area is 2 to 3 miles in width. The second area of importance is situated in the southwestern part of the county between Big Cedar Creek and the Alabama State line. On the southeast the area begins at the foothills of the ridge occupied by the Montevallo gravelly loam and terminates near the Coosa River. A large development north of Fosters Mills is practically a continuation of this. In the northern part of the county a number of fairly large areas are mapped between Floyd Springs and Everett Springs and at Rosedale.

This is a residual soil, derived through the weathering of the interbedded shales and limestones of the Conasauga and Floyd formations. The areas mapped south of the Coosa River are from the Conasauga formation, while north of this river the underlying rocks belong to the latter group. The limestone appears to be more abundant in the southwestern part of the county and gradually diminishes in relative extent to the northeast, until in the northern part the contributing rocks seem to be chiefly shales, although limestone is an important factor. In the tilted condition of the formations the interbedding of the limestone and shale is seen at a number of places, with some resultant differences in the overlying soils. South of the Coosa River there is found in many places a scattering of waterworn, rounded gravel, which probably is either derived from the shale in which it was originally bedded or has been left from Neocene deposits.

The Colbert silt loam has a smooth, level to flat topography, which accounts for the local term of "flatwoods." Slight undulations occur, but in the most typical development of the type there is little surface relief.

Drainage of this type is imperfect on account of the lack of surface relief and the extreme fineness of the surface material and plastic, impervious subsoil. In wet seasons crops are damaged, while in dry seasons they suffer from drought. Artificial drainage is difficult, as the water passes very slowly or not at all to open ditch or tile drains.

The natural tree growth on this type consists of shortleaf pine, post oak, water oak, blackjack oak, willow oak, turkey oak, red oak,

black gum, sweet gum, and some haw. The forest is generally thick, but the trees do not attain great size. There is a thick growth of native grasses.

About 15 to 20 per cent of this type, confined to the higher or knoll situations, is cleared and farmed, the common crops of the county being produced. Yields are low. The soil is rather difficult to prepare, on account of its compact structure. It must be plowed under the proper moisture conditions for best results. Cotton rusts to a great extent on this type, and the farmers usually depend on kainit to correct this condition. Corn inclines to turn yellow and does not attain a good development. As a whole, the type is not highly esteemed, and very few well established farms are to be found on it.

The average selling price of this land is about $20 an acre. The range in price is from $10 to $50 an acre, except where its value is for other than agricultural purposes.

The great need of this soil is better drainage. The supply of organic is very low, and after a few years' cultivation almost entirely disappears. The soil then runs together and becomes very dense, and after heavy rains seems to bake. Organic matter in liberal quantities should be added to keep up the supply in the soil. Lime is also much needed. This type is best suited for small grains and grasses.

Colbert silt loam, stony phase.—A small area of Colbert silt loam which has a covering of stones over the surface is designated on the map by stone symbols as a stony phase. The soil and subsoil are typical with the exception of a small quantity of fine sand on the surface. The stones consist of blocks of sandstone which have been washed down from the adjoining mountains. The area is found at the foot of the northwest face of Horseleg Mountain. The selling value of the land is the same as that of the typical Colbert silt loam. The stones are not found in sufficient abundance to affect the agricultural value.

MONTEVALLO SHALE LOAM.

The surface soil of the Montevallo shale loam is rather variable in character, ranging from a gray, friable silt loam to a reddish-brown silty loam to silty clay loam, with an average depth of about 4 inches. In many small areas it may consist of a heavy silty clay loam containing a large quantity of shale fragments; this condition is found chiefly in eroded areas. The subsoil consists of a heavy, compact to plastic silty clay, dull red in color, with mottlings of red, yellow, and gray. Typically there is a large quantity of shale fragments in the upper portion of the subsoil, while the lower portion grades into partly decomposed beds of shale. There is a high percentage of thin, flat, or platy shale fragments through the

subsoil, and to some extent through the surface soil and exposed on the surface. The shale is distinct from the more angular fragments which impart a gravelly character to the gravelly loam of this series.

The Montevallo shale loam is found in the "flatwoods" section of the county. Some of the largest areas are mapped in the northern part, near Floyd Springs, Rosedale, and Everett Springs. In this section more or less of the Montevallo silty clay loam is included, as the two types are closely associated. A rather large area is found in the southwestern part of the county near Livingston. Many smaller ones are scattered throughout the west-central part.

This soil is residual from underlying shale and limestone beds of the Conasauga and Floyd formations. It appears to be best developed where the beds of shale are thickest and come closest to the surface. Over 40 per cent of the material within the 3-foot profile is shale. The beds are always tilted so that the shale is nearly upright or dips at an angle of about 50°. The limestone apparently has contributed little material to the formation of the type. The thin beds occurring usually give rise to narrow streaks of Colbert silt loam or to a heavy mottled, dull-red and brown, plastic clay subsoil; the areas in which these variations are apparent are so inextensive as to be almost negligible.

The areas of Montevallo shale loam are generally found in smoothly undulating or gently rolling positions, higher than the associated Colbert silt loam. The areas west of Livingston and near Early are more rolling than usual. The surface relief insures good run-off, but the heavy clay subsoil does not allow perfect internal movement of moisture.

The Montevallo shale loam is not a strong or productive soil. About 20 per cent of it has been cleared and is used in part for pasture and in part for crops. The uncleared areas support a mixed growth of shortleaf pine and hardwoods, such as oak and hickory. Yields on this soil are generally lower than the average for the county. The thin soil often washes off after several years of cultivation and leaves exposed the underlying shales. Crops are slow to start and generally do not make much growth. Corn produces a small stalk, and the color of the plants is usually yellowish green.

The average price of land of this type is about $20 an acre.

This soil is difficult to improve on account of the heavy, dense subsoil and the beds of shale at shallow depths. Newly cleared areas should be protected against erosion in order to keep the thin mantle of surface soil intact, as upon this depends the producing power of the type.

Montevallo shale loam, gravelly phase.—The gravelly phase includes areas of Montevallo shale loam in which there is a large

quantity of rounded waterworn quartz and quartzite gravel over the surface and in the surface soil, in addition to the shale fragments. This phase is shown on the map by gravel symbols. While the soil and subsoil are usually identical with those of the typical Montevallo shale loam, there are some areas which differ. The most important variation consists of areas in which there is an appreciable amount of fine sand in the surface soil and where the subsoil has an upper section of friable fine sandy loam which may extend to a depth of 15 inches. This represents the best part of the phase. It occurs usually as a gradational zone between the typical Montevallo shale loam and the gravelly phase. A similar soil may occur where considerable Neocene fine sand and silt remains in the surface soil. The Montevallo shale loam, gravelly phase, is typically developed through the valleys of the Coosa and Oostanaula Rivers. The largest areas are mapped in the vicinity of Early, between Livingston and Neals Ferry, between Oreburg and the Coosa River, near Bush Arbor Church, and about 3½ miles north of Rome.

Except for the gravel, this phase is identical in derivation with the typical Montevallo shale loam. The gravel represents the remnants of a deposit of outwash material. In many places gravel is found on the surface with practically no interstitial finer material, while in other places there may be an appreciable amount of fine sand and silt over the surface. The relationship of the gravel is well illustrated in a number of places where the upper beds of Norfolk fine sandy loam are underlain by beds which give rise to the gravelly phase of the Norfolk fine sandy loam, while below this the gravel is scattered over the lower lying Montevallo shale loam.

The gravelly phase of the Montevallo shale loam is typically found on knolls and slopes and in a very few places in level areas. The topographic relief affords good drainage.

Only a very small percentage of this phase is cleared and cultivated. The yields are fairly good, as the areas cultivated represent the best part of the phase. Most of it is of low agricultural value.

MONTEVALLO GRAVELLY LOAM.

The surface soil of the Montevallo gravelly loam is a light-brown to brown, mellow, friable loam, with an average depth of 3 or 4 inches. About 55 per cent of the surface material consists of small angular fragments of shale with some of cellular chert. The fragments differ from those in the Montevallo shale loam in being blocklike and angular instead of thin and flat or platy. The subsoil is a heavy, sticky, plastic clay of a light-red color, mottled with red, yellow, and brown. It contains an abundance of partly decomposed shale fragments and below an average depth of 10 or 12 inches practically gives way to rotten or partly decomposed beds of shale. The

mottlings in the subsoil are the same as those in the weathered beds of shale beneath. In the type as a whole over 60 per cent of the 3-foot section consists of fragments of underlying rocks. Within the type there occur patches in which a friable yellow subsoil is developed, but these are of small extent and too intricately associated to be separated.

The Montevallo gravelly loam is an extensive soil in this county. The greater part of the type is found in one large, continuous area which begins in the southwestern corner and extends northeastward for a distance of 15 miles to a point 3 miles south of Rome. This area ranges from three-fourths mile to 2 miles in width. It lies to the northwest of the ridge of Dekalb soils derived from the Rome formation, and usually grades into the soils of the "flatwoods." The soil here is derived from the shales and limestones of the Conasauga formation, which is differentiated on the basis of its characteristic siliceous layers. The limestone in the formation has contributed practically no soil material; thin veins are found which do not represent more than 1 foot to 60 feet of shale. Northeast of Rome there are a number of smaller areas which have the same relative position to the shale and sandstone ridge of the Rome formation as does the large area south of Rome. They are discontinuous as a result of stream action and faulting. The areas in the northeastern part of the county are mapped chiefly in the vicinity of Enon School and between the Oostanaula River and Dozier Creek. They are more or less eroded and in places a heavy clay soil appears as a result of denudation. The limestone in these areas occurs in the proportion of about 1 foot to 30 or 40 feet of shale.

An area of typical Montevallo gravelly loam, several square miles in extent, is mapped in the southwestern corner of the county near McGee School. In the Little Texas Valley a narrow strip extends on the north side of Lavender Creek for a distance of about 7 miles. The type here occupies a smooth slope at the foot of sandstone ridges.

This soil occupies ridges and is decidedly rolling to hilly. There are practically no smooth or level areas except in a few places where it grades into the "flatwoods" and in the Little Texas Valley. The ridges are generally deeply eroded and gullied. The topography is quite distinct from that of the other types of the Montevallo series, which have a smoother surface and are found in valley positions.

The Montevallo gravelly loam is a rather poor and unproductive soil, on account of the abundance of gravel and shale fragments and the poor quality of the thin subsoil. The topography, with few exceptions, handicaps farming. About 10 per cent of the type is cleared and used largely for pasture. Lespedeza and native grasses make a fair growth. Yields of the staple crops are far below the

average for the county. The type is difficult to handle. Where it has been plowed much of the surface soil has been carried away, exposing the heavy clay subsoil which in the course of time also is eroded, leaving behind the exposed beds of weathered shale. Land values on this type range from about $7 to $15 an acre.

