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 JASPER COUNTY, GEORGIA.

BY

DAVID D. LONG, OF THE GEORGIA STATE COLLEGE, IN CHARGE,
AND M. EARL CARR, OF THE U. S. DEPARTMENT
OF AGRICULTURE.

W. EDWARD HEARN, INSPECTOR, SOUTHERN DIVISION.

[Advance Sheets—Field Operations of the Bureau of Soils, 1916.]

WASHINGTON:
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1918.

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., November 3, 1917.

SIR: Field operations of the Bureau of Soils for 1916 included a soil survey of Jasper County, Georgia, undertaken in cooperation with the Georgia State College of Agriculture. The selection of Jasper County for survey was made after conference with State officials.

I have the honor to transmit herewith the manuscript and map covering this work and to recommend their publication as advance sheets of Field Operations of the Bureau of Soils for 1916, as authorized by law.

Respectfully,

MILTON WHITNEY,
Chief of Bureau.

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

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SOIL SURVEY OF JASPER COUNTY, GEORGIA.

By DAVID D. LONG, of the Georgia State College of Agriculture, In Charge, and M. EARL CARR, of the U. S. Department of Agriculture.—Area Inspected by W. EDWARD HEARN.

DESCRIPTION OF THE AREA.

Jasper County, Ga., is situated in the central part of the State, about 35 miles north of Macon. Morgan County adjoins it on the northeast, Putnam County on the east, Jones County on the south, Monroe and Butts Counties on the west, and Newton County on the northwest. The boundary between Jasper and Jones Counties has not been established by survey within the last few generations, and its location is very indefinite. It is located on the soil map according to the best information obtainable, and adjusted to the county line mapped in the Jones County soil survey of 1913. The Ocmulgee River separates Jasper County from Monroe County and in part from Butts County.

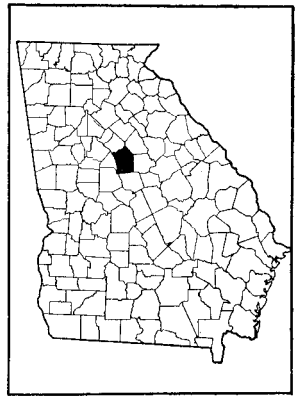

FIG. 1.—Sketch map showing location of the Jasper County area, Georgia.

For a part of the distance along Butts County, the line is very irregular, following the old courses of the Ocmulgee and Alcovy Rivers, through the reservoir formed by the damming of the Ocmulgee River. The boundary line between Newton and Jasper Counties also is very irregular, on account of additions and cessions of territory prior to the Civil War, and it is shown on the soil map according to information obtained from old settlers who were acquainted with the details of these transfers. As mapped the county has an area of 377 square miles, or 241,280 acres.

Jasper County lies in the southern part of the Piedmont Plateau. The fall line between the Piedmont and the Coastal Plain is about 24 miles due south of Monticello. The topography is typical of the Piedmont Plateau, the upland consisting of an old peneplain, with an even sky line, cut more or less into broad divides, and these again into smaller divides, by an intricate and complete system of drainage. A small ridge in the northwestern part of the county

near Eudora, called Barnes Mountain, is the only prominence of note. An exception to the general topography occurs in the so-called "glade," or "flatwoods," section of the county, which consists of a rather low level to very gently undulating area, about 1 mile in width, beginning about 3 miles due south of Monticello and extending southwestward for a distance of 7½ miles. The surface features of this flatwoods section are quite uniform, and there is no conspicuous surface relief.

Along the streams throughout the county there are narrow strips of level to flat flood plains, which vary in extent with the size of the watercourse. These bottom lands usually support a heavy growth of hardwood. The streams generally have eroded their channels to a depth of 40 to 50 feet below the crests of the ridges, but in places, especially in the rougher and more broken parts of the county, they have cut to a depth of 150 feet.

The uplands in general are rolling. They are characterized by undulating ridges which become gently to steeply sloping where they give way to the lowlands along the streams. Gullies or intermittent streams as well as spring-fed drainage ways extend back into the ridges. Around the heads of streams the land usually is more broken and eroded. In general, the northern part of the county is the smoothest, but it includes some broken areas, especially along the course of Murder Creek.

In the southern part of the county the ridges are narrower, the slopes to the streams are steeper, and the streams have cut their channels deeper. In places the land is more hilly, and some areas are conspicuous for their rough and broken surface, having been eroded by numerous streams and gullies into almost perpendicular slopes or walls, with little intervening land suitable for cultivation. Land of this character occurs mainly in an area beginning near Hillsboro and extending northward along the Ocmulgee River to the vicinity of Giles Ferry, but is also encountered in other places along the river.

The county is drained by the Ocmulgee and Oconee River systems. The divide between the two basins is followed by the line of the Central of Georgia Railway from Hillsboro to Monticello, continuing westward and northward near Sardis Church, Bethel Church, Eudora, and Franklin Crossroads to the Newton County line. Tributaries of the Oconee River drain the greater part of the county. An intricate system of streams extends into practically all parts of the upland. The streams have swift currents and are deepening their channels. A large dam has been built on the Ocmulgee River for use in the development of electric power, which is transmitted to all the towns in this part of the State. The flatwoods section is natur-

ally not so well drained, owing to the lack of surface relief and to the impervious nature of the subsoil.

Jasper County was created in 1812 from a part of Baldwin County. The settlers were chiefly Virginians by birth, but came mainly from other parts of Georgia. The section of the county north of Monticello is the most thickly settled. It includes many settlements of white farmers who have developed their own lands. Negro tenants are most numerous in the southern half of the county, where they operate subdivisions of large plantations. The population of the county in 1910 is reported as 16,552. It is all classed as rural, and averages 51.6 persons to the square mile.

Monticello, in the central part of the county, is the county seat and the chief trading point. Its population in 1910 was 1,508. There are a number of small towns within the county, Shady Dale, Machen, and Hillsboro being the most important. Newborn, situated just across the north county line in Newton County, is a trading point for farmers in the northern part of Jasper County.

Fairly good transportation facilities are supplied by two branches of the Central of Georgia Railway. One line extending from Macon to Athens passes through Hillsboro, Adgateville, Monticello, Machen, and Shady Dale. A branch of the main line of the Central of Georgia extending from Gordon to connect with another line at Covington passes through Aikenton, Machen, Kelly, Farrar, Broughton, and Newborn. The southwestern part of the county is afforded transportation by a line of the Southern Railway, which runs for a short distance in the Ocmulgee Valley just beyond the county boundary line. Berner and Flovilla are shipping points on this road.

Wagon roads extend into all parts of the county. These are ordinary graded dirt roads, with no surfacing, and they are kept in fair condition. Telephones are used by a large proportion of the farmers, and practically all sections have rural mail delivery. The chief outside market for the farm products of the county is Macon.

CLIMATE.

The climate of Jasper County is characterized by two periods of maximum rainfall, in February and March and in July and August. Rainfalls exceeding 2.5 inches in 24 hours are of frequent occurrence, and there is an average of 89 days annually with 0.01 inch or more of rain. The average annual snowfall is only about 2 inches. Snow falls mostly in January and February and usually melts almost immediately. The mean annual precipitation is about 49 inches.

The summers are long and warm, with small daily range in temperature. The winters are short and mild, but during exceptionally

cold waves the temperature may approach zero. January and February ordinarily are the most disagreeable months. The mean annual temperature is about 63° F.

The average date of the last killing frost in the spring is March 17, and that of the first in the fall November 13, giving an average growing season of 241 days. Killing frost has occurred as late in the spring as April 17 and as early in the fall as October 11.

The prevailing direction of the wind is from the northwest except during May to August, inclusive, when it is from the south, and during September and October, when it is from the northeast. The mean annual relative humidity as recorded at Macon is 83 per cent.

The following table is compiled from the records of the Weather Bureau station at Monticello, in the central part of Jasper County:

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

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.
	F°.	*F°.*	*F°.*	*Inches.*	*Inches.*	*Inches.*
December	47.8	77	8	3.80	2.71	9.24
January	45.2	77	11	4.47	3.63	9.23
February	46.7	80	[1] 6	5.27	3.58	2.09
Winter	46.6	80	[1] 6	13.54	9.92	20.56
March	51.9	91	20	5.70	2.35	7.43
April	63.4	95	32	3.12	1.47	1.42
May	72.2	98	39	2.82	2.37	1.89
Spring	62.5	98	20	11.64	6.19	10.74
June	78.5	100	48	4.38	2.88	10.72
July	80.2	105	60	4.96	2.34	6.36
August	79.0	104	58	5.46	7.87	6.49
Summer	79.2	105	48	14.80	13.09	23.57
September	75.0	99	48	3.29	.49	4.08
October	62.8	93	30	2.67	.39	5.70
November	55.0	92	19	2.78	3.35	1.66
Fall	64.3	99	19	8.74	4.23	11.44
Year	63.1	105	[1] 6	48.72	33.43	66.31

[1] Temperatures for cold wave of Feb. 13, 1899, not included in record.

AGRICULTURE.

Agriculture in Jasper County developed more slowly than in other parts of central Georgia on account of the early lack of transportation facilities. In the first half of the nineteenth century there

was a steady influx of settlers, who practiced a self-sustaining type of farming. Small areas were cleared and devoted to such crops as corn, oats, and wheat, and cattle, hogs, and sheep were grazed on the open range. With the development of plantation farming, cotton became an important crop, though its production was somewhat retarded by the lack of marketing facilities. During this period large areas of new land were put under cultivation and much land formerly used for grain production was given over to cotton. After the construction of the railway now known as the Central of Georgia, about 1887, the production of cotton increased rapidly, and it was grown almost to the exclusion of other crops. It became necessary to ship in corn and oats to feed the work stock and to import beef and pork for local consumption.

At present the agriculture is in a transitionary stage, the tendency being toward the production of cotton as a part of a better balanced farming system. The presence of the cotton-boll weevil and a growing recognition of the advantages of devoting more attention to producing subsistence and forage crops have resulted in the introduction of diversified farming. Only a small number of farmers, however, produce sufficient subsistence products to meet the requirements of the farm, and the system of agriculture, as well as the business activities of the county, still center about cotton production. This crop occupies 61 per cent of the improved land in farms, in contrast to 18 per cent in corn and approximately 1 per cent each in oats and grains cut green, which comprise the chief sustenance crops. Wheat, rye, cowpeas, sorghum, and sweet potatoes each occupy less than 1 per cent of the total improved acreage.

Cotton in 1909 produced 25,848 bales on 68,168 acres, or an average yield of 0.38 bale per acre. There are no local cotton mills, and the crop is shipped to various port cities.

Corn, which ranks second in importance, was grown in 1909 on 20,324 acres, and produced 219,968 bushels, or an average of 10.8 bushels per acre. Since that year the acreage has been increased somewhat and the average yield is larger, as more care is being devoted to the crop. Corn is not produced in sufficient quantity to supply the local demand.

In 1909 there were 1,559 acres in oats, with a production of 24,108 bushels, an average of 15.4 bushels per acre. Since that year the acreage has increased more than 100 per cent. The crop is used on the farm, being cut green for hay, fed in the straw, or thrashed. A large quantity of oats is annually shipped in from distant points.

