

## SOIL SURVEY OF WILKES COUNTY, GEORGIA.

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### DESCRIPTION OF THE AREA.

Wilkes County, Ga., is situated in the northeastern part of the State, its northeastern corner being about 8 miles from the South Carolina line. It is bounded on the north by Elbert County, on the east by Lincoln County, on the south by McDuffie, Warren, and Taliaferro Counties, and on the west by Taliaferro and Oglethorpe Counties. Broad River forms the county line on the north; Little River forms the entire southern boundary, with the exception of 3 miles; and Dry Fork and Long Creek form the northwest boundary. Wilkes County has an area of 479 square miles, or 306,560 acres.

The county lies wholly within the Piedmont Plateau. This physiographic province extends southward from New Jersey into Alabama. Wilkes County lies in the southeastern corner of this province, being only 25 or 30 miles north of the inner boundary of the Coastal Plain.

The surface of the country was at one time that of a smooth plateau or peneplain, as is evidenced by the smooth and even sky line in all sections. The present rolling topography is the result of a long period of erosion. In general, the surface configuration consists of smooth, undulating divides, which become steeper and more broken near the valleys of the larger streams and their tributaries.

The large creeks have cut their valleys 50 to 100 feet below the crests of the intervening ridges. Generally the slopes to the stream valleys are long and gentle, but in some cases the valleys are bordered by steep hills. In places small ravines and gullies have cut back into the upland, and here the topography is somewhat rough. The smoothest areas in the county are developed in the northeastern part, between Morris and Pistol Creeks. Gently undulating areas of small extent occur in the vicinity of Susan Smith Branch, in the northern part of the county, and around Ficklin, in the southern part. These areas lie somewhat lower than the surrounding country and are known as "flatwoods."

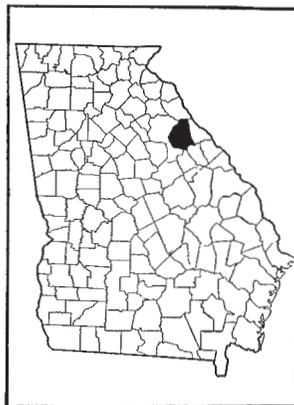


FIG. 22.—Sketch map showing location of the Wilkes County area, Georgia.

Wilkes County lies mainly 500 feet or more above sea level. The highest elevations are in the western part of the county, about Triplett Post Office and Rayle, and in the northern part, between Armstrong and Tignall, where the general elevation is above 600 feet. The highest point in the county, 2 miles south of Rayle, is 680 feet above sea level, and the lowest, on Little River, at the extreme southeastern corner of the county, is approximately 295 feet above sea level.

The drainage system is thoroughly established. The larger streams are fed by tributaries which extend to all parts of the upland and afford drainage for every farm. The drainage waters ultimately reach the Atlantic Ocean by way of the Savannah River. The greater part of the county is drained by the tributaries of Broad River, which forms the northern boundary. The southern part of the county is drained by Little River and its tributaries. An undulating to gently rolling divide between the basins of Broad and Little Rivers extends through the county east and west. Its course follows closely the road from Metasville through Washington to Rayle, and extends thence southwest along a public road to the Wilkes-Oglethorpe line.

Wilkes County is one of the seven original counties created by the Georgia constitution of 1777. The county originally comprised territory now included in the counties of Elbert, Lincoln, and Oglethorpe, as well as parts of Madison, Taliaferro, Warren, Hart, McDuffie, and Green Counties. The county was opened for settlement in 1773, and a number of settlements were founded along Broad River and at the present site of the town of Washington. The early immigrants were chiefly Virginians and North Carolinians. Later immigrants were from South Carolina.

Washington, in the south-central part, is the county seat of Wilkes County. It was established in 1780 and is now an incorporated city. It has a population of 3,065 and is the chief business and residential town of the county. Tignall is the second town in importance. It is the terminus of the Elberton & Eastern Railway and is an important trading point for the northern part of the county, as is Ficklin for the southern part. Smaller trading points are situated in all parts of the county.

The population of Wilkes County, according to the census of 1910, is 23,441, of which 86.9 per cent is classed as rural. The density is 44.5 persons to the square mile. Seventy per cent of the population is negro.