MONTEVALLO SILTY CLAY LOAM.

In typical areas the Montevallo silty clay loam consists of about 4 inches of gray to yellowish-gray, smooth, mellow silt loam, underlain directly by the subsoil. This at first is dull red in color with mottlings of yellow and gray, and consists of a heavy, compact and tough silty clay which is quite plastic when wet. The subsoil is more or less stratified to a depth of 15 to 18 inches. Beneath this the material usually consists of a mottled yellow, red, and gray, heavy silty clay, which is not quite so heavy as the upper subsoil. Some shale fragments are typically found in the lower subsoil, but no masses or beds of shale occur except locally.

There are many variations in the soil. The gray material in places may be 6 inches in depth and in other places may be missing, as on knolls, where it has been removed by erosion. The mottled upper section of the subsoil may extend as deep as 36 inches. In other places the lower subsoil may be very much like that of the Colbert silt loam. Generally throughout the type there are small included spots of the Colbert silt loam and Montevallo shale loam, and in some places these soils are so intricately mixed that the areas had to be mapped according to the predominating material.

The Montevallo silty clay loam is mapped chiefly throughout the central part of the county in the "flatwoods" section, or in the valley of the Coosa River. Important areas are found from Coosa to the vicinity of Robinson. Areas are also found along the Central of Georgia Railroad from the vicinity of Berry Hill to Lavender.

This type is residual from interbedded shale and limestone of the Conasauga and Rome formations. It has been developed in somewhat higher situations than the Colbert silt loam, where better oxidation of the material could take place. The surface is generally undulating, facilitating run-off, but the heavy, intractable nature of the subsoil prevents internal movement of moisture.

Practically all of the Montevallo silty clay loam is cleared and used for general farming. Yields are generally below the average, except on farms which are carefully managed and well fertilized. The soil is rather difficult to prepare and cultivate properly, except in the deepest areas, and it must be handled within a narrow range of moisture conditions.

Land of this type is held at prices ranging from $20 to $35 an acre, depending upon the location and improvements.

The difficulties in improving the productiveness of this type are chiefly due to the inherent refractoriness of the subsoil. Turning under large quantities of organic matter and gradually increasing the depth of plowing should be the first step in improvement of the type. This soil seems to be well suited to small grains and grasses. Pasturing it when wet will generally cause injury by puddling the surface soil.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Montevallo silty clay loam:

Mechanical analyses of Montevallo silty clay loam.

No.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
255272	Soil	0.3	2.7	1.9	3.7	14.6	44.3	32.6
255273	Subsoil	.3	.3	.1	.5	7.4	34.2	57.3

SHACKELTON GRAVELLY LOAM.

The Shackelton gravelly loam has a surface soil of smooth, friable silt loam, yellowish gray to gray in color, and becoming more yellowish in the lower part. The average depth of the soil section is about 7 inches. The subsoil is a pale-yellow, compact, floury silt loam which changes at about 15 inches into a compact silty clay loam of about the same color. On the surface and through the soil and subsoil there is an abundance of shale fragments which, however, tend to break into small blocklike pieces and give the effect of a gravelly soil instead of a shaly type. There are, however, small areas in which the fragments are thin and platy and which are more properly a shale loam, but they are of too small extent to differentiate. Over a large portion of the type beds of shale and limestone are found within the 3-foot profile. Included with the type are small areas of Montevallo shale loam and Shackelton silt loam, which are so intricately associated that separation is impracticable.

The Shackelton gravelly loam is found in that part of the county which lies northwest of the Coosa fault. Most of it occurs in the "flatwoods" section. A fairly large total area is found about 2 miles north of Rosedale, occupying an undulating to rolling ridge, in which the soil is difficult to differentiate from the Jefferson series. The surface is strewn with sandy shale and sandstone fragments which are different from the underlying rocks, and the soil here is somewhat more sandy than typical. The areas mapped between Floyd Springs and Everett Springs are typical of the "flatwoods," where the type is developed on the higher, gently undulating ridges. The areas in the vicinity of Wright School well exemplify the forma-

tion of the type, as they show the limestone and shale interbedded. An area similar in character is found at the edge of Rome. A rather shaly area is found about 1 mile northeast of Berry Hill. A small area of the type south of Lindale is due to a narrow lentil of shale extending up the valley.

The greater part of the Shackelton gravelly loam is derived through the weathering of the interbedded shales and limestone of the Rome formation. The limestone in the formation is generally less abundant than the shales, but thin sections are found at various places throughout the type.

The type has a smoothly undulating to gently rolling topography. Those areas in the vicinity of Wright School and Rome and northeast of Culpepper Mill, Gordon County, are generally higher lying than typical, but even in the "flatwoods," where most of the type is found, it is developed on knolls and ridges and lies decidedly higher than the Colbert silt loam. There is sufficient surface relief to insure drainage.

About one-third of the type is cleared and under cultivation. The forest growth is about evenly divided between shortleaf pine and hardwoods, which include various species of oak and hickory. The type is chiefly farmed by tenants, and there are few large or well-developed farms such as are found on other types. Yields are generally low, and less than the average for the county.

Land of this type is held at $15 to $25 an acre, depending upon the location and improvements.

SHACKELTON SILT LOAM.

The Shackelton silt loam has a surface soil of gray to yellowish-gray, smooth, friable, somewhat compact silt loam, which becomes more yellowish in the lower part. The average depth is 6 to 8 inches. The subsoil is a pale-yellow, smooth, compact silt loam, which becomes heavier with depth and at about 15 inches passes into a compact, tight, friable silty clay loam. The latter sometimes becomes brownish yellow in the lower part. In other places there may be slight mottlings of gray, yellow, and brown in the extreme lower portion of the subsoil. The type is closely associated with the Colbert silt loam and the Shackelton gravelly loam, and includes small areas of each which are too intricately associated for accurate delineation on a map of the scale used. The soil grades toward each of the types. The various areas contain patches of soil in which there is a quantity of flat thick blocklike fragments of shale and small angular fragments of chert. In some of these places the quantity of fragments is scarcely sufficient to make the soil a gravelly loam, and in the others the areas are too small to show. Within the type there occur in some

places streaks, not more than 10 to 50 feet wide, where the subsoil is plastic and gives rise to the typical Colbert silt loam, but which can not be separated on account of their narrow width.

The Shackelton silt loam is mapped in areas of varying size throughout the "flatwoods" section of the county. The largest areas are found 2 miles north of Armuchee and at the Berry Schools. The type is weathered from interbedded shale and limestone of the Conasauga formation. It represents areas in which the usual heavy subsoil derived from these rocks is not developed.

The surface of the Shackelton silt loam ranges from undulating to level, with sufficient relief to afford fairly adequate run-off. The compactness of the subsoil retards the circulation of internal moisture, and crops are sometimes injured in wet seasons.

About 80 per cent of this type has been cleared of the native vegetation, which consists chiefly of shortleaf pine mixed with hardwoods such as oak and hickory. It is used for the general crops of the county, especially cotton. The yields are moderately good. Cotton averages about one-fourth to one-third bale per acre. Corn yields an average of 12 to 15 bushels, and oats about 15 bushels, per acre.

The price of this type of soil ranges from $15 to $40 an acre, depending upon the improvements and location.

The Shackelton silt loam is not a naturally strong and fertile soil. It requires deep plowing, the addition of organic matter, and in some places underdrainage, to produce good yields. The subsoil is easily turned but on account of the fine flourlike texture it soon compacts. It is best suited for the production of small grains and grasses.

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

Mechanical analyses of Shackelton silt loam.

No.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
255236	Soil	0.0	1.2	0.5	1.9	7.0	81.8	7.5
255237	Subsoil	.0	.0	1.4	1.2	8.2	67.9	21.3

CHRISTIAN CLAY LOAM.

The surface soil of the Christian clay loam is on the average a rich-brown to reddish-brown friable clay loam extending to a depth of 6 or 7 inches. The subsoil consists of a brownish-red to red, friable silty clay which becomes heavier with depth and somewhat more compact in structure. Some chert and shale fragments are found through the soil mass, but in such small quantities that they do not influence the type.

This soil is developed from the underlying rocks of the Conasauga formation, which is described by Hayes as consisting of beds of clay shales and beds of oolitic limestone, above which is another mass of calcareous shales interbedded with blue limestone. These rocks are so folded and faulted that both shale and limestone contribute to the soil, and as a further result the soil in some places varies toward the typical soils derived from limestones and in others toward those derived from shales. Where limestone is predominant the soil is more red in color and friable, while in areas derived chiefly from shale the subsoil is light red and somewhat compact.

The Christian clay loam is chiefly developed from the northeastern corner of the county through Rome southwestward toward Lindale and Six Mile. It lies between the Knox dolomite area and the hills of the Rome formation. A series of areas begins near Berwin and extends to Nannie in the vicinity of the Calhoun Road. In these areas the type is quite variable, ranging from the intense red color of the Decatur clay loam to a lighter brick red color. A few small strips in which shale is abundant in the subsoil cut through the larger areas of the type, but they are generally too narrow to show. In the typical areas in this valley along the Calhoun Road near Zuba and Ward Creeks the interbedded shale and limestone are visible in road cuts. From Model School northeastward a large part of the type resembles the Decatur clay loam, the soil being an intense red clay loam, while the subsoil is a dark-red stiff silty clay which grades into shale in many places at depths between 18 and 30 inches. The soil here appears to have come from narrow strips of limestone and shale which are so closely associated that they could not be separated. In the vicinity of Shannon the surface soil approaches a loam, while the subsoil is generally typical. Shale is the predominating bedrock in these areas, but limestone frequently outcrops. Several patches of Shackelton silt loam are included in this vicinity. A small area of the type is mapped about 3 miles south of Armuchee Church. South of Rome, between Rome and Lindale and between Rome and Six Mile, the soil closely resembles the Hagerstown silty clay loam, but is mapped with the Christian series on account of the quantity of shale exposed.

The Christian clay loam is found in a valley position with a smooth even to undulating surface and is well drained. It can be farmed with modern, improved implements.

This type is regarded with favor, and a number of well-established farms are located on it. Practically all of the type is cleared of the native pine and hardwood growth. The general farm crops are produced, and yields practically equal those obtained on the Hagerstown silty clay loam or Decatur clay loam.