The growing of cowpeas for hay and as a soil-improving crop is becoming more common. A large quantity of seed is annually gath-

ered for food and for planting. Much of the crop seeded in corn-land is used for grazing.

Wheat is reported on 441 acres in 1909, but the acreage in 1916 is estimated at 1,500 to 1,800 acres. The wheat is ground at local flour mills and used within the county. The crop is increasing in importance.

Only a very small acreage is devoted to rye. This crop is grown largely for winter pasturage or for early hay; some farmers plow it under in the spring to supply organic matter to the soil.

Alfalfa has been grown successfully in an experimental way, and it can apparently be produced with proper management over the greater part of the county. The average yield is 2 to 3 tons per acre.

Cattle and hogs are not raised in sufficient numbers to supply local needs. The total number of hogs in the county in 1910 was 6,500 and the total number of cattle 4,439. Since that year the number of domestic animals has increased considerably, and the quality of the stock has been improved in some localities by the introduction of pure-bred sires. The registered breeds of hogs consist of Duroc Jersey, Berkshire, Poland China, and Hampshire. Cattle are raised mainly for beef production and consist of local stock improved by crossing with Herefords. A few silos have recently been constructed, and such crops as velvet beans, cowpeas, and sorghum are grown more extensively to feed the stock.

There is a general recognition by farmers of the natural adaptation of certain soils to particular crops, but the prevailing one-crop system of farming permits little opportunity for the use of the soils for producing those crops to which they are best suited.

The general farm crops are grown on all the upland types. Cotton on the bottom soils produces a rank growth of vegetation at the expense of fruit, and is subjected to earlier frosts than on the uplands. It is noticeable that various crops on the Davidson clay loam and the Iredell and Mecklenburg loams develop a stronger and ranker growth of vegetation than on other soil types. The Congaree soils are considered best suited to corn and grass crops, and corn is the leading crop on all the bottom lands except the highest areas of the Ocmulgee bottoms. The Davidson soils are recognized as the strongest for all classes of crops. The heavy clay loam types of the county are considered best for all crops in wet seasons and the sandy loam types the best in dry seasons. Crops are known to be injured more in wet seasons on the sandy, or gray, lands.

The equipment used in general farming is largely limited to light implements, such as one-horse plows, scrapes, and sweeps for cotton farming. The work stock consists almost entirely of mules. The farm buildings are generally small, but adequate for the purposes of farming in this region. On grain farms the equipment is more com-

plete, including two-horse plows, spike-tooth, disk, and spring-tooth harrows, and mowers, binders, and grain drills.

Land for cotton is generally broken in the fall as soon as the preceding crop is removed, but some farmers break the land in the winter or spring. On the Iredell and Mecklenburg loams no attempt is made to plow in the fall, as the soil runs together badly during the winter. In the early spring the land is not harrowed, but is worked with small turning plows into beds, generally from 3 to 4½ feet apart. The better farmers break the land broadcast with two-horse plows, and go over it with harrows. In the spring the rows are laid off with a two-horse plow, the fertilizer is distributed, and the soil is listed back on the fertilizer, leaving the land bedded. In some cases the fields are gone over with a spike-tooth harrow.

Planting takes place from early in April to the middle of May, depending upon seasonal conditions. Fertilizer usually is applied at the time of planting. Cultivation begins with "barring off"; this leaves the young plants on a narrow ridge, which facilitates the chopping-out process. After the plants have been thinned to the desired distance of 14 to 24 inches in the drill, the soil is again turned back to the rows. Four to eight cultivations with sweeps and scrapes are later made at as short intervals as possible, and the crop is laid by the latter part of July. Many different varieties of cotton are grown. Among the most popular are the Cleveland Big Boll, Long Shank, Dongola, Broadwell, Double Jointed, Toole, Hastings, Sure Crop, Russell, Pulnott, and Cooks Improved. A long-staple upland variety, the Columbia, is grown to some extent.

For corn, the land is not prepared so carefully as for cotton. It is generally bedded with a one-horse plow and the seed dropped in the water furrows. A few farmers in the uplands plow in the fall and harrow and fertilize before planting. The rows range from 4 to 5½ feet apart, and the hills are spaced 2 to 3 feet apart in the drill. On the more improved lands the plants are placed at shorter intervals. The corn-planting period extends from the latter part of March to the last of June. Many farmers plant at different dates in order to avoid too great a loss by possible drought. The crop is generally cultivated three times. The leaves are pulled about the middle of August for fodder and the corn harvested in October and November. The prolific varieties are most commonly grown, such as the Marlboro, Hastings, and Watley. A local variety, the Kinnard, is grown to some extent, especially on the bottom lands.

Oats are generally sowed broadcast and plowed under, or drilled in on plowed land. Some farmers disk the land before drilling, and many disk the seed in after sowing broadcast. Oats are often seeded in cotton fields, small drills, which seed about three rows of oats

between two rows of cotton, being used. Farmers endeavor to have the seed sown about the middle of October, but it is often as late as December before the crop is in. No spring oats are grown. The Fulghum is becoming the most popular variety of oats, but the Texas Rustproof, Bancroft, and Appler varieties are grown extensively.

Wheat is sown and fertilized at about the same time and in the same manner as oats. Many farmers wait until after frost to seed wheat, so as to avoid injury by the Hessian fly.

Cowpeas are sown broadcast in small-grain stubble when intended for hay and plowed under, and are sown either broadcast or in rows in cornfields when grown for soil improvement. The crop is grown to some extent with sorghum for roughage. The Unknown, Whippoorwill, Brabham, Crowder, and Blackeye are the varieties most commonly grown.

No definite system of rotation is followed. Farmers make an effort to alternate crops as often as possible, but owing to the prevailing one-crop tenant system of farming it is impossible to alternate them to any considerable degree. Some fields have been in cotton continuously for over 60 years. The value of crop rotation is fairly well recognized by most of the farmers, and many of them practice a rotation consisting of cotton, corn, a small grain, and cowpeas for hay.

The annual expenditure for commercial fertilizers is increasing rapidly. According to the 1910 census the amount expended in 1909 was $149,360. This is practically three times that reported in 1899, and averages $68 for each of the 2,202 farms reporting. Some of the more progressive farmers mix their own fertilizers, but ready-mixed preparations of various grades are almost invariably used for cotton. The most commonly used application for this crop is 200 pounds of a 9–2–2 [1] mixture, but the mixtures range from 9–2–2 to 12–4–4, and the acreage applications from 200 to 600 pounds. Where large quantities are used two applications are made, one at the time of planting and another as a side dressing at the second or third cultivation. About half the farmers use fertilizer on corn, and the available stable manure ordinarily is applied in the drill. Some farmers use the same mixture that is used for cotton, at the rate of about 200 pounds to the acre; others use the same quantity in two applications, and some add 100 pounds of nitrate of soda about the time the tassels appear. Oats usually are not fertilized, but some farmers make an acreage application of about 200 pounds of the same grade of fertilizer as is used for cotton.

It is customary to apply about 100 pounds of nitrate of soda per acre broadcast in the spring. The fertilization is largely confined to

[1] Respective percentages of phosphoric acid, nitrogen, and potash.

drilled oats. Wheat is fertilized in practically the same way as oats. On account of the present scarcity of potash, many farmers fertilize all crops with acid phosphate and cottonseed meal, mixing one part meal to two parts acid phosphate. This is applied at the rate of about 200 pounds per acre.

The amount expended for farm labor in Jasper County in 1909 is given in the census as $151,355, averaging $144 for each of the 1,051 farms reporting the employment of labor. The labor is drawn almost entirely from the negro population, and the supply is apparently adequate. Farm hands hired by the month receive $10 to $15, while day laborers receive 50 cents to $1, depending upon the nature of the work performed. The picking of cotton is paid for by the hundredweight.

The census of 1910 reports the total number of farms in the county as 2,584. Over 87 per cent of the total land area of the county is reported in farms. The average size of farms is given as 69.6 acres,[1] of which an average of 43.2 acres is reported improved.

According to the 1910 census, 81.5 per cent of the farms are operated by tenants. Over two-thirds of the tenants rent for cash, and the remainder farm the land on the share basis. One thousand pounds of lint cotton is the standing rental for a one-horse or 30 to 40 acre farm. Under the most common share-rent arrangement the landowner furnishes the stock, implements, and one-half the fertilizer, and the tenant the labor and one-half the fertilizer. Each receives one-half the total proceeds of the farm.

The price of farm land ranges from about $3 an acre for rough and hilly areas to as much as $80 an acre for well-improved land conveniently located.

SOILS.

Jasper County lies in the Piedmont Plateau division of the United States, in which the underlying rocks consist of widely differing, complex crystalline and semicrystalline formations of undetermined age. The upland soils of the county, which cover practically its entire area, have been formed of materials derived through the weathering of the underlying rocks. The inextensive alluvial soils are composed of material eroded from the uplands and deposited by streams in the bottom lands along their courses.

The upland soils are derived from igneous, metamorphic-igneous, and sedimentary rocks of varying composition. These can be classed in four groups, viz, dark-colored basic rocks, light-colored acidic rocks, mixed dark-colored and light-colored rocks, and metamorphosed sedimentary rocks. The physical and chemical characteristics

[1] The census classes each tenancy as a farm.

of the resulting soil materials vary definitely with the nature of the underlying formations. The soils derived from each of the various groups are broadly correlated into series, which include soils similar in color, structure, and origin, but varying in texture of the soil proper.

The dark-colored basic rocks consist of the Roan gneiss series, in which are included hornblende gneiss and hornblende schist, and associated areas of diorites and gabbro. This is the most extensive formation in the county. A development extending northeastward from the Crawford County line to a point east of Elberton underlies the southern half of Jasper County from the Jones County line northward to Murder and Shoal Creeks. The predominating rock here is a diorite or hornblende gabbro, which ranges in texture from medium and even grained to porphyritic, and in structure from massive to schistose. With increase in the content of hornblende and the development of the gneissic and schistose structure the rocks change to hornblende gneisses or hornblende schists, respectively. They are characterized by basic plagioclase ranging from labradorite to aborthite and secondary hornblende.[1] The soils derived from these rocks are very distinctive in character. They are correlated in three series, the Davidson, Iredell, and Mecklenburg.

The Davidson series is characterized by chocolate-brown to dark reddish brown surface soils, underlain by a heavy, brittle, smooth clay subsoil ranging from reddish brown to dark red in color. Two types are mapped in this series, the clay loam where the chocolate-colored surface soil is more than 6 inches in depth, and the clay where the surface soil is shallow and ordinary plowing turns some of the heavy red clay to the surface. A hilly phase of the clay type occupies the included areas of broken land.

The Iredell soils present a decided contrast to the Davidson. This series occupies the greater part of the glades, or flatwoods. The surface soil is brownish gray or dark gray in color, while the subsoil is a heavy, plastic, sticky clay, of a prevailingly brownish-yellow color with an olive or greenish tint. The series is derived from the same class of rocks as is the Davidson series, and the low, flat topography and the degree of weathering of the material are probably responsible for the difference in color. Only one member of this series is mapped, the Iredell loam.