The railroad facilities are inadequate for the needs of the county. A branch line of the Georgia Railroad extends from Washington to the main line at Barnett. The Elberton & Eastern Railway is a newly built line which affords transportation facilities for the north-

ern part of the county, extending from Tignall to the main line of the Seaboard Air Line Railway at Elberton, in Elbert County.

Public highways lead to all parts of the county. With only one or two exceptions, where they are sand surfaced, the roads are ordinary earth roads, but they are maintained in fair condition.

Savannah was the early outside market for the products of Wilkes County, but it has been supplanted by Augusta and Atlanta. Washington is the principal market place of the county and the main distributing point for supplies. It is 74 miles by rail from Augusta.

#### CLIMATE.

Wilkes County enjoys a mild and healthful climate, characterized by moderate winters and long, warm summers. The rainfall is ample, but there are many clear, sunshiny days. There is no continued dampness or fogginess.

The mean temperature of winter is 43.1° F., the highest temperature recorded for this season being 77° F., and the lowest, 1° F. The winter usually includes periods of balmy weather which continue for a week or more and are followed by rain and a fall in temperature. Light flurries of snow occur. The weather allows considerable farm work during the winter. When moisture conditions permit, the land is generally plowed at this time.

The summer months have a mean temperature of 78.1° F. Hot spells occur frequently, but are not of long duration. The maximum temperature recorded for this season is 107° F., and the minimum is 44° F. The mean temperature for the spring season is 60.5° F., and for the fall 61.2° F. Spring and fall are the most pleasant parts of the year.

The precipitation is well distributed throughout the year, with an annual mean of 48.82 inches. This is ample for the growth of all crops. The total amount of rainfall for the driest year on record is 37.87 inches, and there has never been a complete failure of crops on account of drought. The rainfall is lowest during the fall months, and this feature of the distribution is especially favorable for the harvesting of the leading crops, cotton, corn, and pea-vine hay.

The average growing season extends from April 1 to November 1, a period of 214 days. The latest killing frost in the spring occurred April 24 and the earliest in the fall on October 11.

The table below, giving the normal monthly, seasonal, and annual temperature and precipitation, is compiled from Weather Bureau records of observations at Washington and Point Peter, the latter in Oglethorpe County, 10 miles from the Wilkes County line. It represents accurately the general climatic conditions in Wilkes County.

*Normal monthly, seasonal, and annual temperature and precipitation.*

Month.	Temperature (Point Peter).			Precipitation (Washington).		
	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.....	43.9	72	8	3.92	4.55	5.83
January.....	42.3	75	9	3.74	2.80	3.37
February.....	43.0	77	11	5.73	5.15	3.18
Winter.....	43.1	77	11	13.39	12.50	12.38
March.....	52.3	92	14	4.43	2.88	3.10
April.....	59.5	90	24	3.51	1.23	6.40
May.....	69.6	100	36	3.64	2.10	6.43
Spring.....	60.5	100	14	11.58	6.21	15.93
June.....	77.0	104	44	4.42	5.00	8.64
July.....	79.3	105	52	4.97	2.27	4.78
August.....	78.1	107	51	5.38	8.94	8.89
Summer.....	78.1	107	44	14.77	16.21	22.31
September.....	72.4	100	40	3.71	.33	6.12
October.....	60.3	89	23	2.50	.20	1.97
November.....	51.0	80	13	2.87	2.42	.93
Fall.....	61.2	100	13	9.03	2.95	9.02
Year.....	60.7	107	1	48.82	37.87	59.64

<sup>1</sup> Temperature for cold wave of Feb. 13, 1899, not included.

## AGRICULTURE.

The beginning of agriculture in this region antedates the American Revolution. The pioneer agriculture was of the self-sustaining type. Cattle, hogs, and sheep furnished animal products for food and clothing, while corn, oats, wheat, and barley constituted the crops for household and farm consumption. As the county became more thickly settled, markets were established. Certain products were purchased that were previously produced, out of sheer necessity, on the farms, and their place in the agriculture was taken by crops that were better adapted to the soils and climate.

Cotton was found to be a profitable crop at an early period, but it did not become the leading crop until about 1865. Grain production decreased; the land formerly used for grain, as well as newly cleared land, was devoted to cotton. Corn and oats for the work stock and pork and beef for food were not produced in sufficient quantities for local consumption, and large quantities were shipped in from distant points. From the Civil War period until very recently all the agricultural practices have been based on cotton production. The

following table, compiled from the last four census reports, shows the uninterrupted increase in the cotton acreage, the relatively slight increase in that of corn, and the decrease in the acreage of oats.