Land of this type sells for $35 to $60 an acre, depending upon the location and improvements.

The Christian clay loam is well suited for the production of general farming crops. It is extensively used in other States for the growing of grains, grasses, and forage crops in connection with stock farming.

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

Mechanical analyses of Christian clay loam.

No.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
255256	Soil	1.3	3.4	1.7	5.9	7.4	48.3	32.1
255257	Subsoil	1.7	3.2	1.3	3.0	3.6	35.8	51.3

DEKALB STONY LOAM.

The Dekalb stony loam is characterized by a gray to yellowish-gray and yellow subsoil, but it is quite variable owing to its rugged, broken, mountainous position. For the most part the soil is a friable loam, which becomes more yellowish as the subsoil is approached. The subsoil, beginning at 5 or 6 inches, is a friable, yellow silty clay loam, clay loam, or silty clay. There are local areas in which the surface soil is a heavy fine sandy loam, and the subsoil may be fine sandy clay in places. Very often the subsoil becomes reddish yellow and may contain mottlings of various shades. On account of its mountainous topography, the type as shown on the map contains small areas of Hanceville stony loam and narrow strips of Clarksville stony loam, the latter occurring where the Armuchee or Fort Payne chert outcrops in strips too narrow to show on a map of the scale used. Large outcrops of the bedrock occur. Sandstone fragments, ranging from boulders to gravel and thin platy fragments of shale, are found over the entire type. In some places the ledges of rock are so steep and thick that the areas are a close approach to Rough stony land.

The Dekalb stony loam is mapped in narrow strips on the slopes of Lavender Mountain and Simms Mountain along the Chattooga County line. It is also found on Judy Mountain, on the eastern slope of Turnip Mountain, and on the northern slope of Horseleg Mountain. On account of its intricate association with the Hanceville stony loam, some small inaccessible areas of the Dekalb are shown with that type.

The Dekalb stony loam is derived through the weathering of light-colored sandstones and shales in the Rockwood and Oxmoor

sandstone formations. All the areas are steep sided and cut by deep gorges and the type is too rough and broken for farming.

This soil is forested chiefly with hardwoods. Among the species are post oak, red oak, white oak, and blackjack oak, chestnut oak on the higher elevations, hickory, gum, maple, tulip poplar, and dogwood. Shortleaf pine is also found. The clearings comprise an aggregate of less than 100 acres used for cultivation. There are very few areas suitable for cropping or for plowing, and the type is best suited for forestry and grazing. Land values on this type are low.

DEKALB FINE SANDY LOAM.

In the Dekalb fine sandy loam the surface soil is a smooth, friable, fine sandy loam, gray to yellowish gray in color and becoming more yellowish in the lower part. The soil averages about 7 inches in depth. The subsoil is typically a pale-yellow to bright-yellow friable fine sandy clay, ranging toward a silty clay loam. Some included areas have a silty surface soil, while the subsoil is a silty clay. Small angular fragments of sandstone and shale are found throughout the type, but only in small local areas do they occur in sufficient quantities to form a gravelly loam. Extensive areas are practically stone free.

This is a residual type, derived from sandstones and shales from various formations. The Rome formation, which consists of green, white, yellow, and brown sandstone with some shale, gives rise to the largest area of the type and to the only part found east of the Oostanaula River and south of the Coosa River. Here the type begins at the Gordon County line in the northeastern part of the county and extends almost uninterruptedly to Rome and thence southwestward, vanishing in the vicinity of Six Mile. Farther south the type is again developed, extending southwestwardly to very near the southwest corner of the county. An arm of the main development extends southward about 1¼ miles southwest of Vans Valley, reaching close to the Polk County line. This area occupies a ridge, which in some places assumes the proportions of a low mountain. It has an eroded topography, but with some smooth, even surface on top, while the slopes are generally rounded and steep. From the vicinity of Cunningham to the southwest corner of the county there is a fairly large rough and broken area.

In the northern part of the county a number of typical areas are found. One occurs between Heath and Lavender Creeks, extending from Orsman to Thomas. It has some rock fragments scattered over the surface in a few places, and on small knolls the subsoil is more reddish than typical. The soil here is derived from the Oxmoor sandstone, which consists of thin-bedded brown and white sandstones.

This area is found on a high ridge, which is practically a continuation of Rocky Mountain, although considerably lower. At Armuchee Church a small area occupies a lower, smooth valley position. Thin blocklike fragments of the underlying sandy shales or fine-grained sandstone come close to the surface. A narrow area practically surrounds Rocky Mountain, beginning near Antioch Church in Big Texas Valley and adjoining the larger area above mentioned near Orsman. From Antioch Church to Evergreen School this area occupies a valley position, and contains large quantities of sandstone and shale in the subsoil. The soil here closely resembles the Shackelton gravelly loam. From Evergreen School, extending through Little Texas Valley, the soil occupies a low monoclinal ridge which has a rather smooth ascent and top, but terminates with rather steep slopes to the north and east. A well-developed area of the type mapped east of Judy Mountain is practically a continuation of the rougher Dekalb stony loam area on the higher part of the mountain. It smooths down gradually and at its eastern edge merges into the topographic features of the "flatwoods." On the summit of Rocky Mountain a typical area occupies a high plateau which has a smooth, level to flat surface. The ascent to this area, however, is rather difficult.

The Dekalb fine sandy loam is well drained throughout its extent. About 20 per cent of the type is cleared and used for the production of the staple crops. The uncleared areas are covered with a mixed growth of shortleaf pine and hardwoods, which include various oaks, hickory, and scattered chestnut. Yields are quite variable, depending upon the management of the soil. Cotton over the greater part of the type does not yield more than one-third bale per acre, but on some farms a half-bale average usually is obtained. Corn yields range from 10 to 20 bushels per acre.

Land values on this soil range from about $7 to $40 an acre, depending on the location and improvements.

The numerous steep slopes and rough areas throughout the type are chiefly responsible for the lack of development. The soil itself is desirable for general agriculture. The soil is light and open, and plowed and cultivated with ease. It loses its native fertility rather rapidly, and it is necessary to keep the soil supplied with organic matter by turning under green-manuring crops, such as cowpeas. Deeper plowing and subsoiling will doubtless be beneficial.

HANCEVILLE STONY LOAM.

The Hanceville stony loam in the surface portion is a light-brown to reddish-brown friable loam containing an appreciable quantity of fine sand. The subsoil, beginning at 7 inches, is a light-red, friable

silty clay loam or clay which gradually becomes heavier and in the lower depth is decidedly red, friable silty clay. Owing to the mixture of rocks underlying and to the mountainous topography, there are many variations from typical. In places the soil is a dark reddish brown fine sandy clay loam and the subsoil a heavy fine sandy clay. In other areas the soil is brownish gray but grades into a yellow silt loam before the typical red subsoil is found.

The type along the lower slopes includes strips of cherty soil which are too narrow to map. Small areas of the Dekalb stony loam and Hanceville clay loam also are included on account of their intricate association and their inaccessible situation for accurate mapping. Throughout the type large stones and gravel occur in varying amounts, but generally in abundance. Ledges and outcrops of the underlying rocks give the areas a decidedly rough character, and together with the stones make farming difficult.

This soil is weathered from the Rockwood formation, which is brown to dark red, but mingled with some lighter colored sandstones. Shales also occur in the formation, and where they are sufficiently abundant to influence the type a heavy, red clay results. The darkest red coloration of the type follows the beds of sandstone.

The Hanceville stony loam is the most extensive of the mountain types. It is found on all the mountains of the county. The largest areas are mapped in the northwestern and northern parts of the county, on Simms, Lavender, Turnip, and John Mountains. Areas are also mapped on Hart, Horseleg, and Turkey Mountains.

The soil occupies steep slopes, broken hillsides along the gorge-like streams which cut back into the mountains, and narrow-crested sharp summits. Practically the entire type is unsuited for farming. The few small areas that are sufficiently smooth for cultivation do not comprise more than 0.1 per cent of its extent.

Practically none of the type is cleared of the native forest, which consists mainly of hardwoods such as oak, hickory, gum, maple, and poplar, with some chestnut and chestnut oak at elevations above 800 or 900 feet. Shortleaf pine is also found. The type is used to a small extent for pastures. It is best suited for this purpose and for forestry.

HANCEVILE SHALE LOAM.

The fine-earth material of the Hanceville shale loam consists of light-brown, smooth silt loam to loam, while the subsoil is typically a mass of broken fine shale with some smooth, brown silt loam material filling the interstitial spaces. A heavy, friable, dull-red silty clay loam to silty clay soil is found in a few areas. Shale fragments occur in abundance through the soil material, and in some places the surface soil is simply a mass of fine shale particles. There

are small patches which have a yellowish-gray surface soil and a yellowish, friable silty clay subsoil, but they are too small to separate.

Included with this type are small areas of Upshur gravelly loam. The soil of these areas consists of purple or Indian-red silt loam or loam underlain by beds of shale with a small amount of fine material of about the same color and texture as occurs in the surface soil. These patches of soil are derived from beds of purple shale, which, however, is entirely different from that giving rise to the Hanceville shale loam. The largest areas of the included Upshur soil occur in the northern part of the county north of Enon School. Small bodies occur in the general region of the Dekalb fine sandy loam southward to Rome, and thence southwest of Rome to near Vans Valley.

The Hanceville shale loam is not an extensive soil. The largest areas are mapped in the northeastern part of the county between Woodward Creek and the Gordon County line. A large number of smaller areas are found in the vicinity of Nannie and Pinson, as well as in the valley northeast of Rome through which the Southern Railroad and the Calhoun Road extend. South of Rome there are a few areas mapped in the vicinity of Six Mile.

The Hanceville shale loam is a residual soil, derived through the weathering of the shales of the Conasauga formation. This formation contains a small amount of interbedded limestone which shows in a number of places. The limestone is so thin and relatively unimportant in the formation of the soil that its influence is practically negligible. The proportion of limestone to shale is about 1 to 100.

The Hanceville shale loam is found on moderately low, rounded ridges which occur throughout the valleys. The topography is rolling, with very few level areas. A conspicuous feature of the topography is the occurrence of rounded knolls. Drainage is everywhere well established.

A large part of the type has been cleared of the native growth, which consisted mainly of shortleaf pine, post oak, red oak, and hickory. Much of the type is lying idle or used for pasture. The common crops are grown in the farmed areas, but yields are generally below the average for the county. Some farmers, however, obtain fair yields of all the crops. Best yields are obtained where there is at least 5 or 6 inches of soil material overlying the shale.