The Mecklenburg soils are intermediate in character between the Davidson and Iredell. The surface soil is brown and friable, while the subsoil is light reddish brown, frequently mottled with red, yellow, and brown, and is a heavy sticky or waxy, plastic clay. The soils thus resemble the Davidson in color, while they have the struc-

[1] Hopkins, Oliver B., Bul. 29, Ga. Geol. Survey.

ture and texture typical of the Iredell. This is probably due to an intermediate stage of weathering, resulting from intermediate topographic relief. One type of the Mecklenburg series is mapped—the loam.

The light-colored acidic rocks are classified with the Carolina gneiss formation. They consist mainly of gneisses, with a very small proportion of granite. The gneisses and included schists occur as a fine-grained gneiss, as a fine-grained biotite gneiss with phenocrysts of feldspar, as a coarse-grained or porphyritic biotite gneiss, and as a finely laminated mica schist. These rocks are closely associated in a belt extending in a northeast-southwest direction from a point near Pittman Ferry to the Newton County line about 3 miles south of Newborn. Roughly, this area is bounded on the east by a part of Herds Creek, Hardys Creek, and Barnes Mountain, and thence by a line passing near Murder Creek Church, Rock Hill School, and Pitts Chapel. Three series are derived, at least in part, from this group of rocks, the Cecil, Durham, and Appling.

The Cecil series has gray to brownish-red surface soils, with a light-red or brick-red, stiff, brittle subsoil, in contrast to the deep-red, smooth subsoil of the Davidson series. The Cecil series is represented by four types, the stony sandy loam, sandy loam, sandy clay loam, and clay loam, with hilly phases of the sandy clay loam and clay loam.

The Durham series is in part derived from these formations, but in part is of doubtful origin. It is characterized by gray surface soils and a yellow, friable sandy clay to clay subsoil. The sandy loam is the only type of the series mapped in this county.

The Appling series is intermediate between the Cecil and Durham. The surface soil is gray, and the subsoil consists of a mottled yellow and red, friable sandy clay to clay. The Appling sandy loam, with a hilly phase, is mapped.

In some small areas mica schist is the predominant formation and gives rise to soils of the Louisa series, which is described below.

The group of soils derived from mixed dark-colored and light-colored rocks is second in extent in the county. These soils in many cases constitute a gradation between soils of the first two groups mentioned. The largest area of the closely associated dark and light colored rocks consists of a thinly laminated formation of biotite gneiss, porphyritic gneiss, hornblende gneiss or hornblende schist, and mica schist. Thin weathered sections of each extend into the lower subsoil in many places. This formation adjoins the light-colored rocks on the northwest and the area of dark-colored rocks on the southeast. It is partially bounded by a line running northeastward from Pittman Ferry along Barnes Mountain and through Murder Creek Church to the Newton County line near Pitts Chapel. It

reaches into Morgan County along the entire boundary line, and near Mobley Bridge extends southward to a point near Aikenton, and thence southwestward near Monticello and along Wise Creek to the Ocmulgee River.

These formations give rise mainly to soils of the Cecil series. Numerous strips of Davidson soil occur, due to intruding dikes of diorite or to a preponderance of hornblende schists, sufficient to produce the dark color characteristic of the Davidson series.

A somewhat different mixture of rocks gives rise to soil of distinctly different character. An aplitic granite and a closely associated hornblende gneiss, both of which are cut by dikes of gabbro-diorite, and in a few places by dikes of pegmatite, occur in a narrow strip extending from the southwestern corner of the county to a point a few miles southwest of Monticello. Small areas also occur northeast of Monticello, extending to a point about 2 miles east of Shady Dale. This formation gives rise to the Wilkes series, which is characterized by brownish-gray to gray surface soils underlain by a subsoil which typically consists of two sections. The upper section is a yellowish to brownish-yellow or a mottled red and yellow sandy clay, while the lower is a plastic, sticky clay of a brownish-yellow color with an olive or greenish cast. The upper part of the subsoil is similar to the subsoil of the Appling series, while the lower part resembles that of the Iredell. The sandy loam is the only member of the Wilkes series mapped in this county. In a small area of soil derived from this formation the heavy, plastic lower section of the subsoil is lacking, and the soil is mapped as the Appling sandy loam, hilly phase.

The metamorphosed sedimentary rocks consist of quartzite and mica schist, which occur in a narrow strip extending from the vicinity of Eudora to a point near the mouth of Herds Creek. The quartzite is a hard, dense rock which forms Barnes Mountain. It gives rise to the Dekalb series, which is characterized by grayish-brown surface soils and a yellow, friable sandy clay to clay subsoil. The stony sandy loam is the only type of this series mapped in Jasper County. From the mica schist is derived the Louisa series. This has gray to brownish-red surface soils. The subsoil is a light-red or brick-red, heavy, brittle clay, which is slick and greasy to the feel, the series differing in this respect from the Cecil. The clay loam of the Louisa series is mapped in Jasper County.

The Molena series consists of brown to reddish-brown surface soils, underlain by a loose, friable sandy clay subsoil of a red to dark-red color. The origin of the material of this series is not definitely known. Chemical analyses indicate that it is influenced by feldspathic sands or arkose. The series is represented in this county by one type, the sandy loam.

The alluvial soils of Jasper County consist of material washed from various kinds of upland soil. They are classed with the Congaree series, which is characterized by grayish-brown to red surface soils and a red, friable subsoil of varying texture. The material giving rise to the silty clay loam type has been washed chiefly from areas of the Davidson soils. The fine sandy loam occurs in the flood plains of the Ocmulgee River. Along many streams the soil consists of intricately mixed patches of silty clay loam and sandy loam, and is mapped as Meadow (Congaree material).

The table below gives the name and actual and proportionate extent of each soil type mapped in Jasper County:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Davidson clay	44,160	23.2	Appling sandy loam	3,648	1.6
Hilly phase	11,200		Hilly phase	320	
Cecil clay loam	41,088	18.3	Iredell loam	3,712	1.5
Hilly phase	3,136		Cecil stony sandy loam	2,304	1.0
Davidson clay loam	42,624	17.6	Louisa clay loam	1,728	.8
Cecil sandy clay loam	38,016	15.9	Durham sandy loam	1,344	.6
Hilly phase	576		Mecklenburg loam	1,216	.5
Cecil sandy loam	19,392	8.0	Congaree fine sandy loam	1,088	.4
Congaree silty clay loam	11,904	4.9	Molena sandy loam	704	.3
Meadow (Congaree material)	7,680	3.2	Dekalb stony sandy loam	320	.1
Wilkes sandy loam	5,120	2.1			
			Total	241,280	

DAVIDSON CLAY LOAM.

The Davidson clay loam has a mellow, friable clay loam surface soil usually of a dark reddish brown or chocolate, but in local areas lighter reddish brown color. The subsoil, beginning at an average depth of about 8 inches, consists of a deep-red or maroon, heavy clay, rather compact and stiff and slightly plastic when wet. This material extends to depths of 25 to 30 feet, the color becoming less pronounced with increase in depth. The type is known locally as "black land," on account of its dark color. It is also called "gummy land" or "push land," as the soil does not scour readily from the plow.

This type as mapped varies from the typical in many places, owing to differences in the soil-forming material and in topography, and to other less obvious causes. In large areas in the southern part of the county, especially near Adgateville and Hillsboro, the surface soil is very dark, and the subsoil is a clay loam to silty clay differing little in color from the surface soil. Small, narrow strips of soil of this character occur in nearly all the areas of the Davidson clay loam, and probably form 20 to 25 per cent of the entire area of the type.

In contrast to this dark-colored variation, there are areas of appreciable extent in which the surface soil is a redder, heavy, friable clay loam, not quite so mellow as typical, but not so heavy as the surface soil of the clay type. This soil represents a gradation toward the Davidson clay. It occurs chiefly in topographic positions which would favor the removal of the lighter soil material, as on slopes and in rolling situations.

In a number of areas the surface soil contains varying quantities of sand, and in the sandiest areas it resembles the Cecil sandy loam, except for its dark-chocolate color. The sandy material has been contributed by numerous thick seams of quartz which cut through the formations giving rise to this type. These included sandy areas are most numerous in a roughly defined area lying between South Fork of Wolf Creek, Whiteoak Creek, and Murder Creek. Several small areas occur in the northern part of the county, but here the sandy material has apparently been contributed by thin interlaminations of other rock materials within the formation giving rise to the type.

Some small areas of Davidson clay and Cecil clay loam are included with this type, owing to their small extent. Small, stony areas occur, due to the outcropping of quartz veins and of the parent rock material. Areas of this kind, where important, are shown on the map by stone symbols.

The Davidson clay loam is one of the most extensive soil types in the county, being especially important in the southern part. Large typical areas extend from the Jones County line to Monticello and thence northeastward toward Aikenton. In the northern part of the county the type occurs in a strip of isolated areas extending in a northeast and southwest direction, being typically developed from Warren Academy to Calvin, between Sardis Church and Farrar, and from Shady Dale northeast to the county line.

In the largest and most typical areas the type is derived from hornblende schist, diorite gneiss, or schist. The darkest-colored variation is derived chiefly from diorites or hornblende gabbro. The latter are massive rocks which have their most extensive development from Adgateville and Hillsboro southwest to the Jones County line, following closely the flatwoods section of the county. The areas in the northern part of the county are derived in part from the interlaminated formation in which the predominant basic rocks are sometimes cut by diorite dikes. Small areas in the vicinity of the Cecil soils are due to thin inclusions of hornblende schist within the light-colored acidic rocks. The various soil-forming rocks, no matter whether of the massive diorite or platy schists, appear to weather in a spheroidal manner. The gradation from rock to soil may be seen in many road cuts.

The Davidson clay loam occurs in the smoother parts of rolling to hilly areas, where the type occupies the even crests of gently sloping ridges. Where stream branches dissect the generally even surface or where the slopes to the streams are steep the type gives way to the Davidson clay. It does not extend entirely across interstream areas, except where the relief is slight. In places the type occurs at the base of the slopes, where it consists more or less of colluvial material. The drainage of this type is good.

The Davidson clay loam is one of the strongest and most important soils in Jasper County, and is well suited to all the crops commonly grown in this region. Nearly all of it has been cleared and is devoted to the production of the general farm crops. The native forest consists of various species of oak and hickory. The trees make a tall, vigorous growth, indicating a naturally fertile soil.

Cotton, corn, oats, cowpeas, and wheat are the principal crops. Cotton yields from one-third to more than one bale per acre, with an average of about one-half bale. The average yield of corn is about 18 bushels per acre, but yields as high as 75 bushels are obtained where the land has been well cared for and is well fertilized. Yields of 40 bushels per acre are common in favorable seasons. Wheat yields 12 to 35 bushels per acre. The average yield of oats is about 25 bushels per acre, but many farmers obtain 50 to 60 bushels. The maximum yield of 95 bushels obtained in Jasper County was produced on this type. Cowpeas yield from one-half to more than 1 ton of hay per acre. Cotton makes a heavier growth on this type than on the other soils, at least those of the uplands, and small grains make a thicker and heavier growth and develop better filled heads. In some cases, where the surface soil has been washed away, crops planted in the subsoil have produced normal yields. It is said that this soil can be maintained in a productive condition more easily than any of the other types.