Year.	Cotton.	Corn.	Oats.
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
1879....	30,891	21,493	11,855
1889....	52,181	25,131	12,697
1899....	52,353	30,287	6,662
1909....	70,009	30,749	6,204

Within the last 10 years there has been an appreciable change in the agriculture of Wilkes County. Cotton remains the principal product as the money crop, but the tendency is to produce more of the meat and grain supplies, which have heretofore been purchased to a great extent. Impetus has been given to this movement by the recent high prices of grain, more grain being produced recently than ever before in the history of the county. This movement toward diversification of crops is not yet general but is growing. At present there are comparatively few farms that produce all the necessary food supplies.

The agriculture of Wilkes County consists of the production of cotton as the main cash crop, together with the growing of corn, and a smaller acreage of oats, cowpeas, and grains cut green and used to feed work stock. Hogs and cattle are raised but in numbers inadequate to supply meat products for local consumption.

According to the census, in 1909 there were 70,009 acres devoted to cotton, producing 29,339 bales. Practically all the business activities of the county are based upon the production of this staple.

Corn is the crop of second importance. In 1909 there were 30,749 acres devoted to corn, producing 343,621 bushels. All the corn produced is used on the farms for the feeding of work stock, the fattening of hogs or for making meal.

The area in oats in 1909 was 6,204 acres. Since that year the acreage devoted to oats has increased possibly 100 per cent or more.

Cowpeas are grown mainly for hay and for soil improvement. However, quite a large quantity of cowpea seed is gathered, being used mainly for seeding purposes, but to some extent sold locally. Sweet potatoes, various other vegetables, sorghum sirup, and fruit in small quantity are produced for home consumption.

Increased interest is manifested in the raising of live stock, especially hogs. While 10 years ago there were very few registered animals in the county, there are to-day many registered Poland China, Duroc Jersey, Berkshire, and Tamworth hogs. The quality of the cattle is also being steadily improved. The leading breeds

are the Shorthorn, Angus, and Jersey. Hogs sold or slaughtered on farms in 1909 numbered 4,811. The number of cattle sold or slaughtered was 2,140. In general, the milch cows supply only the home requirements for dairy products. A few small herds near Washington are used in commercial dairying.

The natural adaptation of certain types of soil to particular crops is recognized to quite an extent, although the prevailing system of farming does not permit the planting of crops in all cases on the soils best suited to their production. The farmers throughout the county realize that the Congaree soils are the best for corn. The Iredell soils are also considered good soils for corn and the best soils for oats, while grasses and hay crops also do well. The sandy loams are recognized as best suited for sweet potatoes and garden vegetables. The clay lands are considered the best for small grain and clover. Cotton is grown on all the upland soils without much regard to their adaptation.

The soils of Wilkes County cover a wide range in character and are suited to the development of a diversified system of agriculture, including general farming, trucking, and the growing of fruits.

The equipment used to carry on farming operations is not of the most modern or efficient type. The implements consist chiefly of one-horse plows, scrapes, and sweeps. Two-horse turning plows and various kinds of improved harrows are rapidly becoming more common. The work stock consists chiefly of mules. The farm buildings are generally small, though usually adequate for the requirements.

On the better farms of the county the land for cotton is broken broadcast in the fall. In the spring it is laid off in rows, after being well harrowed and smoothed into good seed-bed tilth. The general practice is not so thorough, as the rows are laid off by plowing out a furrow into which the fertilizer is placed. The land is then listed over the fertilizer and the seed is planted on this bed. Soon afterwards the middles are broken with a turning plow. The rows are usually laid off about 3 feet apart, though on the more productive land they may be as far apart as 5 feet. The planting period is from April 10 to May 15.

The first cultivation begins with "barring off," or plowing close to the young plants and throwing the soil to the middle of the rows, which leaves the young cotton on narrow ridges and facilitates the work of chopping out or thinning the plants with hand hoes. The soil is later turned back to the rows. Subsequent cultivations are performed with sweeps or scrapes. Cotton receives on an average about four cultivations, although the better farmers give as many as eight or ten.