This type is not exceptionally strong or productive, and it soon loses its natural fertility. After several years of cultivation it becomes eroded and the brownish-red shales become exposed to such an extent that subsequent cultivation consists of plowing through the exposed shales. Whole fields in which shales are found on the surface are met with.

HANCEVILLE FINE SANDY LOAM.

In the Hanceville fine sandy loam the surface soil consists of a brownish-gray to brown, mellow, friable fine sandy loam, underlain at an average depth of about 7 inches by a heavy fine sandy loam of yellowish-red color. This grades into a friable heavy, red fine sandy clay or silty clay, the latter often being encountered in the lower part. Shale fragments are found in some areas, but not in sufficient quantities to alter the soil. Sandstone fragments also are found.

This type is derived from formations of sandstone mingled with some shale. It is not extensive and is found chiefly on Rocky Mountain or on valley ridges around this mountain. Most of the type on Rocky Mountain is found on the inner slopes of the synclinal ridge, or around the rim of the ridge. A small patch occurs on the flat-topped plateau portion of the mountain. In a small area of the type east of Judy Mountain the subsoil is almost invariably quite compact and stiff.

The Hanceville fine sandy loam occurs chiefly in the mountainous section of the county, although the areas are generally smooth and arable. The highest areas are those on the top of Rocky Mountain. East of Judy Mountain the type is found in its lowest position, which approaches that of the "flatwoods" section of the county. All of the areas are well drained.

Most of the type is cleared of the original growth of mixed shortleaf pine and such hardwoods as oak, hickory, and chestnut. It is used in the production of the common crops of the county, which give relatively good yields. The average yield of cotton is about one-half bale per acre and of corn about 15 bushels. Considerably higher yields are obtained on farms operated by owners. Land values on this type are variable, but average about $20 an acre.

This type is generally recognized as a good farming soil, well suited for general farm crops. Apples have been successfully produced on this soil in other counties on a commercial scale.

HANCEVILLE CLAY LOAM.

The surface soil of the Hanceville clay loam is a dark-red to reddish-brown, friable clay loam which contains considerable fine sand and in some places grades toward either a heavy sandy clay or a light friable loam. The subsoil begins at an average depth of 6 inches and consists of a bright-red to dark-red, friable sandy clay which extends to a depth of 3 feet or more. In some places the subsoil is not quite so sandy, grading more toward a friable silty clay loam. Fragments of sandstone are found through the soil and subsoil, but they are nowhere as abundant as in the stony loam type of this series.

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The Hanceville clay loam is mapped in local developments in the mountain regions of the county. The largest areas are found on Lavender Mountain, about 2 miles southwest of Evergreen School, at Fouche Gap, and at O'Brian Gap. Several small areas are mapped on the slopes of John Mountain. Other areas lie about 1⅕ miles north of Orsman along Heath Creek, and on the eastern extension of Rocky Mountain.

The soil is derived through the weathering of the white and brown sandstones of the Rockwood and Oxmoor formation. Brown or reddish-brown sandstone is predominant in the areas where this type is found. Some shales also are found in the formation.

The type is developed in mountainous regions, but it occupies chiefly the smoother portions. Those areas on Lavender Mountain occupy the smooth crests of the mountain, which, however, are not level, although smoother than the steep slopes on each side. On Rocky Mountain a small area is found on the level plateau section, while the other areas are located on the gentle inner slopes of the synclinal trough. The areas near Orsman occur on the upper edges of a low monoclinal ridge. The type is sufficiently smooth for cultivation; in fact, it is chosen for cultivation, as it represents the smoothest portions of the mountains. The surface relief affords good drainage. Erosion is more or less active and may have contributed to the formation of the type by washing away the finer material of the soil after the land was cleared and leaving the heavier material behind, for in uncleared areas there is considerably more silt and fine sand in the surface material.

Practically all of the type has been cleared of the original forest growth, which was the same as that on the Hanceville stony loam. Some of the areas were formerly used in the production of peaches, but they are now abandoned or used for pasture. Corn, the chief crop, yields from 15 to 30 bushels per acre. Cotton is grown to some extent and averages about one-half bale per acre, although higher yields are obtained, especially when the land is newly cleared.

This is a strong productive soil, but it is generally difficult of access, and the tendency to erode unless carefully protected is another handicap. The soil is well suited for the production of peaches or apples. Being located on the ridges, it has good air drainage, which protects the fruit from frosts. After the land is farmed for a number of years the original supply of organic matter is lost and the soil compacts. Added organic matter will help to prevent erosion and keep the soil open and loose.

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

Mechanical analyses of Hanceville clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
255266	Soil	0.5	1.0	0.6	26.0	18.3	28.5	25.2
255267	Subsoil	1.9	1.3	7	28.4	14.5	28.1	25.1

NORFOLK FINE SANDY LOAM.

The Norfolk fine sandy loam as typically developed in Floyd County has a light-gray to brownish-gray, loose, friable fine sand to loamy fine sand surface soil, passing at about 4 to 6 inches into pale-yellow, friable, mellow, fine sandy loam or loamy fine sand which extends to a depth of 15 to 18 inches. The subsoil is a pale-yellow, friable, fine sandy clay which continues to a depth well below 3 feet. While the type is rather uniform wherever it is found, there are some slight variations, chiefly in the vicinity of Morton School. Here there are a few patches in which fine sandy clay is found at a depth of 24 to 30 inches, as well as a few poorly drained patches which have a drab or bluish-gray surface soil and a mottled yellow and gray, fine sandy clay subsoil. Around the edges of the type there may be small local areas of the gravelly phase.

This type is developed in its largest extent in the Coosa Valley. The most extensive area is found in the Morton Bend of the Coosa River in the vicinity of Morton School. Other well-developed areas are found at Livingston and east of this place south of the Coosa River. Smaller areas are mapped at Early, McGee School, Melson School, and County Line Church. In the Oostanaula Valley there are only a few areas mapped, the most important occurring at Oostanaula School, and in the Horton Bend. Along the valley of the Etowah River there are only a few small areas.

The Norfolk fine sandy loam is derived from beds of silt, sand, and gravel deposited during Neocene times, contemporarily with the more extensive Coastal Plain deposits in the southern part of the State. The sedimentary deposits, together with the gravel beds, are estimated to range from 30 to 40 feet in thickness. The gravel beds immediately underlying this type give rise to its gravelly phase. The Neocene deposits are found in stratified beds. They are believed to be the inner formations of the extensive Neocene (Lafayette?) formation which is developed farther south in Alabama. Iron crusts, which are common in this type in south Georgia, are also found locally in this type. The parent material is considerably older than that in the case of the Holston fine sandy loam which the Norfolk resembles to some extent. Leaching has been active, and

has carried the fine sediment to the lower part of the soil profile, leaving the upper part more sandy and consequently, looser and more open.

The type has an undulating surface, and good drainage is afforded by the surface relief and the open, loose subsoil. It is found only on smooth positions, such as level-topped ridges or flats, as in the more rolling areas the material has been eroded away except for small remnants here and there. The type lies at elevations ranging from 50 to over 300 feet above the river. Two small areas mapped 2 miles south of Melson School occupy the crests of so-called mountains, which are over 300 feet higher than, and are located about 2½ miles from, the Coosa River. The type is usually surrounded by residual soils derived from consolidated rocks.

Practically 90 per cent of this type is cleared of the native growth, which consisted of longleaf and shortleaf yellow pine, with some oak and hickory. The common crops of the county are produced, with varying degrees of success, depending upon the management. Cotton averages one-half bale or less, corn about 15 bushels, oats 15 bushels, and peavine hay about three-fourths ton, per acre. On the best-managed farms yields are about twice as large.

The Norfolk fine sandy loam is a desirable soil, generally preferred by farmers to the surrounding types, especially when these are of the Colbert or Montevallo series. It is open and loose and can be readily plowed and cultivated with light implements and work stock, and under a wide range of moisture conditions. A number of well-established farms are found on the type.

Land of the Norfolk fine sandy loam averages about $40 an acre in price.

Besides the general-farm crops of the county, which are successfully produced, this type can be used with profit for a wide range of crops. Among those which have proved successful in other parts of the State are tobacco, peanuts, cantaloupes, watermelons, asparagus, and a large number of other truck crops. Sweet potatoes also are successful. This type of soil is very easily built up to a high state of productiveness, and can just as easily deteriorate. Its chief need is organic matter, which should be turned under in the form of stable manure or some leguminous crop.

Norfolk fine sandy loam, gravelly phase.—The gravelly phase is distinguished from the typical Norfolk fine sandy loam on the map by gravel symbols. The fine-earth material is identical with that of the typical Norfolk fine sandy loam, but the phase has a large quantity of rounded waterworn gravel over the surface and through the soil and subsoil, approximating 30 to 50 per cent of the soil mass. In some places gravel is so abundant that it is impossible to penetrate the subsoil with the soil auger. The gravel is chiefly quartzite,

and averages in diameter about 1¾ or 2 inches. In a few local patches the type presents slight variations, the lower part of the subsoil material being residual. This variation is found in the outer edges of the phase as it grades into the Montevallo shale loam.

This phase is developed chiefly in the same region as the typical Norfolk fine sandy loam. In the Coosa Valley the largest area is found just south of Oreburg. A number of other areas are mapped in the vicinity of Livingston and between Livingston and Bush Arbor Church. Several prominent areas are found in the vicinity of Early. A number of small developments are found in the Oostanaula Valley in the vicinity of Oostanaula School. In the region of the Etowah River the type is chiefly developed southeast of Bass Ferry.

The gravelly phase of the Norfolk fine sandy loam is developed from the lower strata of the Neocene deposits. In its typical developments it is found directly beneath the material which gives rise to the typical Norfolk fine sandy loam, but in many cases this upper part has been removed and the gravelly material appears on the surface. Exposures in road cuts reveal the gravel content, and horizontal beds of gravel showing the original order of deposition are found in a few places.

The soil is undulating to rolling, and decidedly more rolling than the gravel-free area. It is found on knolls, slopes, and the crests of rounded hills, and on some smooth, level areas. Drainage is well established as a result of the topographic relief and the open subsoil.

Not over 40 or 50 per cent of the gravelly phase is farmed. The same crops are grown as on the Norfolk fine sandy loam, but yields are appreciably lower. The soil is hard to plow on account of the gravel, which often causes it to pack. The best yields are obtained in wet seasons.

This land is held at an average of about $20 an acre.