The price of this land ranges from $20 to $60 an acre, depending upon the location and improvements.

The chief need of this soil is the use of methods to maintain its natural productiveness. It is especially suited to small grains, cotton, grasses, and alfalfa.

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

Mechanical analyses of Davidson 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.*
254714	Soil	1.4	6.6	6.2	21.6	7.7	30.4	26.3
254715	Subsoil	.8	5.6	4.2	16.8	6.8	24.8	41.1

DAVIDSON CLAY.

The surface soil of the Davidson clay consists of about 1 to 3 inches of deep-red or brownish-red, heavy, friable clay loam, passing abruptly into heavy, dark-red clay. Over about 40 per cent of the type, where erosion has been most active, the material is a heavy clay from the surface downward. The subsoil is an intensely red or dark-red, heavy, stiff, smooth, and somewhat compact clay, extending to considerable depths. The intense, red color of this soil in freshly plowed fields presents a decided contrast to the chocolate color of the clay loam type, but after the soil lies undisturbed for some time the surface veneering of clay loam material closely resembles in appearance the surface soil of the clay loam type. The surface soil is typically very heavy, somewhat sticky, and plastic when wet, but can be worked into a pulverulent condition if handled when the moisture content is just right. The type generally is free from stony material.

The Davidson clay occurs in rather large, continuous areas in the southern part of the county, extending northward from the Jones County line through Monticello and thence northeastward toward Aikenton. The soil is in most places typical, but it includes small areas of Davidson clay loam, which seem to be remnants of former extensive developments, and a few areas of Cecil clay loam, which are of more or less doubtful origin. Apparently the type occurs in those positions where the lighter surficial material, which would give rise to the clay loam type, has been removed by erosion. It is derived through the weathering of the same rocks that give rise to the clay loam, and the two types differ little except in depth of the dark-colored surface soil. Occasionally the subsoil of the clay loam shows a dark color which is not encountered in the clay type.

The Davidson clay occupies the more broken areas and steeper slopes in the southern part of the county. It is also encountered on some of the smoother divides, which are gently rolling. Only these smoother areas have the surface veneering of clay loam, while on the steep slopes bordering streams the heavy clay is exposed. The rougher areas are separated as a hilly phase. Owing to the surface relief the drainage is thoroughly established and in some places is excessive.

The Davidson clay is practically all cleared of the heavy stand of hardwoods, largely oak and hickory, that constitute the native growth. It is devoted to the general farm crops. Ordinary yields are about the same as on the Davidson clay loam, but the maximum yields do not approach those obtained on the latter type.

Land of the Davidson clay ranges in price from $15 to $60 an acre, depending upon location and improvements.

The Davidson clay is not as high in organic-matter content as the clay loam, and crops do not make as heavy a growth, except on a few farms where the land has been well handled. The soil is generally hard to plow on account of its heavy texture. It is likely to be impaired in productiveness if plowed when too wet and clods form which are difficult to break down. The best yields are obtained in wet years, crops suffering in dry seasons, as the compact, heavy surface soil prevents the passage of moisture to the subsoil, where it could be held in reserve. It is advisable to keep the soil as open and loose as possible, and coarse vegetable matter should be plowed under. This type is especially suited to the production of cotton, grain, grass, and forage crops, including alfalfa, which is successfully produced on this soil near Rock Hill, S. C., and in small patches in this county. It could probably be profitably devoted to stock farming. Heavy implements and draft stock are required to handle this soil properly.

Davidson clay, hilly phase.—The Davidson clay, hilly phase, differs essentially from the typical soil only in topography. It occurs in the southwestern part of the county, in the vicinity of New Hope Church and Enon Church and along Stalking Head, Little Falling, and Falling Creeks and other streams. Many small areas about stream heads and along branches are too narrow to be shown separately on the map.

This land is very rough and broken. The streams have cut their courses to considerable depth below the tops of the ridges, which are very narrow crested, with steep and precipitous slopes. Many small gullies have been cut into these ridges, resulting in a surface so broken and dissected that there is little land suitable for cultivation. The soil is badly eroded and any attempt to cultivate it would only promote washing and gullying. There remains a thin growth of hardwoods, a good stand of merchantable timber having recently been removed.

The price of land of the Davidson clay, hilly phase, ranges from $3 to $7 an acre.

As this soil supports a heavy undergrowth of grasses and lespedeza, its use for pasture should prove profitable.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the typical Davidson clay:

Mechanical analyses of Davidson clay.

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.*
254708	Soil	0.8	5.2	4.6	22.2	10.8	18.2	38.3
254709	Subsoil	.6	2.4	2.4	11.8	5.8	17.5	59.5

IREDELL LOAM.

The surface soil of the Iredell loam typically consists of a dark-gray or slightly brownish gray to grayish-brown, mellow, friable loam, having an average depth of about 7 inches. The subsoil is a heavy, plastic or waxy, sticky clay, with a greenish-brown to yellowish-brown color, due to minute yellow, brown, and green mottling that is apparent under close examination. Generally the color becomes more greenish and less brownish with increasing depth, but the material is often more yellowish in the lower part. The olive-green cast, however, is present throughout the entire subsoil profile. The type in many places approaches the characteristics of the Mecklenburg loam, and some small areas of the latter type are included, mainly on knolls. The Iredell loam generally carries a slight scattering of stones, consisting of quartz and fragments of the parent rock, but there are some large stone-free areas. The stonier soil occurs near the Central of Georgia Railway in the northwestern extremity of the main area of the type. The quartz characteristically has a pinkish tint, in contrast to the milk-white color of that encountered in other soils.

The Iredell loam is derived exclusively through the weathering of dark-colored basic rocks, such as diabase and diorite, which are closely associated in position. Outcrops of diorite occur in a few places, and occasionally there is a scattering of partly weathered and rounded bowlders over the surface. Often the partially decomposed diorite or diabase is encountered within 3 feet of the surface. These rocks are cut by pegmatite dikes, which upon outcropping give rise to gravelly areas. Such areas are too small to map separately.

In addition to one or two small areas, the Iredell loam is mapped in an almost continuous area about three-fourths mile in width beginning 3 miles south of Monticello and extending in a southwesterly direction for a distance of 7½ miles through Gladesville. This area roughly includes that part of the county locally known as the glades or flatwoods. The surface is prevailingly low and flat, but is gently undulating in places. There are few well-defined stream channels, and drainage is only fair, on account of the lack of surface relief and the heavy, impervious structure of the subsoil, which interferes with the internal movement of moisture.

About 10 to 15 per cent of the total area of the Iredell loam is under cultivation. It is farmed chiefly by tenants. About 20 per cent of the type is in abandoned fields. The uncleared areas support a forest growth consisting predominantly of oak and hickory, with some shortleaf and loblolly pine. The undergrowth is chiefly broom sedge, Johnson grass, crowfoot grass, and lespedeza, the latter

being especially luxuriant in old fields and affording very desirable pasturage in good seasons. Cotton is the crop of first importance. It produces a rank growth of weed and yields one-fourth to one-half bale of lint per acre. Corn yields 12 to 40 bushels, and oats 20 to 40 bushels or more. Cowpeas yield one-half to 1 ton of hay per acre. The best yields are obtained in moderately dry seasons. The most commonly used fertilizer is 12 per cent kainit, of which the ordinary application is 200 pounds per acre. Cotton rusts badly on this soil, and the use of kainit tends to prevent this.

The selling price of land of this type ranges from $10 to $20 an acre.

The Iredell loam is best suited to the growing of hay and grain crops, in conjunction with stock feeding. In pasturing stock care should be taken not to have too many animals on the land in wet weather, as the soil is likely to puddle and become intractable. The type can be worked properly only within a narrow range of moisture conditions; its productiveness is impaired by plowing when too wet. This soil in Wilkes County has been improved by the growing of crimson clover. In deep plowing care should be taken not to turn too much of the heavy clay to the surface. The land should be plowed at different depths from time to time to prevent the formation of a plowsole, which may become very hard in soils of this character.

MECKLENBURG LOAM.

The surface soil of the Mecklenburg loam consists of a dark-brown to dark grayish brown, friable, mellow loam, extending to an average depth of about 7 inches. There is a distinct line of demarcation between the surface soil and subsoil. The latter typically begins with a light reddish brown color, and becomes more yellowish and less reddish with increase in depth, changing to yellowish brown, with an olive cast, below a depth of 18 inches. It consists of a stiff, heavy, plastic clay which extends without much change in texture to a depth of 36 inches or more. In many patches the subsoil is more reddish than typical, closely resembling that of the Davidson series, while on the other hand it grades imperceptibly in places into that of the Iredell loam. This type is intermediate in character between the Davidson and Iredell soils, and it includes small areas in which the surface soil is as red as that of the Davidson series or the subsoil as greenish as that of the Iredell. The soil in these small areas apparently is partly colluvial. Stones, consisting of fragments of the underlying rocks, occur in abundance in small areas.

The Mecklenburg loam is derived through the weathering of diorites and diabase, as are also the Iredell and Davidson soils. The ma-

terial has been oxidized more thoroughly than that giving rise to the Iredell soils, but to a less degree than that of the Davidson soils.

This type is not extensive. It is encountered in rather small areas in the flatwoods region, and occurs chiefly in the vicinity of Enon Church and Gladesville, in the southwestern part of the county. It has a more undulating topography than the Iredell loam, and is better drained, though the impervious subsoil somewhat retards the internal movement of moisture.

The greater part of the type is under cultivation. The common general farm crops are grown, and give about the same yields as on the Iredell loam. Alfalfa could probably be sucessfully produced on this soil.

The price of land of the Mecklenburg loam averages about the same as that of the Iredell loam.

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

Mechanical analyses of Mecklenburg 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.*
254701	Soil	15.4	9.8	3.9	16.5	19.4	27.2	7.6
254702	Subsoil	.2	.5	.7	8.0	7.8	32.9	49.9

CECIL STONY SANDY LOAM.

The Cecil stony sandy loam differs little from the Cecil sandy loam except in having large quantities of angular quartz stones scattered over the surface, through the soil mass, and occasionally through the subsoil. The fine earth of the soil consists of a gray to light brownish gray, loose, friable sand to loamy sand; the subsoil, occurring at an average depth of about 7 inches, is a light-red or brick-red, stiff, brittle, heavy clay which extends to depths considerably greater than 3 feet. Sometimes instead of the abrupt change from the surface soil to the subsoil there is an intermediate stratum, about 6 inches thick, of reddish to yellowish red, friable sandy loam to sandy clay loam. The stone content ranges from 20 to 60 per cent of the soil mass. In places it is almost impossible to bore into the material with a soil auger. The stones range from very small fragments to fragments about 12 inches in diameter, and average about 2 to 2½ inches, in greatest dimension.