Many different varieties of cotton are planted, the most popular being the Dongola. The King and Simpkins' Prolific are grown

when the crop is put in after grains. Other common varieties are the Cleveland, Big Boll, Money Maker, Long Shank, Pulnott, and Sunbeam. Wilt-resistant varieties are not necessary, as wilt is not common in the county.

In preparing for corn, the more progressive farmers break the land broadcast and work the soil into good tilth. The general method of preparation, however, is a wide departure from this. The rows are run off  $3\frac{1}{2}$  to 5 feet apart and the corn is planted in the water furrows,  $2\frac{1}{2}$  to 3 feet apart in the drill. Where the land is productive and well fertilized the interval between the stalks is less. As cultivation progresses the middles of the rows are plowed out. Only two or three cultivations are given corn, and the lack of thoroughness in preparation of the land, fertilization, and cultivation is chiefly responsible for the low average yield. Yields of 25 to 40 bushels per acre are not uncommon where the better methods of farming are practiced.

The planting period for corn extends from March 20 to as late as July. The period of planting is prolonged, so that at least part of the crop will encounter favorable seasonal conditions. Little corn is planted in April, as most farmers fear possible midsummer drought. The blades are pulled for forage in the month of August. In some cases the upper part of the stalk is also taken. Very little of the corn crop is cut and shocked or shredded. The ears are gathered in November.

White varieties of corn are used chiefly, with Hastings and Marlboro Prolific the most common. The varieties soon become mixed, and little attempt is made to keep the seed pure or to select seed scientifically.

The general method of sowing oats consists of broadcasting the seed and turning it under by shallow plowing. This naturally leaves the surface in a rough and undesirable condition. Harrowing after plowing is beneficial and is done in a few cases, but a better method sometimes used consists of plowing the land broadcast (or disking, if corn land is used), after which the soil is harrowed, and the seed drilled in. Oats are also seeded in the cotton fields with small drills, which place three rows of oats between the cotton rows. September and October are considered the safest months for sowing oats, and all the farmers aim to get the crop sown by the last of October, though it is often November or December before all the crop is in. A part of the oat crop is cut green for hay in the early spring, but the bulk of it is harvested in June with mowers or by hand, as few binders are in use. The grain is either fed in the straw or thrashed. The Fulghum, Appler, and Bancroft are favorite varieties. Texas Rustproof is also sown extensively. No spring oats are grown.

When cowpeas are grown for hay or forage the seed is generally broadcasted in grain stubble and turned under with either a small turning plow or the disk harrow. Cowpeas are sometimes seeded in corn fields, either in rows, between the corn rows or broadcasted over the field at about the time of the last cultivation of the corn. When planted in corn the crop is grown as a soil renovator and is either grazed down by hogs or turned under after some seed is picked for the next season or for use as food. Cowpeas are also grown in combination with soy beans. The crop is sown usually in May or June, and is harvested in the latter part of September or in October. Fertilizers are not used with cowpeas. Yields of hay range from one-half ton to  $1\frac{1}{2}$  or 2 tons per acre, higher yields being obtained on the lowlands at the expense of seed production. Many varieties of cowpeas are grown, including the Speckler, Crowder, California, White Crowder, New Era, Ram's Horn, Unknown, Whippoorwill, Iron, and Blackeye.

Wheat, rye, and barley are not grown to sufficient extent to be classed as generally grown crops. They are mainly sown in the fall for winter pasturage and are turned under in the spring to supply needed organic matter to the soil.

Experiments have been made with alfalfa in the vicinity of Celeste, Tignall, and Washington, and have proved a success. The stands were obtained by first sowing the land to grain, followed by cowpeas, which were turned under. The land was then limed and inoculated and the alfalfa sown in October. The growing of alfalfa is gradually extending.