The gravelly phase is suited to about the same crops and responds to the same method of treatment as the typical Norfolk fine sandy loam.

GREENVILLE CLAY LOAM.

The surface soil of the Greenville clay loam is a dark brownish red friable, heavy clay loam which contains an appreciable quantity of fine sand. The subsoil, beginning at an average depth of 7 inches, is a dark-red friable, silty clay loam to silty clay which continues to a depth of 3 feet or more without appreciable change except that it becomes somewhat more compact and a little heavier in the extreme lower portion. Variations within the type are slight except in one area in Reynolds Bend of the Etowah River, where a loamy variation occurs. In this area the soil is a reddish-brown, friable,

loamy sand, while the subsoil consists of a dark-red, loose, friable, loamy sand to sandy loam. Other variations consist of small, eroded patches where the heavy subsoil material is exposed on the surface and small local areas in which the lower subsoil is probably residual from dolomite. Scattered, rounded, waterworn gravel may be found in places, but never in abundance.

The Greenville clay loam is most extensive in the eastern part of the county, both north and south of the Etowah River. One of the largest areas is found between Johnson School and Bass Ferry. South of the river, areas are mapped south of Dykes and south of Bass Ferry. A few smaller areas are mapped north of Rome. Only a very few small areas are found along the Coosa Valley.

The Greenville clay loam is developed from beds of silt and clay which were deposited in Neocene times. The deposits are spoken of by Hayes as the inner development of the Lafayette(?) formation which is found farther south in Alabama.

This type has a generally rolling to hilly topography, as its usual position is on the crests or tops of some of the highest hills overlooking the river. It is developed at elevations ranging from 40 to as much as 200 feet above the rivers. Drainage is well established as a result of the surface relief.

The greater part of the type is cleared and used in the production of the staple crops of the county. Yields are quite variable on account of differences in the farming methods. Cotton averages about one-half bale per acre, corn about 15 bushels, and oats about 16 bushels.

Land of the Greenville clay loam is held at an average price of about $35 to $40 an acre.

This type is well suited to the general farm crops of the county, and it is recognized as a strong desirable soil. Although it is a clay loam, it contains sufficient fine sand to make plowing and cultivation easy, and a good seed bed can be readily worked up. It has good moisture-holding features. Improvement can be brought about by plowing the land deeper, subsoiling, turning under green manures, and rotating crops. At present, a large part of the type is farmed by tenants.

Greenville clay loam, gravelly phase.—The gravelly phase, which is distinguished on the soil map by gravel symbols, is almost identical in soil material with the typical Greenville clay loam. It, however, contains more fine sand in the soil and subsoil, and is consequently more friable. In some places the soil to a depth of 4 to 5 inches is a reddish-brown, friable loam. There is a large quantity of rounded, waterworn quartzite gravel on the surface and through the soil and subsoil. The fragments average about 1¾ inches in diam-

eter. Gravel is not as abundant as in the gravelly phase of the Norfolk fine sandy loam.

The gravelly phase is more extensive than the typical Greenville clay loam. The largest development is found at Rome and north of Rome between the Etowah and Oostanaula Rivers. Part of the city of Rome is built upon this type. The largest areas are found along the Etowah River in the vicinity of Turner School and Bass Ferry. Only a few areas are mapped in the Oostanaula and Coosa Valleys.

This type is derived from old Neocene deposits of which only remnants are to be found. The gravel beds lie at a lower level than in the gravel-free areas of the typical soil. In a few places, the gravel is seen in the original bedding plane. The deposits of the parent material are not everywhere evenly distributed, and in some eroded places residual beds of dolomite are exposed.

Practically all of the Greenville clay loam, gravelly phase, is cleared and used for farming. It is favorably regarded by the farmers, who obtain good yields of all the common crops. The gravel, while abundant, does not make yields materially lower than on the typical areas. A number of productive farms are found on this phase.

The average price of this land is about the same as that of areas of the Greenville clay loam except near Rome, where on account of the location the prevailing price is $100 or more an acre.

ORANGEBURG FINE SANDY LOAM.

The Orangeburg fine sandy loam has a surface soil of gray to brownish-gray, mellow, friable, fine sandy loam which becomes yellowish in the lower part. The average depth of the soil is 7 or 8 inches. The subsoil begins as a yellow, friable, heavy fine sandy loam which soon passes into a friable fine sandy clay. At an average depth of about 15 inches it grades into a red, friable, heavy fine sandy clay which continues to a depth well below the 3-foot profile and becomes more reddish with depth. In the lower part of the subsoil there is a small quantity of rounded or waterworn gravel.

Two areas make up the Orangeburg fine sandy loam in Floyd County. The largest is mapped three-fifths of a mile south of Oreburg, while the second is located south of the Coosa River at Bush Arbor Church.

This soil typically occupies high knolls which have a more or less even surface. They stand well above the general level of the surrounding soils of the flatwoods section, and are well drained. The material represents the remains of deposits of Neocene sand, silt, and gravel similar to those giving rise to the Norfolk fine sandy loam

and Greenville clay loam. This type represents, however, intermediate material, which is not as yellow as the Norfolk nor as red as the Greenville. The material is no doubt contemporary with similar soils found in the Coastal Plain section of the State.

Practically all of the Orangeburg fine sandy loam is cleared and used in general farming. Yields are about the same as on the Norfolk fine sandy loam, which is adapted to about the same crops.

ALLEN STONY LOAM.

The Allen stony loam as found in Floyd County is quite variable, chiefly on account of differences in its mode of formation. In most places the surface material consists of about 7 inches of brown to reddish-brown, friable, mellow loam which contains an appreciable amount of fine and very fine sand. The subsoil consists of a red to brownish-red, friable, fine sandy clay, grading into a silty clay loam or silty clay.

In its second most extensive occurrence the surface soil is a reddish-brown, friable clay loam, underlain by a brick-red to dark-red, friable silty clay loam, to silty clay. There are fairly large areas in which the soil consists of a grayish-brown to light-brown, friable, mellow fine sandy loam, while the subsoil, beginning at about 7 inches, is a yellow to reddish-yellow fine sandy clay which passes at an average depth of 18 inches into dull-red, friable silty clay loam or silty clay. Gradations of these main phases of the type occur so frequently that it is difficult to separate them satisfactorily on a map of the scale used.

Sandstone fragments or semirounded blocks are characteristically found on the surface and through the subsoil. The quantity is variable, being greatest nearest the base of the mountains. In some places, especially in small coves at the heads of streams issuing from the mountain areas, the stones make up as much as 50 per cent of the soil mass. They usually become less in quantity with distance from the mountains. The stones are either stratified or occur as lenses in the main parent formation.

In addition to the main differences in the type, there are several smaller but important variations. One occurs in the lower lying positions at the heads of streams. In these lower positions the soil is a smooth silt loam of a dark-brown color, while the subsoil consists of a friable, mellow, reddish-brown or brownish-red silty clay loam. Some stones are found. These areas must be distinguished from narrow areas found along gullies in which the material is chiefly stones with some fine earth intermixed.

Stone-free areas occur chiefly in small patches, but in the northwestern part of the county along the Central of Georgia Railroad, near the Chattooga County line, there are two fair-sized areas which

are practically stone free, as the material has been carried out beyond the limits of the stony areas.

Along the outer and inner edges of the type it may grade into material from consolidated rocks. At the outer edges where the formation thins out and gradually merges into the limestones and shales of the flatwoods some residual material occurs in the lower part of the subsoil which is identical with the Montevallo of Colbert types. Along the inner edges the Allen merges with the Hanceville stony loam and must be separated in some cases by an arbitrary line. In such cases the line is drawn at the base of the mountains, where the smoother valley topography begins.

The Allen stony loam is a colluvial soil, consisting of material washed down from mountain positions and spread over the foothills and valleys below in the form of colluvial-wash, alluvial-fan, or valley-filling material. The material has come chiefly from the Hanceville soils, which in turn are derived from various sandstones. A very small percentage of the type represents colluvium from the Clarksville stony loam, which is derived from the Fort Payne chert formation in the mountains. The colluvial formation of the type is emphasized by the stratification observable in some localities and in other places by the underlying shales and limestones, which give rise to other types. They are found in deep cuts and sometimes come to the surface near the base of the mountains.

The Allen stony loam is an extensive soil throughout the mountainous section of the county. It occurs in strips around the base of the mountains which average about one-half mile in width, but may widen to as much as 1 mile. The largest area is found on the southeast side of Lavender Mountain. Narrow strips occur at the base of Simms, Turnip, Horseleg, John, and Turkey Mountains. The area along John Mountain north of Floyd Springs represents some of the heaviest of the type, the texture grading from a loam to approximately a clay loam.

The Allen stony loam varies in surface configuration. The positions it occupies range from slopes and knolls at the foothills of the mountains down to low alluvial areas. In general the type is rolling, and it is well drained, but practically all of it is well suited for the use of improved farm implements.

This is a strong, productive soil, and a desirable type locally, as on one side it is bordered by the rough mountain slopes and on the other by the soils of the Colbert and Montevallo series, none of which are as strong and fertile. In Big and Little Texas Valleys, as well as in the "pocket" of the northern part of the county, this type forms the basis of the agricultural development.

Practically all of this type is cleared and used for the production of the common crops. Yields are variable, depending chiefly upon

the farm management. Cotton yields range from one-third to 1 bale per acre and average more than one-half bale. Corn yields 15 to 40 bushels per acre, the higher yields generally being obtained in the lower or semialluvial areas. Good farmers have produced over 50 bushels per acre on this type. Oats are extremely variable in yields, chiefly on account of seasonal differences, but they average 20 to 25 bushels per acre. Cowpeas produce an average of 1 ton of hay per acre.

Land of this type is held at prices ranging from $25 to $60 or more an acre, depending upon the location and improvements.

The Allen stony loam can be made more productive chiefly by means of deep plowing and subsoiling in combination with the turning under of large quantities of organic matter and with the rotation of crops. The type is well suited for general farm crops, especially small grains and grasses and forage crops. The stoniness is the chief objection to the type.

ALLEN FINE SANDY LOAM.

The surface soil of the Allen fine sandy loam consists of a brownish-gray to brown, mellow fine sandy loam, which often becomes yellowish in the lower part. The average depth of the soil is 7 or 8 inches The subsoil is typically a red, friable, heavy fine sandy clay, which becomes more silty with depth. Sometimes there is an upper stratum of yellowish-red, friable, heavy fine sandy loam, which may extend as deep as 18 inches. There is a small amount of sandstone intermixed with the soil material, but nowhere near as much as is found in the associated Allen stony loam.