The Cecil stony sandy loam is mapped in two sections of the county. The area in the southeastern part, in the vicinity of Henderson School, represents the western extension of a development lying mainly in Putnam County. In this area the stones are gen-

erally of the larger sizes, and the soil is derived from a granitic gneiss. The largest area of the type is mapped between Shady Dale and Aikenton. The origin of the soil in this vicinity is not definitely known, but much of the sandy material is believed to be due to disintegration of the quartz.

The type occurs principally on conspicuous, wide ridges, slightly higher than the surrounding country. Small lateral drainage ways cutting back into the ridges form deep, narrow valleys, and the topography is in general rolling. Surface drainage is well established, but crops suffer in wet seasons as on the Cecil sandy loam.

The Cecil stony sandy loam is unimportant because of its rather small extent. All the areas are cleared of the native growth of shortleaf pine and hardwood, and are devoted to the crops commonly grown in the county. The stones interfere seriously with tillage operations, especially where there is a sufficient content of small-sized stones to make the soil hard and gravelly. Crop yields are somewhat lower than on the Cecil sandy loam.

The price of land in the Cecil stony sandy loam ranges from $15 to $25 an acre, depending upon the location and improvements. There are few well-developed farms on this type.

CECIL SANDY LOAM.

The surface soil of the Cecil sandy loam is a gray to light brownish gray, moderately loose, friable sand to loamy sand with an average depth of 7 or 8 inches. In some places the lower part of the surface soil is yellowish gray. The subsoil typically begins as a reddish to yellowish-red, heavy sandy loam or sandy clay loam, and at a depth of about 12 inches abruptly changes to a red or brick-red, heavy, brittle, stiff clay, which is somewhat tenacious and plastic when wet. In some places the light sand soil rests directly upon the red, heavy clay. There is a scattering of quartz stones in places, but areas containing a considerable quantity of stones are separated as the Cecil stony sandy loam.

As mapped the Cecil sandy loam grades in some places into the heavier Cecil sandy clay loam, and in other places into the Appling sandy loam, which is characterized by a mottled red and yellow subsoil. Small areas of Cecil sandy clay loam and Appling sandy loam are included. The surface soil in many places approaches a fine sandy loam, and in the vicinity of Hardys Store, in the western part of the county, it is a typical fine sandy loam over a total area of about 250 acres.

The Cecil sandy loam is largely confined to the northern part of the county, where it occupies irregular areas, in a strip extending in a northeast-southwest direction. The type occurs most extensively

in an ill-defined section between the Alcovy River on the west and Hardys Creek and Barnes Mountain on the east, extending from the Central Georgia Power Company Reservoir to a point near the Morgan County line at Newborn. In this region it is typically developed in large areas. The soil is derived through the weathering of various kinds of acidic rocks which are more or less closely associated. They consist of massive, hard, fine-grained biotite granite or granitic gneiss, a coarse-grained to porphyritic and a porphyritic biotite gneiss, and a very finely laminated mica schist. The rocks flare abruptly to the east at Prospect Church, and give rise to a large area of typical Cecil sandy loam in that vicinity. Numerous rock outcrops occur near Rock Hill School.

A second important group of areas of this soil lies about 3 miles farther east, extending in a similar northeast-southwest direction from the vicinity of Bethel Church to Calvin, following the outcrop of a medium-grained biotite gneiss, from which the type is derived.

Large and important areas occur in the vicinity of Shady Dale, Kelly, and Farrar, and as far to the northeast as the Morgan County line. In these areas the type is derived in part from granitic gneisses and in part from a laminated formation of gneiss, mica schist, and hornblende schist. It is developed where the more acidic rocks predominate. The soil in this region contains considerable fine material in the surface layer and in patches of an acre or less may approach the dark color of the Davidson clay loam. A few small areas of the type occur scattered through the southern part of the county, where they owe their origin to small areas of granitic gneiss cutting through the predominating rocks.

The Cecil sandy loam in general has an undulating to rolling topography. It occupies relatively smooth positions, such as the crests of divides, and where the surface features become more or less broken gives way to the Cecil sandy clay loam. In the vicinity of Rock Hill School, however, the surface is strongly rolling. The relief in places is sufficient to make terracing advisable, but it is not necessary to have the terraces as near together as on some other types. Surface drainage is good, but the internal drainage is not so complete. The moisture is readily absorbed by the open surface material, but it is checked by the heavy subsoil, and crops suffer considerably in wet seasons. Best yields are obtained in years of moderate rainfall.

The Cecil sandy loam is practically all cleared of the native forest growth of shortleaf pine and hardwood, principally oak and hickory, and is used for the production of the staple crops. Cotton is the chief crop. In favorable years it yields one-fourth to three-fourths bale per acre, but in wet years the yields are considerably lower. Corn

yields 8 to 25 bushels per acre, and oats 15 to 30 bushels. Cowpeas produce one-third to 1 ton of hay per acre.

Land values on the Cecil sandy loam range from $15 to $40 an acre, depending mainly upon location and improvements.

The Cecil sandy loam is a valuable type, and it supports a number of well-improved farms. The soil is easily handled with light implements, and can be worked under a wide range of moisture conditions. Its greatest need is thorough preparation of the seed bed and an increase in the supply of organic matter. The soil is equally suited for general farming and for the growing of special crops, such as truck, peaches, and tobacco.

CECIL SANDY CLAY LOAM.

The surface soil of the Cecil sandy clay loam consists of about 2 to 4 inches of light brownish-gray to grayish-brown, friable loamy sand, resting upon a reddish-brown to red, friable, heavy clay loam which continues to a depth of about 7 inches. In plowed fields the surface material consists of a grayish-brown to grayish-red, friable, mellow sandy clay loam. The subsoil, beginning at about 7 inches and extending to a depth of 3 feet or more, consists of a light-red or brick-red, heavy, stiff, brittle clay, which is more or less sticky and plastic when wet. The type, except in small areas shown on the map by stone symbols, contains little stone. These stony areas occur mainly in the vicinity of Aikenton.

The type as mapped includes some variations from the typical. Some areas consist of patches of Cecil sandy loam and clay loam too closely associated to be separated satisfactorily. This type is intermediate between the Cecil sandy loam and Cecil clay loam, and grades in places toward the characteristics of one or the other. It may include typical developments of each of these types, which are not mapped separately on acount of their small extent. In a number of areas of considerable size the soil resembles a sandy phase of the Davidson clay loam, especially in the color characteristics of the surface soil and subsoil. Such areas are presumably influenced by a predominance of basic rocks in the formation that gives rise to this type, or by narrow intrusions of basic rocks. These various included areas are scattered through the type in the north-central part of the county.

The Cecil sandy clay loam is an extensive soil. It occurs in two principal developments. The largest begins in the west-central part of the county, near Wallers Academy, and extends northeastward across the county to the Morgan and Putnam County lines, gradually increasing in width toward the northeast. The soil is typically developed in the vicinity of Sardis Church, Blackwell, Shady Grove Church, Aikenton, Shady Dale, Kelly, and Farrar. The type in this

part of the county owes its origin to the weathering of an interlaminated formation of basic and acidic rocks, the latter predominating in most places. Occasionally intrusions of gneiss occur.

The type also is encountered in a strip about 3 miles wide along the western boundary of the county, reaching from the Central Georgia Power Company Reservoir to the vicinity of Murder Creek Church. Here it is residual from associated fine and coarse grained biotite gneisses, a biotite gneiss of porphyritic structure, and a mica schist. Erosion is to some extent responsible for the development of the type in this section, having removed a part of the surficial sands which would otherwise have given rise to the closely associated Cecil sandy loam.

Smaller areas of the type are mapped in the southeastern part of the county, near Henderson School and along Goolsby Branch. In these the type appears to be derived from granite gneisses. Small areas occur also in the northern half of the county.

This type has a gently rolling to rolling topography. It occupies smooth divides and more or less steep slopes. In general, where the surface becomes broken the type gives way to the Cecil clay loam, owing to the removal of the sandy surface material by erosion, while in situations where the topography is favorable for the accumulation of sand the Cecil sandy loam is developed. In some places, however, the contributing rocks themselves contained only a small proportion of sandy material. The areas of the type in the northwestern part of the county are more or less broken and hilly, and are separated as a hilly phase. Surface drainage is adequate over all the type. The run-off is rather rapid, and close terracing is generally needed to prevent injurious erosion.

The Cecil sandy clay loam is one of the important soils of Jasper County, and approximately 90 per cent of it is cleared and in cultivation to general farm crops. It was originally covered with a heavy growth of shortleaf pine and hardwood, chiefly oak and hickory. Cotton, the chief crop, gives an average yield of about one-half bale per acre, but yields as high as 1 bale are sometimes produced. Corn yields 10 to 30 bushels per acre, oats 15 to 40 bushels, and cowpeas one-half to 1 ton of hay.

This soil is a desirable intermediate type between the light Cecil sandy loam on the one hand and the heavy Cecil clay loam on the other. Crops are not damaged so severely by excessive rainfall as on the sandy loam, and do not suffer so readily from drought as on the clay loam. The type is also intermediate between these soils in the labor required in its preparation and tillage, as well as in the range of moisture conditions under which the soil can be worked. There are many well-established farms on this type.

Land values range from $15 to $60 an acre, depending chiefly upon location and improvements.

For its improvement the type is mainly in need of deeper plowing, the incorporation of organic matter, the rotation of crops, and the prevention of erosion.

Cecil sandy clay loam, hilly phase.—The Cecil sandy clay loam, hilly phase, is separated from the typical soil on a basis of topography, which has a considerable influence on the agricultural value of the land. The phase consists of a grayish-brown, friable sandy loam underlain at a depth of 2 or 3 inches by a heavy sandy clay or red, stiff clay. This gives way to a red, stiff, brittle clay which extends to a depth of 3 feet or more. The material is residual from gneiss and mica schist, as is the typical Cecil sandy clay loam in the northwestern part of the county.

This phase is of small extent, being confined to the northwestern part of the county in the vicinity of Waters Bridge. Its distinctive feature is its broken and hilly topography. The slopes are rather long and steep and more or less broken and gullied by erosion and by short lateral streams which deeply dissect the surface. Only small patches of soil can be cultivated profitably. Very little of the land is cleared. It is covered with a heavy growth of shortleaf yellow pine and oak, hickory, and other hardwoods. The phase can best be used for pasture.

The selling price of land of this phase ranges from $5 to $10 or more an acre.

CECIL CLAY LOAM.

The Cecil clay loam typically consists of a brownish-red, friable clay loam, changing abruptly at a depth of 5 to 7 inches to a subsoil of light-red or brick-red, stiff, heavy, brittle clay which continues to considerable depths below the 3-foot soil profile. Except in a few patches the type is rather free from stones.