No definite system of rotating crops is followed in Wilkes County. Farmers attempt to alternate the fields between cotton and grain crops as much as possible, but there are instances where land has been in cotton since it was first put in cultivation. The value of practicing rotations is becoming more generally recognized, and the more intelligent farmers follow a system including cotton for one or two years, followed by corn, and the latter by a small grain and cowpeas. The amount of money expended for commercial fertilizers is increasing by large sums annually. In 1899 the expenditure was \$71,000, while in 1909 it reached \$190,268. Home mixing of fertilizers is not general, although to a limited extent the more progressive farmers prepare their own mixtures. Commercial preparations are invariably employed with cotton. The usual application consists of 200 to 600 pounds per acre of an 8-2-2<sup>1</sup> grade, but the 9-3-3 grade is becoming more popular. A few farmers use a grade as high as 10-4-4. Many different formulas are used containing 8 to 10 per cent

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<sup>1</sup> The figures represent the respective percentages of phosphoric acid, nitrogen, and potash.

phosphoric acid, 2 to 4 per cent nitrogen, and 2 to 5 per cent potash. When large quantities of fertilizers are used two applications are made, and a side dressing of nitrate of soda or sulphate of ammonia is applied by a few of the more progressive farmers. In the case of corn, a small quantity of fertilizer is applied at the time of planting. In many instances no fertilizer is used with corn, while on some farms the same grades and quantities are applied as in the case of cotton. Complete fertilizers are not commonly used with oats, although farmers that drill oats apply about 200 pounds per acre, of the grades ordinarily used for cotton, at the time of seeding. It is general, however, to apply about 100 pounds per acre of a top dressing of nitrate of soda or sulphate of ammonia in the spring, and farmers practically depend upon this top dressing to produce the crop. No fertilizer is used with cowpeas.

Farm labor is drawn largely from the negro population. According to the census the amount expended for labor in 1909 was \$174,006, or \$143.10 per farm reporting. Only one-third of the farms, however, reported outlay for labor. Ordinary hands receive \$10 to \$15 a month, while day labor is paid 75 cents to \$1 a day. Cotton is picked by piecework, the rates ranging from 35 cents to 50 cents per 100 pounds of seed cotton. Toward the close of the season the rate is increased to 75 cents or more per hundredweight.

The 1910 census reports 3,586 farms, containing 87.2 per cent of the land of the county. One-half the farm land is classed as improved. The average number of acres of improved land per farm is 35.7. The average size of farms, reported as 71.3 acres, does not represent the average size of land holding, as the census tabulates each tenancy as a farm.

Only 21.5 per cent of the farms are operated by owners, although the total value of all property included in these farms is not far below the aggregate value of all tenanted farms. Most of the tenants are negroes. Land is leased for a standing rent of 1,000 to 1,500 pounds of lint cotton for a one-horse farm, ranging in size from 20 to 30 acres. When tenant takes land on shares, the landlord furnishing all the necessary stock and implements and one-half the fertilizer, the rent is one-half the products.

Land values range from \$15 an acre, for the poorest land and that in the more remote sections of the county, to \$25 or even \$100 an acre for productive and well-improved farm land, the price depending upon the location and the influence of towns and transportation facilities.

#### SOILS.

Most of the soils of Wilkes County are residual, being derived from crystalline, igneous, and metamorphic rocks of the Piedmont

Plateau, chiefly highly feldspathic, light-colored, acid and subacid rocks—granite, granite-gneiss, and mica schists, although dark-colored sub-basic to ultrabasic rocks also have contributed a small proportion of the soil material. It is believed that a large part of the county is underlain by a basic metamorphosed schist. Besides the upland residual soils there are in the stream bottoms a number of soils of alluvial origin. The material forming these soils has been washed from the upland soils and reworked and deposited by the streams along which it occurs.

The soils of the county may be broadly divided into series, according to the color of the subsoils. These are red in the Cecil series, yellowish brown with a greenish cast in the Iredell series, and yellow with reddish mottlings in the Appling series. The types having red subsoils, as well as those having subsoils yellow in color with reddish mottlings, are derived from the light-colored crystalline rocks, such as granite, mica schist, and gneiss, while the types having yellowish-brown subsoils with a greenish cast are derived from dark-colored rocks, such as diorite and diabase.

The texture of the surface material is closely related to the character of the material making up the underlying rocks. The coarse-textured soils, such as the coarse sandy loams, are derived from very coarse grained granite and granite gneiss; the sandy loams from medium-grained rocks, including granite and mica schist; and the loams, fine sandy loams, clay loams, and clays from very fine grained rocks, such as diorite, diabase, and chlorite schist. The stony types are the result of the breaking up of outcropping quartz veins, fragments from which are scattered in large quantity over the surface of these soils.