The Allen fine sandy loam is not an extensive soil, but it is developed in fair-sized areas throughout the northern part of the county. One of the largest areas is mapped in the vicinity of Crystal Springs. There is a narrow striplike area around the eastern base of Rocky Mountain near Orsman. Several other areas are mapped about 1 mile southwest of Evergreen School. Smaller areas are found in Big Texas Valley.

The fine sandy loam has a similar origin to the stony loam, and the topography is practically the same. It is a valuable soil, and generally recognized as such, as nearly all of the areas are cleared and cultivated. The general farm crops are produced, and give yields about equal to those obtained on the Allen stony loam.

Land of this type is held at $25 to $50 an acre, depending upon the location and improvements.

This type is farmed with greater ease than the Allen stony loam on account of the fewer stones on the surface and through the soil. The same crops are adapted to it.

JEFFERSON STONY FINE SANDY LOAM.

The surface soil of the Jefferson stony fine sandy loam consists of a gray to yellowish-gray, friable, mellow fine sandy loam extending to an average depth of about 7 inches. The subsoil is typically a friable silty clay loam, containing an appreciable quantity of fine sand. It is pale yellow to bright yellow in color, but may grade into a reddish-yellow color in the lower part of the 3-foot profile. On the surface and through the soil material there is usually a great mass of blocklike fragments of sandstone, with a small proportion of chert. The stones vary from 8 or 10 inches in greatest dimension down to the smallest fragments. In many places they are so abundant that the surface is literally a mass of stones, while in the subsoil they may in places constitute 50 to 60 per cent of the material. Within the type there may be found small areas where stones are not so abundant, and in a few patches the type may be stone free. Along the edges of the type farthest from the mountains residual material from shales and limestones often comes within the 3-foot profile, and in a few cases, as on knolls, may come to the surface. These areas are generally too small and intricately associated to be separated on the map. In places the subsoil may be more reddish than typical, grading into the Allen stony loam.

This is not one of the extensive soils of the county, but it is found in fair-sized strips at the foot of several mountains. Several areas are mapped near Lavender. Some of the largest areas are found on the northwest and southeast sides of Horseleg Mountain, and on the southeast side of Lavender Mountain. Large areas occur on both sides of Turkey Mountain. A smaller area is found along Horn Mountain near Everett Springs.

This is a colluvial soil, formed chiefly from sandstone but containing an appreciable quantity of material from chert. The original residual material formerly occupied the mountains along the sides of which this type is now found. Erosion and colluvial action are chiefly responsible for its occurrence in its present situation. Its derivation as colluvium from the higher situations accounts for the many variations found throughout the type. At the base of the mountains the colluvial mass is thickest and it generally thins out away from the mountain. The colluvial material has covered knolls and slight hills which are underlain by various rocks that would naturally give rise to other soils, and the underlying formations are sometimes exposed on the highest knolls.

The topography of the type is quite variable. It is found along the foothills of the mountains and principally occupies slopes, which may be long and gentle or short and steep. It is also found on

knolls, as well as on low, level positions which grade into the alluvial bottoms. Drainage is good throughout the entire area.

Practically all of the type has been cleared of the original forest growth, which consisted mainly of oak, hickory, and shortleaf pine, and placed under cultivation to the common crops of the county. Fairly high yields are obtained. Cotton yields from one-fourth to as much as 1 bale per acre, depending upon the management. The average yield is about one-half bale per acre. Corn averages 12 to 15 bushels per acre and cowpeas about three-fourths ton of hay. A number of good farms are found on this type, despite its stony character. Stones have been hauled from many of the fields, but those from below keep coming to the surface and during heavy rains others are washed down the mountain slopes. This soil is, however, generally preferred to those of the "flatwoods" or mountain sections.

JEFFERSON FINE SANDY LOAM.

In the typical Jefferson fine sandy loam a gray to yellowish-gray, mellow friable fine sandy loam extends to a depth of about 7 inches. The subsoil is typically a pale-yellow, friable fine sandy clay extending to 3 feet or more. In some places the subsoil gives way to a friable silty clay, especially in the lower part of the 3-foot profile. In the outer edges of the type, farthest from the base of the mountains, the soil material becomes thinner and residual material may be found in the lower subsoil; in fact, patches of residual soils occur which have not been wholly covered by the outwash material. With the exception of a few scattered fragments the type is generally free from stones.

A number of areas of this type are mapped near the various mountains. The type is found on the west side of Turkey Mountain, near Piney School, near Armuchee Church, and at a number of other places. The largest area is that on the southeast side of Lavender Mountain south of O'Brian Gap.

This soil consists of material washed down from the mountains. Most of it came originally from sandstones and shales, but a small quantity from beds of chert. The latter plays an almost negligible part in its composition. This type is situated farther out from the mountains than the stony fine sandy loam of this series, as it represents the finer material which has been carried beyond where most of the sediment of the eroding waters was dropped. This colluvial material is as much as 10 feet deep nearer the mountains, but it gradually thins until it forms only a thin veneering over the residual soils.

This type chiefly occupies smooth, undulating areas and long gentle slopes. It is considerably smoother than the associated stony fine

sandy loam, and in a number of places is as level as the flatwoods sections. Drainage, however, is well established.

About 65 per cent of the type is cleared and cultivated. Crops produce about the same yields as on the stony fine sandy loam of this series.

The price of the land ranges from $20 to $40 an acre, depending upon the location and improvements.

The Jefferson fine sandy loam is a productive type when handled judiciously. The friable, fine sandy surface soil can be plowed and cultivated with ease and under a wide range of moisture conditions. The subsoil is also open and more or less loose, and its structure permits of deep plowing and good drainage. The productiveness can be increased considerably by restoring the organic matter which has been lost by years of successive clean cultivation. This can best be supplied by turning under leguminous crops or stable manure. This soil is well suited for the general farm crops of the county and a number of special crops, such as tobacco, sweet potatoes, and truck.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Jefferson fine sandy loam:

Mechanical analyses of Jefferson fine sandy loam.

No.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
255240	Soil	0.4	3.9	3.2	13.8	31.1	39.0	8.5
255241	Subsoil	.8	4.0	2.9	10.0	22.8	40.7	1.87

MURRILL SILT LOAM.

The soil of the Murrill silt loam rather uniformly consists of about 7 inches of gray to brownish-gray, smooth, friable, mellow silt loam which becomes yellowish-gray in the lower part. The subsoil is a smooth, friable pale-yellow to bright-yellow silty clay loam which becomes more compact and impervious in the lower part of the profile. The type may include small patches in which there is a quantity of fine sand and small angular fragments of chert either on the surface or at some point in the subsoil. This fine sand and chert material in some places causes very slight knolls. In places exposures show a slight stratification of this fine sand or cherty material. Generally, however, the type is free from stony or gravelly material. At a few places within the areas and along the outer edges the lower part of the subsoil may be residual from shales or limestone, but this occurs only as the deposits giving rise to the type thin out.

The Murrill silt loam is not an extensive soil, but the areas are prominent and conspicuous. The largest areas are found northeast

of Rome in the vicinity of Waters Store, Rush Church, and Hickory Grove School. A few small areas are mapped in the southwestern part of the county at Rehoboth Church and 1½ miles east of this point.

This soil material has been carried down from the Clarksville soils, in the Knox dolomite region, by stream action, and deposited around the heads of these streams in the valleys below. It consists chiefly of alluvial-fan material derived from the dolomite formations. On account of its mode of formation the thickness of the material forming the type is quite irregular, being thickest adjoining the hills and thinning out farther in the valleys. It may overlie shale or limestone formations.

The type is level to flat, with only slight undulations. There is sufficient slope to afford good drainage.

All of this type is cleared and farmed. It is generally looked upon as strong and productive when properly handled. Yields vary considerably with the soil management. Cotton ranges in yield from one-third to 1 bale per acre, with an average of about one-half bale. Corn yields 12 to 35 or 40 bushels, with an average of about 15 bushels. Oats average about 15 bushels and wheat about 12 bushels per acre. Forage crops are particularly productive. A number of good farms are found on this type.

Land values vary from $25 to $40 an acre, depending upon the improvements and location.

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

Mechanical analyses of Murrill silt loam.

No.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
255210	Soil	1.0	2.2	1.2	4.9	6.5	68.4	16.0
255211	Subsoil	1.8	3.0	1.3	4.4	4.6	59.0	25.6

CUMBERLAND CLAY LOAM.

The surface soil of the Cumberland clay loam consists of a reddish-brown to red, heavy, friable clay loam which extends to a depth of 6 to 8 inches. The upper part of the soil is frequently a brown, mellow loam to silt loam, 2 to 4 inches deep. In a few patches the silty material is as much as 5 inches in thickness, and the soil is more nearly a silty clay loam. The subsoil is a heavy, friable, brownish-red to dark-red silty clay which is more or less compact in the lower part of the 3-foot section.

Included with this type are small areas of brown, mellow loam underlain by friable, smooth, yellowish-brown silt loam to silty clay

loam. Such areas consist of typical Elk loam, but owing to their small extent they are not separated on the soil map. They occur along Big Cedar Creek from the Polk County line to where it is crossed by the Southern Railroad. All of these areas are cleared and used for the production of cotton, corn, and cowpeas. Yields compare favorably with those obtained on the typical Cumberland clay loam.

The Cumberland clay loam is developed in small areas along the rivers. Only a few small areas are found along the Oostanaula River, but along the Etowah River it is mapped along the Bartow County line, south of Bass Ferry, in Reynolds Bend, and at Rome. It occurs along the Coosa River in variously sized areas, the largest being that south of Neals Ferry.

This soil is derived from old alluvium which has been deposited in former times by the rivers during flood stages. It now lies well above overflow on second bottoms or terraces. The material has doubtlessly come from a large number of upland soils within the drainage area of the rivers along which the type is now found. Crystalline as well as sedimentary rocks contributed the original material.

All of this type is cleared and under cultivation. It is one of the most desirable in the county, and supports a number of productive farms. All of the general farm crops are produced. Cotton on most of the farms produces 1 bale per acre. Corn averages over 20 bushels without the use of fertilizers, while yields of 40 bushels are commonly reported. Oats average about 25 bushels and wheat about 15 bushels per acre. Wheat yields are cut down by the rust. Cowpeas produce an average of more than 1 ton of hay per acre. Land of this type is generally held at $75 to $100 or more an acre.