This type in some places grades toward the Cecil sandy clay loam and in others toward the Davidson clay loam. These gradations are often intricately associated in small areas, and the type as mapped includes patches of each of these soils, especially in an area roughly forming a triangle and extending from Maxwell to the Morgan County line between Newborn and Broughton. The boundary lines of some areas of the type are in places largely arbitrary, on account of its gradual merging into the Cecil sandy clay loam and Davidson clay loam. There are some included strips of Davidson clay loam, too small to be shown on the map. These are due to intrusions of dark-colored basic rocks. Some patches of soil of mixed derivation, formed from granitic gneiss cut by hornblende schist, and occurring in narrow strips, also are included. In these the soil varies in character-

istics about equally between the Cecil and Davidson series. In a few small areas the soil has all the characteristics of the Davidson clay loam, but owing to the presence of granitic gneiss in these areas they are mapped as the Cecil clay loam on account of the derivation of the material. Some small areas of typical Cecil clay are included with the Cecil clay loam, on account of their small extent. These consist of 2 or 3 inches of brownish-red clay loam underlain by the typical red, heavy clay subsoil. Such areas occur along the upper course of Pittman Creek near Newborn and at various other places, especially along the slopes of streams.

Areas of the Cecil clay loam occur in all sections of the county, but most extensively in the northern part. Its largest development is in a strip 3 to 4 miles wide beginning along Murder Creek, near Maxwell, and extending to the Morgan County line between the various branches of Pittman Creek. Large areas occur also in a strip about $2\frac{1}{2}$ miles wide beginning near Willow Spring School and extending northeastward to Murder Creek, between Calvin and Murder Creek Church. Here the Cecil clay loam is typically developed in the vicinity of Warren Academy, Concord Church, Benton Store, and Liberty Church. Considerable areas are encountered just northwest of Monticello, along Shoal Creek, along Turkey Creek, and northwest of Mobley Bridge.

About 90 per cent of the type in the areas mentioned above is derived from a closely laminated formation of biotite gneisses of various textures, hornblende schist, and mica schist. Erosion has been instrumental in the formation of the heavy textured surface soil, through the removal of the surficial sands. The areas along the western county line, near Bethlehem Church and along Rocky Creek, apparently are derived through the removal of the sandy material from a residuum of weathered biotite granitic gneisses. The scattered areas in the southern part of the county are of more or less mixed derivation, as the granitic gneisses and hornblende schists are closely associated. In such cases the character of the soil material is naturally influenced by the close presence of the dark-colored basic rock.

The surface of the Cecil clay loam is generally rolling. There is little level to gently undulating land except on the crests of some of the wide ridges. The type occupies rounded ridges, with long and more or less regular slopes. The surface relief induces thorough drainage, and terracing is necessary throughout the type to prevent injurious erosion.

The Cecil clay loam originally supported a forest growth consisting predominantly of hardwood, mainly oak and hickory, with some shortleaf and loblolly pine. Practically all the timber has been removed, except on the steeper slopes immediately along the stream courses. The land is used for the production of the staple crops,

cotton, corn, oats, and hay. Alfalfa is grown successfully in several places. The agricultural conditions on this soil are generally good. The type supports a number of well-equipped farms.

Cotton yields range from one-fifth to as much as 1 bale per acre, averaging about one-half bale. Corn ordinarily yields 10 to 30 bushels, with as much as 50 bushels per acre in exceptional cases. The average yield of oats is about 15 to 18 bushels per acre. Sixty bushels have been produced under favorable conditions and with proper handling of the soil. Cowpeas yield from one-half to 1 ton of hay per acre.

The Cecil clay loam is considered a strong and productive type for cotton, grain, and forage crops. On account of its heavy texture strong implements and work stock are required to properly prepare the seed bed. The soil can be worked under only a narrow range of moisture conditions. When plowed while wet it forms clods which are difficult to break down, and when dry the soil is hard and difficult to turn. The crops yield best in years of abundant rainfall.

The price of land of the Cecil clay loam ranges from $15 to $60 an acre, depending upon the location and improvements.

Crops on this type suffer from drought, although the soil is retentive of moisture. This presumably is caused by shallow plowing and by lack of organic matter in the soil, which causes it to become hard and retards the absorption of moisture. Deep plowing and the turning under of coarse vegetable matter would be beneficial.

Cecil clay loam, hilly phase.—The soil of the hilly phase is identical with that of the typical Cecil clay loam. The areas of the phase, however, contain a larger percentage of soil material which closely approximates the Davidson clay loam and clay. This material occurs along streams in small areas, and on the whole makes the soil one of rather mixed composition. Its occurrence is due principally to narrow intrusions of diorite and hornblende schist through the granitic gneiss and aplitic granite which give rise to the phase.

The hilly phase of the Cecil clay loam is not extensive. The largest area is a strip about three-fourths mile wide extending along the Ocmulgee River from Goodman Ferry to a point near Willow Spring School. Another area begins near Old Dempsey Ferry and extends along the Alcovy River for about 3 miles. A third area occurs near Mobley Bridge, in the northeastern part of the county.

The distinctive feature of the phase is its rough and broken surface. It occupies narrow-crested ridges with steep slopes which are cut by narrow, deep ravines. Small, narrow crests of ridges constitute the only land suitable for cultivation. The drainage is thorough to excessive.

A very small percentage of the phase is cultivated. It supports a scattered growth of oak, hickory, shortleaf pine, and loblolly pine,

and is largely used for pasture. This is the best use to which it can be put.

The price of this land ranges from $2 to $5 an acre.

DURHAM SANDY LOAM.

The Durham sandy loam has a surface soil of gray, loose sand to light loamy sand, passing into a yellowish-gray loamy sand or light sandy loam at 4 to 6 inches. The subsoil consists of a yellow sandy loam in the upper part, passing at about 12 to 20 inches into a bright-yellow friable sandy clay. The type in places varies toward the Appling sandy loam, the lower part of the subsoil showing slight mottlings of faint red and gray. The soil is generally free from stones.

This type is most extensive in the northwestern part of the county. Several areas are mapped between Benton Store and Eudora and about 1 mile northwest of Murder Creek Church. A typical, fair-sized area occurs about 1 mile southeast of Machen. The origin of the soil is doubtful, as no rocks are exposed in the areas of the type, except near Murder Creek Church, where a fine-grained biotite gneiss frequently outcrops.

The Durham sandy loam occupies smooth to gently undulating areas with sufficient surface relief to afford fair run-off. The internal drainage is deficient, and in wet seasons the soil becomes water-logged and crops are seriously injured. The best yields are obtained in years of moderate rainfall.

This type is not important, on account of its small extent. It is all cleared of the native growth of shortleaf yellow pine and hardwood and used for the production of the staple crops. Cotton yields one-sixth to one-half bale per acre, corn 8 to 25 bushels, and oats 15 to 30 bushels.

The price of land of the Durham sandy loam ranges from $15 to $25 an acre, depending upon the location and improvements.

This soil is primarily adapted to early trucking. In certain other States it is used for early truck crops as well as for bright-yellow tobacco. Crops require rather liberal fertilization with a high-grade mixture, which is best distributed in several applications during the growth of the crop. The principal need of the type is the incorporation of organic matter.

APPLING SANDY LOAM.

The surface soil of the Appling sandy loam is a gray to brownish-gray, loose, friable sand to loamy sand. The subsoil begins as a pale-yellow, friable sandy loam and passes at about 20 inches into a light sandy clay of mottled red and yellow color, or yellow mottled with red. With increased depth the material becomes heavier and more

reddish. Except for occasional scattered rock fragments and a few stony areas the surface is generally stone free.

This type grades into the Cecil sandy loam in some places and into the Durham sandy loam in others, and as mapped includes small areas of each. The patches of Cecil sandy loam occur on small knolls, and the patches of the Durham in low places. In some of these gradational areas the subsoil does not have the red color typical of the Cecil series, the material having rather a salmon tint.

The Appling sandy loam is not an extensive type. It occurs principally in the northern part of the county, in the vicinity of Murder Creek Church and Rock Hill School. Smaller areas are mapped in the vicinity of Bethel Church, Kitchens Store, northwest of Waters Bridge, and near Machen and Shady Dale.

In the largest areas the type is derived from variously textured gneisses and included mica schist. In the small areas it is derived from different rocks and its characteristics appear to be due to uneven oxidation or leaching.

The surface of this type is in general irregular or choppy, the areas occupying many low knolls and corresponding depressions. On the whole the land is rolling, and surface drainage is complete. The internal drainage is not so thorough, as the moisture entering through the loose and open surface soil is checked by the compact substratum, causing crops to be materially damaged in wet seasons.

The Appling sandy loam is relatively unimportant, on account of its small extent. Nearly all of it is cleared of the native forest growth, consisting of shortleaf and loblolly pine and hardwood, such as oak and hickory. The type is used for the general farm crops commonly grown in the county, and the yields are about the same as on the Durham sandy loam.

Land values range from $15 to $25 an acre.

Appling sandy loam, hilly phase.—The surface soil and subsoil of the Appling sandy loam, hilly phase, are about the same as those of the typical soil. The phase, however, is derived from an aplitic granite, closely associated with hornblende schist. It occupies the narrow crest of a hilly area in the southwestern part of the county, occurring along the public road leading to Goodman Ferry, between Rush Creek and Long Branch. Practically all the land is cleared and under cultivation. Yields of all crops are about the same as on the Wilkes sandy loam.

Land of this phase is valued at $5 to $7 an acre.

WILKES SANDY LOAM.

The surface soil of the Wilkes sandy loam is somewhat variable, but in general consists of a gray or grayish-yellow to brownish-yellow loamy sand to light sandy loam, 5 to 8 inches deep. The subsoil

is typically developed in two sections. The upper part usually is a yellowish to brownish-yellow sandy loam, quickly grading either into a friable sandy clay or into a heavy, friable, stiff clay, having a small content of sandy material and containing more or less disintegrated rock. This friable clay grades into a layer of stiff, plastic, sticky or waxy clay, which has a minutely mottled coloring of brown, yellow, and green. This very impervious layer may occur at any depth in the soil section or may be lacking, disintegrated rock material taking its place. Included with this type are some areas of Appling, Cecil, and Mecklenburg soils too small to map separately. The type is generally free from stones, but over small areas there is a scattering of small quartz stones and fragments of the underlying rocks.

The Wilkes sandy loam is derived from an admixture of rocks, the soil profile including two layers which are widely different in physical and chemical composition. The underlying rock formation consists of a light-colored granite-gneiss composed chiefly of quartz and feldspar,[1] with little or no mica, interlaminated with a dark-colored hornblende schist. The whole formation is cut by dikes of diabase or diorite as well as by dikes of feldspar and pegmatite. The light sandy material of the upper part of the soil section is derived chiefly from the granitic gneiss, feldspar, and pegmatite, while the heavy, intractable clay has originated from the hornblende schist, diabase, and diorite. A narrow dike of dark-colored rock, hornblendite, has also entered into the composition of the soil.

The Wilkes sandy loam occurs in the southwestern part of the county in a strip of large, disconnected areas extending in a northeast-southwest direction, beginning in the vicinity of Philadelphia Church and continuing to the southwestern corner of the county. Typical areas are encountered in the vicinity of Philadelphia Church, Tyler Crossroads, Oak Grove School, and Enon Church.

The surface ranges from sharply rolling to steep and hilly, becoming more rough and broken toward the southwestern corner of the county. The type occupies small, rounded hills formed by numerous gullies and branches. The areas along and south of Crow Branch are badly eroded, and only patches of 5 to 10 acres are suitable for farming. The type naturally has good surface drainage, but owing to the heavy, plastic nature of the subsoil the internal drainage is rather poor. The soil becomes very hard on drying after rains. The best yields are obtained in years of moderate rainfall with frequent showers.

The Wilkes sandy loam is not an important agricultural type, owing chiefly to its unfavorable topography, and only about 1 per cent of it is farmed. The native timber growth, consisting of oak,

[1] Referred to as aplitic granite. Bul. 39, Georgia Geological Survey.

hickory, and some shortleaf pine, has been removed, but there is a scattered growth of old-field pine, with a scrub growth of haw, blackjack oak, persimmon, and other trees, with an undergrowth of broom sedge, Bermuda grass, and lespedeza.

Cotton yields one-sixth to one-fourth bale per acre, corn 7 to 12 bushels, and oats about 10 to 12 bushels. Fertilizers of low grade commonly are used on cotton, but corn and oats are not fertilized. Cotton rusts and corn turns yellow in prolonged wet or dry seasons. Good yields are obtained only under the best moisture conditions. Farming in general is comparatively difficult on this type.

The average selling price of this land is about $7 an acre. Much of it is fenced in large pastures.

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

Mechanical analyses of Wilkes sandy 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.*
254712	Soil	4.6	10.2	7.4	35.8	15.5	19.8	6.9
254713	Subsoil	3.1	4.4	2.8	14.4	9.8	31.4	34.0

DEKALB STONY SANDY LOAM.

The surface soil of the Dekalb stony sandy loam consists of a light-gray to yellowish-gray loamy sand to loam, averaging about 7 inches deep. The subsoil begins as a pale-yellow fine sandy clay to silty clay loam. It gradually becomes heavier and somewhat more compact, and below a depth of about 15 inches is a yellow silty clay containing a small percentage of sand. There is a general friability to the subsoil as a whole. The lower subsoil in some small areas is yellowish red, or yellow with mottlings of red. Blocklike fragments of the underlying rock are scattered thickly over the surface, and are so abundant through the surface soil and subsoil that it is practically impossible to penetrate to any considerable depth with the soil auger. In the southern part of its development the type includes many outcrops of the vitreous quartzite formation to which the soil owes its origin.

This type is of small extent, but it is rather conspicuous on account of its contrast to the other soils of the county. It occurs in the northwestern part, occupying a narrow-crested, steep-sided ridge which extends southwestward from a point near Eudora for a distance of 2½ miles. The ridge terminates abruptly, but about 2½ miles from it, in the vicinity of Edwards Store, an extension occurs in the form of a small area which lies in a straight line with the axis

of the main ridge. The main development rises 50 to 150 feet above the surrounding country, and is a conspicuous topographic feature, known as Barnes Mountain. Owing to the heavy covering of stones, the run-off is not very rapid, and erosion is not serious in the few cultivated patches. The land is not favorably situated for cultivation, and only a small acreage on the northwestern end of the ridge and along the lower slopes is farmed. Most of the type is covered with a heavy growth of hardwood, chiefly oak and hickory, with some shortleaf yellow pine.

The selling price of this land is comparatively low.

With good marketing facilities it is probable that this type could profitably be used for the production of peaches.

LOUISA CLAY LOAM.

The Louisa clay loam is characterized by a surface soil of brownish-red to red, friable clay loam 6 to 8 inches deep. There is a veneering of fine sandy loam, about 2 inches thick, over the surface. The subsoil typically consists of a light-red or brick-red, friable, stiff clay, which often becomes lighter red as the depth increases. It commonly grades into the underlying rock at depths ranging from 18 to 36 inches. Both surface soil and subsoil are somewhat slick and greasy to the feel, owing to the presence of small mica particles.

Near Warren Academy there is an appreciable quantity of quartz gravel over the surface of the type, and the surface soil varies between a heavy fine sandy loam and a clay loam. In the area near Keys Store the surface soil is a heavy clay loam, and the color is darker red than the typical. In small included areas the soil ranges to a fine sandy loam, loam, and sandy clay loam.

The Louisa clay loam occurs only in the northwestern part of the county, between Herds Creek and the Alcovy River. It is encountered mainly in a strip about 5 miles long and two-fifths mile wide, beginning at the southern end of Barnes Mountain and extending in a general northeast and southwest direction to a point within one-half mile of the Central Georgia Power Co. Reservoir. Smaller areas are mapped near Keys Store, at the head of Hardys Creek, and between Eudora and Kitchens Store.

The type follows the development of a mica schist. In its principal area it is derived from this rock exclusively, but the smaller areas appear to be derived from an interlaminated formation in which the mica schist becomes thicker and outcrops. Fragments of this rock, generally small, are scattered over the surface and through the soil material. Mica scales occur throughout the soil mass.

The surface of the Louisa clay loam is rolling. The type occupies many knolls and ridges somewhat higher than the immediately surrounding country. The land is not too rough for farming, but the

run-off is rapid in places, and terracing or ditching to prevent erosion is advisable.

Practically all the Louisa clay loam is cleared of the native forest growth, consisting of oak, hickory, and shortleaf pine, and is used for the production of the staple crops of the county. Cotton produces one-fourth to one-half bale per acre, the yields depending upon the season, treatment, and local variations in the soil. Corn yields 8 to 20 bushels per acre, and cowpeas one-fifth to one-half ton of hay. Oats give low yields. Most of the type is farmed by tenants. The type as a whole does not seem to be so strong and productive as the Cecil or Davidson soils.

The average price of land of this type is about $15 to $18 an acre.

MOLENA SANDY LOAM.

The Molena sandy loam typically has a surface soil of brownish-red to dark reddish brown, friable, mellow loamy sand, extending to a depth of 6 to 8 inches. The subsoil varies from a red loamy sand to a dark-red heavy sandy loam. The material gradually becomes heavier as the depth increases, and below an average depth of about 18 inches is a dark-red, heavy sandy clay. This heavier material may be encountered at any depth from 12 to 30 inches, and in some places it is lacking. The nearer it approaches the surface the more valuable is the land for general farming. In some small areas the sandy loam material, constituting the lighter part of the subsoil, continues to a depth of 3 feet or more. Such areas represent developments of the Molena loamy sand.

The Molena sandy loam as mapped is rather uniform in general characteristics, but in one area near Bridges Ferry it consists predominantly of a dark-gray or brownish-gray loamy sand underlain at a depth of 7 or 8 inches by a reddish-yellow to yellow sand or slightly loamy sand. The material is very loose and incoherent and naturally droughty.

The Molena sandy loam occurs in the southwestern part of the county. The largest area is mapped between Goodman Ferry and Oak Grove School. Other areas occur between Waits Ferry and Bridges Ferry. All the areas are near the bottom lands of the Ocmulgee River, but generally lie about 100 feet above the stream. The type occurs on the tops of the highest hills in the vicinity, and with descent of the slopes gradually gives way to heavy clays which are residual from underlying rocks. The soil may be influenced by residual material about the margins of the areas. Between Waits Ferry and Bridges Ferry a small area occurs along a slope, and it is probable that the material which would otherwise give rise to this type on the crest of the hill has here been removed. The Molena sandy loam is identical in appearance with the Greenville sandy

loam of the Coastal Plain region of the State, and the occurrence of the type on the gently undulating crests of high hills suggests that it represents isolated areas of Coastal Plain material that has escaped erosion.

The type occupies smoothly undulating areas which either terminate in a gentle slope or suddenly end in a rather steep slope. In the latter case the soil of the slope is residual from the underlying rocks, as this type is confined to the smoothest topographic situations. Its smooth, even surface is in contrast to the angular, broken topography of near-by hills of residual soils. Surface drainage is well established, but the underdrainage is not so thorough, and in wet seasons the soil absorbs sufficient moisture to drown growing crops. The best yields are obtained in years of moderate rainfall.

All the type is cleared of its original timber growth and devoted to the general farm crops. The type is of considerable importance; it constitutes almost the only smooth, tillable land in the region where it occurs. Cotton yields one-fifth to one-half bale per acre with an acreage application of about 200 pounds of an 8–2–2 fertilizer. Corn yields 8 to 15 bushels per acre in favorable seasons without the use of fertilizer. Oats yield from 8 to 15 bushels per acre. Wheat does not do well on this soil.

Land of this type is held at $15 to $30 an acre. This soil is in need of organic matter. The growing of leguminous crops is an effective means of supplying this constituent.

The results of mechanical analyses of samples of the soil and subsoil of the Molena sandy loam are given in the following table:

Mechanical analyses of Molena sandy 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.*
254705	Soil	1.0	27.8	22.6	27.4	5.4	8.0	7.8
254706	Subsoil	1.2	23.4	17.6	22.7	4.4	10.4	20.3

CONGAREE FINE SANDY LOAM.

The surface soil of the Congaree fine sandy loam typically consists of a yellowish-brown to grayish-yellow, mellow, friable fine sandy loam, with a large content of finely divided mica flakes. It is 7 to 10 inches deep, averaging about 8 inches. The subsoil differs little from the surface soil except in some small areas, in which it is slightly heavier and more brownish. The type as mapped includes small areas of fine sand immediately along the banks of the river as well as unimportant developments of heavy silty clay loam in sloughs, and of sand and coarse sand on small ridges. Strata of sands, clays, and other material occasionally are encountered in the soil profile.

The Congaree fine sandy loam occurs in narrow strips in the bottom lands of the Ocmulgee River in the southwestern part of the county. It is typically developed between Bridges Ferry and Waits Ferry, and at Goodman Ferry, Smith Ferry, Giles Ferry, and Pittman Ferry.

The type occupies flat areas which are sufficiently elevated above the stream to have good drainage in seasons of moderate rainfall. A few areas, including those at Smith Ferry and Waits Ferry, lie above the highest flood stages of the river, and in some measure resemble terraces, or second bottoms.

The Congaree fine sandy loam is a desirable soil, but owing to its small extent it is not important in the agriculture of this county. More than 80 per cent of its area is under cultivation to the general farm crops. The uncultivated part supports a scattered growth of loblolly and shortleaf pine, with some hardwood, and is used for pasturage. Bermuda grass, lespedeza, and other native grasses grow luxuriantly.

Cotton and corn are the principal crops grown. Cotton yields one-third to three-fourths bale per acre and corn 15 to 40 bushels. Cotton does not make so rank a growth as on the other soils of this series. Only a very small acreage has been devoted to small grains, although oats and wheat have produced fair yields. All crops do best in years of moderate rainfall. Yields may be greatly reduced by floods. About the same fertilizers are used for cotton as on the uplands. Phosphoric acid commonly is applied to hasten the maturity of the crop.

The selling price of this land ranges from about $20 to $40 an acre.

CONGAREE SILTY CLAY LOAM.