The Cumberland clay loam is naturally a strong, productive soil, well suited to general farm crops, especially small grains and forage crops. Its productiveness could be greatly increased by adding organic matter, as by the turning under of leguminous crops. Deep plowing and subsoiling have proved very successful; increased productivity has been noticed in the furrows which have been deeply plowed.

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

Mechanical analyses of Cumberland clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
255250	Soil	0.7	2.6	1.3	7.4	18.0	43.9	26.1
255251	Subsoil	.5	1.5	0.7	4.2	12.7	37.0	43.2

HOLSTON FINE SANDY LOAM.

The Holston fine sandy loam has a soil of light-brown to light-brownish gray, heavy loamy fine sand to fine sandy loam, underlain at 7 or 8 inches by a friable, pale-yellow fine sandy loam which gradually becomes heavier and at an average depth of 12 to 15 inches passes into a friable, heavy, bright-yellow sandy clay, which continues to 3 feet or more.

The type shows some minor variations. In some places, chiefly on the upper terraces, the type is somewhat heavier than in the typical areas and is characterized by a more brownish-gray soil and a brownish-yellow subsoil. This variation, which probably represents about 20 per cent of the type, occurs chiefly in the Morton and Foster Bends of the Coosa River. A few local areas contain a small quantity of rounded gravel. The soil in a few slopes from one terrace to another represents a close approach to the Cumberland clay loam. Along the Oostanaula River there are two areas, 2 and 3 miles south of Troutman Bend, respectively, in which the soil is a gray very fine sandy loam to silt loam, while the subsoil is a pale-yellow, friable silty clay loam to silty clay.

The Holston fine sandy loam occurs chiefly along the Oostanaula and Coosa Rivers. The largest areas lie in the various bends of the Coosa River, notably in Foster and Morton Bends. Important areas also lie along the Oostanaula River from Troutman Bend south to Riverside School. Smaller areas occur along these rivers and also along Armuchee Creek.

The type consists of old stream deposits, which now lie well above overflow. The material has, no doubt, been collected from many sources and deposited in the big bends of the rivers and at the confluence of streams at an early period when they were adjusting their courses. The areas are even and level, with a very gentle slope. The type occurs at elevations 15 to 40 feet above the river, and there are at least three successive abrupt rises from one level to another, each 5 to 15 feet in height. The type has good drainage, mainly internal, as practically no streams flow through the areas. The type lies well above flood stages of the river except at a few points; the highest water of the 1886 and 1916 floods covered it to a depth of about 1 foot, but did not remain for any considerable time.

All of the Holston fine sandy loam has been cleared of the native forest growth, which consisted of hardwoods similar to those on the overflowed bottom lands, with a good percentage of shortleaf pine. The type is used in the production of all the ordinary crops of the county, but cotton is grown on about 80 per cent of the total cultivated area. Cotton averages about one-half bale per acre, but on well-farmed areas yields of 1 bale are common. Corn produces 15

to 30 or more bushels, depending upon the treatment of the soil and the fertilization. From 40 to 60 bushels are obtained on the best-farmed fields. Oats and other small grains are not grown to any considerable extent. Cowpeas produce from three-quarters ton to 1½ tons of hay per acre. Fertilizers are used for cotton at the rate of 200 to 400 pounds of an 8–2–2 or 10–2–2 grade per acre.

The selling value of this type of soil ranges from $30 to $60 an acre, depending upon the location and improvements.

The Holston fine sandy loam is well suited for the production of the ordinary crops of the county as well as for special crops for trucking purposes. The loose and friable soil is easily prepared and cultivated. Its productiveness can be increased materially by turning under stable or green manures, as the type is deficient in organic matter.

Holston fine sandy loam, deep phase.—The deep phase of the Holston fine sandy loam has a surface soil of gray to brownish-gray fine sand to mellow loamy fine sand, extending to an average depth of 8 inches. The subsoil consists of a pale-yellow to brownish-yellow loamy fine sand to mellow fine sandy loam which extends to a depth of 30 to 36 inches. The typical heavy fine sandy clay is only developed in places in the extreme lower subsoil, and it is lacking in a large percentage of the type. Small areas with a fine sandy soil and subsoil are included with this phase as mapped.

This phase is developed in one large area in the Foster Bend of the Coosa River and in one small area about four-fifths of a mile southeast of Mount Hope. The material is made up of alluvium which has been deposited during high-water stages by the river. Much of the sandy material was laid down by the floods of 1916, which mark the first overflow since 1886.

The surface is level to slightly undulating and somewhat lower than that of the typical Holston fine sandy loam. Drainage is well established and takes place chiefly through the open, loose subsoil.

The selling value of this phase is considerably less than that of areas of the typical soil, as yields are only about one-half to two-thirds as large.

HUNTINGTON GRAVELLY LOAM.

The Huntington gravelly loam is a rather variable type. For the most part, the soil is a grayish-brown to brown, mellow, friable loam to silt loam, containing considerable angular and partly rounded chert fragments. The subsoil, beginning at an average depth of 7 or 8 inches, consists of a yellowish-brown to brown, friable, mellow silt loam to silty clay loam with which a large quantity of angular chert fragments is mingled. A few patches are chert-free, but they are of very small extent.

In the upper parts of the stream courses the soil is somewhat typical. The soil is a more grayish loam to silt loam, while the subsoil is a brownish-yellow to yellow, silty clay loam. The chert fragments are found in great abundance in this variation of the type, in some places approximating 50 to 90 per cent of the soil mass. Other small variations occur, but are of small importance.

This is an alluvial soil, made up of sediments gathered from the various uplands which lie within the drainage area of the streams along which it is found. Practically all of the type comes from the upland regions of Knox dolomite, and the typical areas are found almost entirely along streams which drain the areas having red soils or subsoils. The gray-soil and yellow-subsoil variation consists chiefly of alluvial wash from the Clarksville gravelly loam. Practically all of the gravel consists of the common chert fragments found on the Clarksville, Frederick, and Hagerstown gravelly loams.

The Huntington gravelly loam is mapped along the small streams of the southeastern and eastern parts of the county which drain the region of gravelly or cherty soils. It is most extensive along Silver, Boyd, Spring, and Dikes Creeks. The areas are usually narrow.

This soil occupies the level to flat areas in the stream bottoms, which are subject to overflow with almost every heavy rain. The water moves off quickly after ordinary rains and does little damage. Drainage under ordinary conditions is generally good, although there are some low spots which are not so well drained.

Most of the type has been cleared of a heavy growth of hardwood and scattered pine, and is used chiefly in the production of corn. Some of the higher areas are used for cotton. The uncultivated areas are either low, poorly drained patches or places where so much stone has been washed in that the land could not be successfully tilled. The typical areas of the type are much more productive than the yellow-subsoil variation, in which gravel and stones are so abundant. Corn averages 18 to 20 bushels per acre, and on the better areas as much as 40 bushels is often obtained without the use of commercial fertilizers. Cowpeas produce from three-fourths ton to more than 1½ tons per acre of hay. Cotton averages three-fourths bale per acre.

No separate value can be given for land of this type, as it is usually sold in conjunction with the associated uplands.

HUNTINGTON FINE SANDY LOAM.

The surface soil of the Huntington fine sandy loam is uniformly a light-brown to brown, friable, mellow, fine sandy loam, averaging about 10 inches in depth. The subsoil is less uniform and consists of yellowish-brown to brown fine sandy loam to an average depth of 12 to 15 inches, underlain by a dark-brown, mellow silt loam. In a num-

ber of areas the fine sandy loam material extends to a depth of at least 3 feet, there being practically no difference between the soil and subsoil.

This type is confined to the river bottom lands. Practically all of the alluvial lands of the Etowah River consist of this type. It is found in fairly large areas along the Coosa River from Turner Bend to the State line, and principally in Camp Bend and Morton Bend. Along the Oostanaula River there is only one area, between Bell Ferry and Troutman Bend. In many cases, especially along the Etowah River, the type occurs as a narrow ridge or natural levee, and here is somewhat more sandy than typical.

The Huntington fine sandy loam occupies level bottom lands which are subject to periodical overflow, but between inundations the areas are well drained. The material consists of sediments carried from all parts of the drainage basin of the rivers and deposited by flood waters. It occurs in many places where the high waters have swept across the land. This particular soil has been laid down by moving water, as in cases of high backwater the Huntington silt loam is developed.

The Huntington fine sandy loam has been cleared of the native vegetation, which was the same as that found on the silt loam of this series. It is regarded as one of the most durable and fertile soils of the county and is used in the production of all the staple crops, especially corn. The yields and general farming methods are about the same as on the Huntington silt loam except on the deeper sandy areas, where the yields are lower. The type is used to some extent for permanent pasture and for the growing of cantaloupes and watermelons for home use.

Land of this type sells for $40 to $100 an acre.

Besides the general farm crops this soil is well suited for trucking purposes. It is easily prepared for a seed bed and is easily cultivated. Little fertilizer is required to maintain the productiveness, as each overflow adds plant food.

HUNTINGTON SILT LOAM.

The surface soil of the Huntington silt loam is a rich-brown to dark-brown, friable, mellow, smooth silt loam. The subsoil begins at 7 to 10 inches and consists of a yellowish-brown or dark-brown or chocolate-brown friable silt loam to silty clay loam. In many cases there is little difference between the soil and subsoil, the whole 3-foot section consisting of a smooth, mellow silt loam. In level areas there is a shallow veneering of fine sand, in which case the soil approaches the Huntington fine sandy loam. Along the Oostanaula River there are large areas which have a light-brown surface soil and a reddish-

brown silty clay subsoil. The largest of these is a broad area south of the junction of Armuchee Creek and the river. At this point the land is higher above the river than the average but is subject to overflow. For an alluvial type, this soil as a whole is very uniform.

The Huntington silt loam is found in areas of varying sizes along all the rivers and larger creeks. Large areas are mapped along the Coosa and Oostanaula Rivers, and smaller ones along the Etowah. Along Armuchee Creek and the lower portion of Big Cedar Creek the type is found in rather broad areas.

This is an alluvial, first-bottom soil, subject to periodical overflow. Some areas are not inundated for periods of two to five years, depending upon the stage of the rivers. Low areas along the rivers and the greater portion of the type along the creeks are overflowed at least once a year. The type occupies level, low areas and has good drainage except at high-water stages. It is derived from many sources, as the rivers flow through regions of various kinds of rock. Mica flakes commonly found through the soil material indicate that some of the material has been derived from crystalline sources.