The surface soil of the Congaree silty clay loam consists of about 8 to 12 inches of heavy, friable, and somewhat mellow, silty clay to silty clay loam, of a brownish-red to dark reddish brown color. The subsoil does not differ appreciably from the surface soil, except that it contains dark grayish brown streaks in the lower part in places. In a few small areas there is more or less sand on the surface, deposited during the high-water period of 1916. Where the type grades into areas of Meadow (Congaree material) it varies from the typical in places. Small areas of this soil are included with the Meadow.

Included with this type are two bodies of Congaree silt loam, one at Waits Ferry and the other about 2 miles south of Bridges Ferry. The surface soil here is a brown, mellow silt loam. The Congaree silty clay loam occurs almost exclusively along streams flowing

through regions of heavy soils, such as those of the Davidson series, in the southern part of the county. The uniformity in the texture of the material is principally due to the homogeneity of the contributing upland soils. Since there are few areas of sandy upland within the drainage area of the streams, there has been little opportunity for the bottoms to become "sanded" or for an appreciable content of sand to have become intermixed with the material.

The largest area of this soil occurs along Murder Creek from the vicinity of Maxwell to the Putnam County line. The type is also found along the tributaries of Murder Creek, such as Shoal, Whiteoak, and Wolf Creeks. Large areas are mapped along Cedar Creek and its tributaries, as well as along Falling, Little Falling, and Stalking Head Creeks and many small branches in the southern part of the county. The type occupies strips of bottom land varying from 100 to 2,000 feet in width. The areas are low and flat, and are subject to overflow following heavy rains. From indications on the trunks of trees, the type along Murder Creek is sometimes inundated to a depth of 15 feet. Except during high-water periods the land is sufficiently well drained to be cultivated. It requires a 3 or 4 foot rise of the stream to overflow this soil.

This is apparently the strongest and most productive type in the county for such crops as corn, oats, and hay, but owing to the danger of overflow only about 5 per cent of its total area is under cultivation. The type supports a more or less thick growth of sycamore, gum, shortleaf pine, hackberry, haw, ironwood, ash, white oak, water oak, chestnut oak, hickory, elm, poplar, and other trees. The areas of more open growth are used for pasture, as Bermuda grass and many other native grasses flourish. The type is used to some extent for the production of corn, and oats, sorghum, and cowpeas are grown in a small way. Corn yields 20 to 40 bushels per acre, oats 30 to 40 bushels, and cowpeas three-fourths ton to 1½ tons of hay per acre. No fertilizers are used on this soil.

If this type could be drained at a reasonable cost its reclamation would be profitable, as it would constitute probably the strongest soil in the county for small grains and forage crops.

MEADOW (CONGAREE MATERIAL).

The areas mapped as Meadow (Congaree material) represent Congaree soils so intricately mixed that their separation into distinct types is impracticable. The predominating soil is the Congaree sandy loam, which has a surface soil of grayish-brown to reddish-brown, friable, mellow sandy loam extending to a depth of 8 inches and underlain by a more or less stratified subsoil of predominantly sandy and clayey material. In some places the soil is a sandy loam

from the surface to a depth of at least 3 feet, while in other places the surface material is underlain by a friable, mellow silty clay. There are also included typical and partly typical areas of fine sandy loam, loam, and silty clay loam, as well as "sand flats," which consist of recently washed-in sands without distinct soil characteristics. These sand areas have a barren appearance, and constitute the poorest agricultural land included. They are not extensive, but occur at various points along White Creek and Wise Creek and its branches. The flood waters which swept over the type in 1916 made large deposits of sand in places, which changed the natural character of the soils. Much valuable bottom land was practically ruined by this so-called "sanding."

Meadow (Congaree material) occurs along those streams which flow through areas of sandy soils. It is developed principally in the northern part of the county, and to a smaller extent in the western part. Typical areas occur along Crow, Wise, Herds, Rocky, Popes, Lowry, Broddus, Jack, and Pittman Creeks, upper Murder Creek, and the tributaries of these streams.

This type is encountered in low, flat bottomland positions. In ordinary seasons the drainage is sufficient to permit the growing of crops, but in wet seasons the entire area is covered by overflow waters.

About 40 per cent of this land is cultivated, chiefly to corn and forage crops. Corn yields 20 to 35 bushels per acre, and cowpea hay three-fourths to 1 ton. No fertilizers are used on this soil. A part of the type is used as pasture and for growing native hay. The uncleared areas along the larger streams support a heavy timber growth, similar to that on the Congaree silty clay loam, while along the smaller streams and especially in or near the so-called sand-flat areas there is a larger proportion of willow and alder, with some oak and other trees.

The selling price of this land varies with that of the surrounding uplands.

With deepening of the stream channels and the establishment of better drainage, so as to prevent inundations and consequent loss of crops, this would be a valuable soil for the production of corn and forage crops.

SUMMARY.

Jasper County, Ga., is situated in the central part of the State. It lies in the Piedmont Plateau, and has a typically rolling topography. There are some hilly and broken areas as well as inextensive "flatwoods," or "glades." The county has a total area of 377 square miles, or 241,280 acres.

Drainage is thoroughly established through an intricate network of streams tributary to the Oconee and Ocmulgee Rivers. Murder

Creek, which flows eastward to the Oconee River, is the largest stream in the county.

The population of Jasper County in 1910 was 16,552, averaging 51.6 persons to the square mile. It is all classed as rural. Monticello, the county seat, had a population of 1,508 in 1910. It is the chief trading point for the county. Shady Dale, Machen, and Hillsboro are small towns and trading points of local importance.

Jasper County has fairly good railroad facilities, and public roads, generally kept in fair condition, lead to all sections. Rural mail delivery and telephone service reach all the farming communities.

The climate is characterized by long, warm summers and short, mild winters. There is a mean annual rainfall of about 49 inches, which is well distributed through the year. The mean annual temperature is about 63° F. The county has an average growing season of 241 days.

The agriculture is centered about the production of cotton. There is a tendency toward a more diversified system of farming. The area devoted to cotton in 1909 was 68,168 acres, and the average yield was .38 bale per acre. Corn is the second most important crop. In 1909, it is reported, on 20,324 acres, the average yield was 10.8 bushels per acre. Of the cultivated crops oats ranked next, with a total of 1,559 acres, and an average yield of 15.4 bushels per acre. Cowpeas and wheat are growing in importance. Cattle and hogs are not raised in sufficient number to supply local demands, although the raising of domestic animals is increasing in importance, and the quality of the stock is being improved.

Most of the farm work is done with light implements, and mules are largely used as work stock. More thorough farming methods are gradually coming into use. No definite system of rotation is practiced, but farmers change the crops as often as practicable. Commercial fertilizers are invariably used for cotton. More than 80 per cent of all the farms in the county are operated by tenants.

Jasper County lies in the Piedmont Plateau, and the upland soils are of residual origin, derived from the weathering of the underlying rocks. Alluvial soils occur inextensively along the streams.

The Davidson soils are derived from dark-colored basic rocks. They cover a considerable part of the county, and are strong soils, well suited to cotton, grain, and grass and forage crops.

The Iredell loam is the principal soil of the glades, or flatwoods section of the county. It is suited to grasses and small grains. Cotton rusts badly on this soil.

The Mecklenburg loam is derived from dark-colored rocks. It is a desirable soil for farming, but is of small extent.

The soils of the Cecil series are characterized by light-red, stiff, brittle subsoils. They are derived from light-colored crystalline

rocks and from a mixture of dark and light-colored rocks. These soils are well suited to general farming.

The Durham and Appling sandy loams are of small extent. They are derived from light-colored crystalline rocks. These soils are suited to trucking and general farming, but are not highly productive.

The Wilkes sandy loam is derived from a mixture of basic and acidic rocks. It has poor internal drainage, on account of its heavy, plastic lower subsoil, and yields are low.

The Dekalb stony sandy loam is derived from quartzite. This soil occurs on a ridge known as Barnes Mountain. Only a small part of the type is farmed.

The Louisa clay loam is largely derived from mica schist. This type is rather inextensive. It is not very productive, but practically all of it is farmed.

The Molena sandy loam is a soil of doubtful origin. It is all under cultivation, and seems best suited to trucking and light general farming.

The soils of the Congaree series occur along streams, and are subject to overflow. These are strong soils, apparently best suited to corn.

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[PUBLIC RESOLUTION—No. 9.]

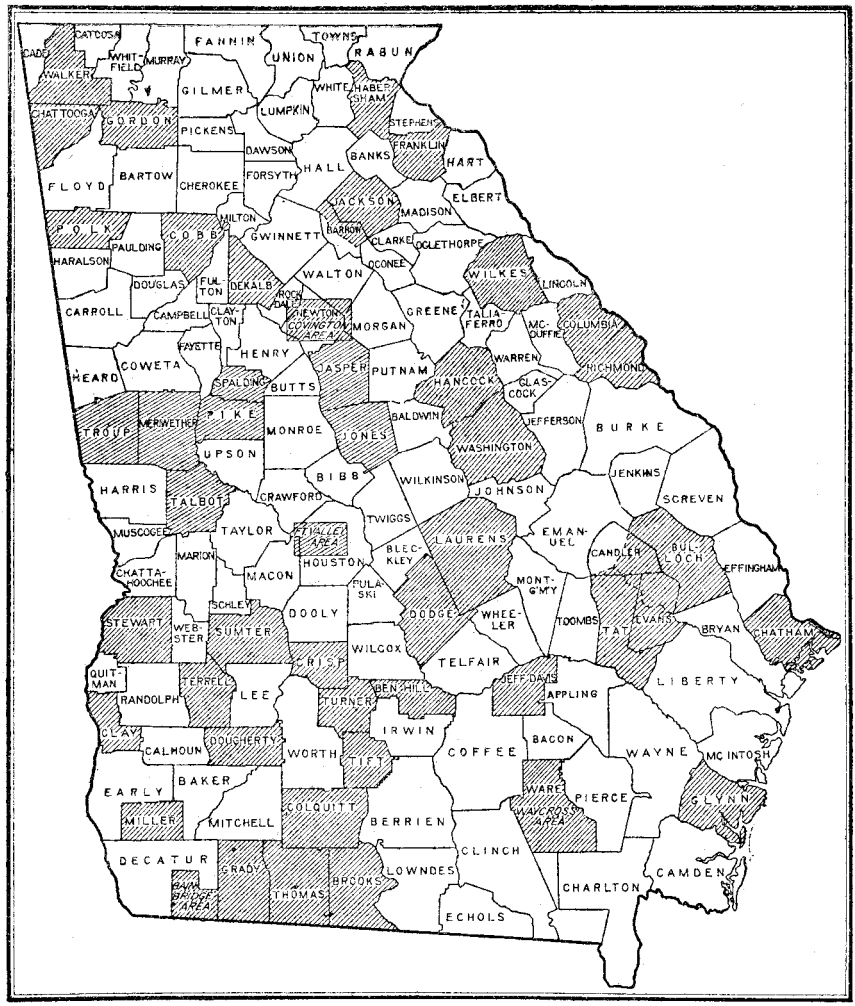
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

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.]



Areas surveyed in Georgia.

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