This type originally supported a heavy growth of hardwoods such as oak, hickory, beech, gum, tulip poplar, sycamore, ash, maple and walnut. There was some shortleaf pine. All the type has been cleared and is now used for farming. It is justly regarded as the most productive type in the county. It is primarily the corn-producing soil of the county, as it is especially suited for this crop. Forage crops, small grains, and cotton are also grown. Under favorable conditions corn will average about 40 bushels per acre, while yields of 60 to 100 bushels per acre are often reported. Cowpeas yield from 1½ to 2 tons of hay per acre. Oats average about 20 bushels and cotton about 1 bale per acre. Native grasses produce large yields of hay, especially in low seepage places. Practically no fertilizer is used. This type of soil is valued at $70 to $100 an acre.

Many farmers complain of a decreasing productiveness of this soil. One cause is the presence of a hardpan, which is formed by compacting the soil through continual plowing at the same depth.

POPE FINE SANDY LOAM.

The surface soil of the Pope fine sandy loam is typically developed as a grayish-brown to brown fine sandy loam with an average depth of about 7 inches. The subsoil typically consists of a yellowish-brown to brown fine sandy clay to silty clay. On account of its mode of origin, there are some variations from typical in this soil. More or less stone is found in places, especially in that portion of the type near the heads of streams. Small stones or gravel are also

found at various points. The subsoil is commonly stratified and consists of various textures ranging from sand to silty clay.

The Pope fine sandy loam is found in the first bottoms of various streams which carry alluvium from the mountainous regions of the county. The material is derived chiefly from sandstones and shales, and this is the chief feature distinguishing the type from the associated Huntington soils. The division line between the Pope and Huntington is often drawn arbitrarily.

The Pope fine sandy loam is mapped in rather large areas in the northern part of the county along John Creek and its branches. In the northwestern part of the county it is found along King, Heath, and Cabin Smith Creeks as well as along a number of smaller branches which drain the region underlain by sandstones and shales.

This soil has a smooth, level topography, and is fairly well drained during ordinary seasons. As it occupies the first bottoms of the various streams it is subject to overflow with almost each heavy rain. The water moves off readily, however, and crops are seldom lost from water remaining too long over the surface.

This soil is generally regarded with favor, and practically all of it has been cleared and is used in the production of corn and forage crops. Corn averages about 25 bushels per acre without the use of fertilizers. Practically no cotton is produced. This land is usually sold in conjunction with the adjoining uplands.

POPE SILT LOAM.

The Pope silt loam has a surface soil of grayish-brown to brown, mellow, smooth silt loam, which at an average depth of about 7 inches passes into a brownish-yellow or yellowish-brown, smooth friable silty clay loam. This continues to a depth of 3 feet with only slight changes in texture and color. Stratification is noted in a number of places. In a few areas the type is more grayish than typical. while the subsoil may be more yellowish.

This type is rather inextensive, being confined mainly to the flood plains of Woodward and Beach Creeks. The alluvium has been carried chiefly from upland soils derived from sandstones and shales. The type occupies flat bottoms along the streams and is subject to periodical overflow. Deposition of material continues with each inundation at the present time.

Practically all of the type has been cleared. It is used chiefly in the production of corn and forage crops. No cotton is grown. Yields of corn average about 25 to 30 bushels per acre, but on some farms are considerably higher. Crops are grown without the use of commercial fertilizers. A large part of the type is used for pasture.

ROUGH STONY LAND.

Rough stony land is a classification which, regardless of the character of the soil material, is made to include those portions of the mountain areas which are so steep and stony that their use for agricultural purposes is precluded. It includes the steep, rocky slopes of John and Horn Mountains in the northern part of the county. In some places and slopes are almost precipitous, and the rocks outcrop in the form of cliffs. The type on Rocky Mountain also consists of almost precipitous slopes of rock outcrop.

The forest growth is more or less scattered and consists of shortleaf pine, oak, hickory, chestnut oak, and some chestnut. This land is best suited for forestry. It is generally too rough for good pasture.

SUMMARY.

Floyd County is situated in the northwestern part of the State of Georgia. It has an area of 502 square miles or 321,280 acres.

This county lies in the Appalachian Valley physiographic province of the United States. The Appalachian Valley is made up of a large number of physiographic forms, which occur in this county. The topography includes rolling table lands, high rolling ridges, high mountain plateaus, extensive river terraces, and low alluvial areas.

An ample water supply is afforded by many springs and wells.

Rome is the county seat and the town of first importance.

Transportation facilities are afforded by four railroad lines passing through the county.

The climate is characterized by long summers, short winters, and an adequate rainfall for crop production.

The agriculture of the county is centered around cotton production. Other crops, principally corn, oats, wheat, and forage crops, are grown to some extent, but not in sufficient quantities to supply local demands.

The soils of the county show a wide diversity in mode of origin, color, texture, structure, topography, natural fertility, and crop adaptations.

The Decatur clay loam and its ridge phase are the strong and productive red limestone soils of the county. They are the most productive of the upland types.

The Hagerstown silty clay loam, a reddish-brown limestone soil, is not very extensive, but it is almost equal in productiveness to the Decatur clay loam. The Hagerstown gravelly loam is one of the strongest of the ridge soils in the dolomite region of the county. Both of these types are cleared and farmed.

The Clarksville gravelly loam is an extensive soil in the dolomite section of the county, and it is fairly productive. The loam is more

desirable, as it lacks the chert fragments. The stony loam of the Clarksville series is not cleared, and is generally considered an undesirable soil on account of the abundance of stones.

The Frederick gravelly loam is also derived from dolomite. It is considered more desirable than the Clarksville gravelly loam. A phase of the Frederick gravelly loam and all of the Frederick clay loam have a compact and stiff subsoil. They are derived from beds of chert.

The Colbert silt loam is an extensive soil in the "flatwoods" section of the county. It is derived from interbedded limestone and shale. The soil is difficult to handle, and is of only fair productiveness.

The Montevallo soils are generally low in productiveness and difficult to handle.

The Shackelton gravelly loam and silt loam are good farming soils, largely under cultivation. They give about average yields for the county. These soils are derived from interbedded shales and limestones.

The Christian clay loam is a productive soil, but of small extent.

The Dekalb stony loam is a rough mountain soil, and practically none of it is cleared. Part of the Dekalb fine sandy loam is cleared, and where it has a smooth surface it makes valuable farming land.

The soils of the Hanceville series are derived from sandstones and shales and generally have brown soils and red subsoils. The stony loam occupies steep-sided mountain areas and is not farmed. The fine sandy loam and clay loam occupy smoother situations and make good farming land.

The Allen stony loam and fine sandy loam consist of colluvium washed down from near-by mountains. Both these soils form valuable farming land. The soils are brown to reddish brown, and the subsoils dark red.

The Jefferson stony fine sandy loam and fine sandy loam are of similar origin to the Allen soils, but they have gray to yellowish-gray surface soils and yellow subsoils. They are almost entirely under cultivation and produce good yields.

The Murrill silt loam consists of soil material washed down from areas of the Clarksville types. It is a good soil, and all of it is farmed.

The Norfolk fine sandy loam is well suited for general farming and for special crops. The gravelly phase is not as desirable as the typical soil.

The Orangeburg fine sandy loam is of small extent, but a valuable farming type.

The Greenville clay loam and its gravelly phase are strong, productive soils, well suited for general farming.

The Cumberland clay loam is a terrace, or bench soil, of small extent, but it is naturally fertile.

The Holston fine sandy loam is a strong, productive, second-bottom soil, well suited for general farming and for special crops.

The Huntington silt loam and fine sandy loam are very strong, productive first-bottom alluvial soils. They are well suited for corn and forage crops, and in higher situations, for cotton. The Huntington gravelly loam is also a fertile soil, but not quite as desirable as the other types.

The Pope fine sandy loam and silt loam are fertile first-bottom alluvial soils, well suited for corn and forage crops. The material forming these types has come chiefly from regions of sandstone.

Rough stony land is a nonagricultural type, much of it being too rough even for grazing.

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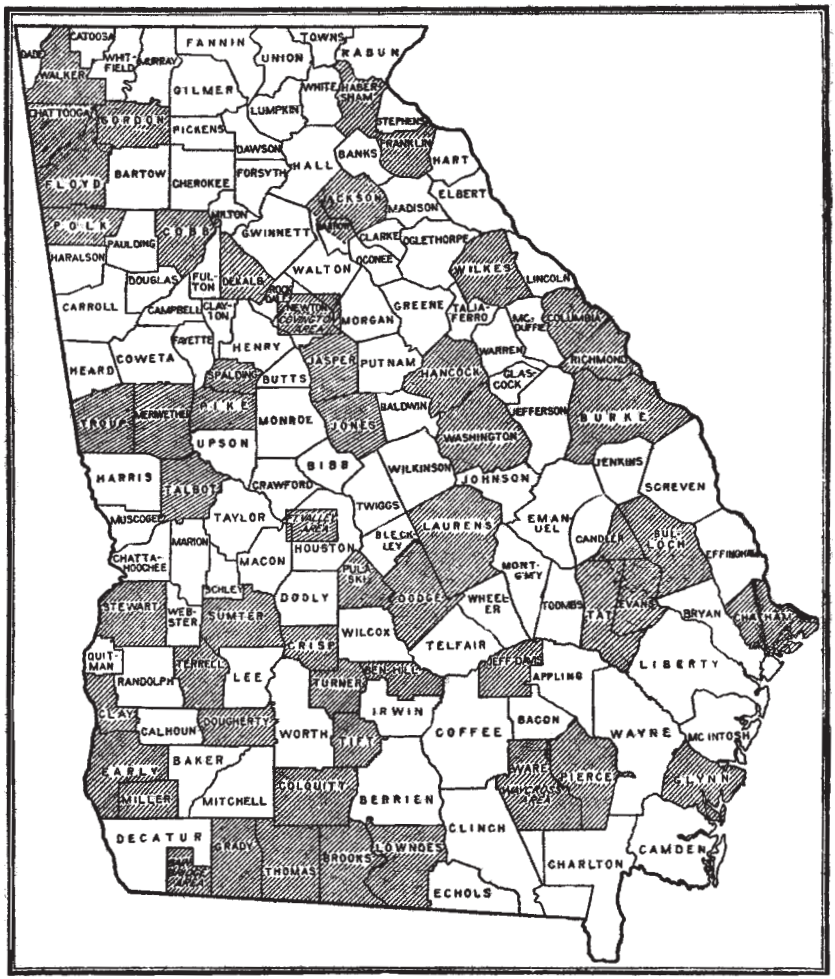

Areas surveyed in Georgia.

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