Most of the soils of the county are heavy, belonging to the silty clay loam, clay loam, and clay classes. A considerable area of soils of sandy loam, fine sandy loam, and loam texture also occurs.

Exclusive of Meadow (Congaree material), 17 soil types and one phase are recognized in Wilkes County. The soils similar in all essential characteristics except texture are grouped into series. There are five such series.

The Cecil series is characterized by red, brown or gray surface soils underlain by a deep-red or brick-red, stiff, heavy clay subsoil, which is usually brittle, but when wet is somewhat plastic and tenacious. The types of this series comprise the greater part of the county, as well as the greater part of the Piedmont section of the State. In Wilkes County the stony fine sandy loam, stony clay loam, very coarse sandy loam, coarse sandy loam, sandy loam, stony sandy loam, fine sandy loam, clay loam, and clay are mapped.

The Appling series has gray to brownish-gray surface soils, underlain by a friable sandy clay subsoil of reddish-yellow color or yel-

low mottled with red and in places gray. The series is residual from igneous or metamorphic rocks. It is well drained. In this county the coarse sandy loam and plastic-subsoil phase, the sandy loam, and the fine sandy loam types are mapped.

Typically the Iredell series has brown surface soils, but the color varies from light brown to almost black. The subsoil is an extremely plastic, sticky clay of a yellowish-brown or greenish-yellow color. The series is derived through weathering from rocks of basic character. In Wilkes County the Iredell fine sandy loam and loam types are recognized.

The Congaree series is the only series of recent alluvial origin in the county. It has brown to reddish-brown, friable surface soils, and in general there is little change in color or texture from the surface downward. The soil material is derived by stream wash from upland Piedmont soils. The series is represented by the sandy loam and silty clay loam members.

The Wickham sandy loam (old alluvial) is an inextensive soil developed on stream terraces lying well above overflow. It is characterized by a reddish-brown surface soil and reddish, friable sandy clay subsoil.

Meadow (Congaree material) consists of alluvial material of mixed texture.

In subsequent pages the individual types are described in detail, and on the map accompanying this report their distribution is shown. The following table shows the name and the actual and relative extent of each type mapped:

*Areas of different soils.*

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Cecil clay loam.....	117,632	38.5	Cecil coarse sandy loam.....	5,312	1.7
Cecil sandy loam.....	56,640	18.5	Cecil stony fine sandy loam...	4,096	1.3
Congaree silty clay loam.....	23,040	7.5	Appling fine sandy loam.....	3,904	1.3
Appling sandy loam.....	16,960	5.5	Cecil stony clay loam.....	3,840	1.3
Cecil fine sandy loam.....	16,832	5.5	Cecil clay.....	2,560	.8
Cecil very coarse sandy loam..	14,528	4.7	Cecil stony sandy loam.....	1,536	.5
Iredell loam.....	12,544	4.1	Meadow (Congaree material)..	1,344	.4
Appling coarse sandy loam...	6,400	3.2	Wickham sandy loam.....	256	.1
Plastic-subsoil phase.....	3,328				
Congaree sandy loam.....	8,320	2.7	Total.....	306,560	.....
Iredell fine sandy loam.....	7,488	2.4			

**CECIL STONY CLAY LOAM.**

Areas indicated on the map with stone symbols in the Cecil clay loam color represent the Cecil stony clay loam. This type is similar to the Cecil clay loam in origin, color, texture, and structure, but carries a

sufficient quantity of stones to affect its agricultural value. The stones usually consist of angular quartz fragments ranging in size from pebbles to pieces 6 or 8 inches in diameter. These fragments are derived from thin seams or veins of quartz occurring in the original rock formations. In an area in the northeastern part of the county, about a mile north of Pistol, the stony character is due to the outcropping of the underlying rock, the type here differing in this respect from all the other developments.

The Cecil stony clay loam has its largest development in the southern part of the county between Rocky Creek and Little River. A number of areas are found near the southeastern corner of the county. Many small areas from 1 acre to 5 acres in extent are included with the Cecil clay loam.

Nearly all the areas have been cleared of the native vegetation and are farmed. The crops grown and the yields are about the same as in the case of the Cecil clay loam.

#### CECIL STONY SANDY LOAM.

Areas in Cecil sandy loam color, marked on the map with stone symbols, represent the Cecil stony sandy loam. This type has the same physical characteristics as the Cecil sandy loam in both surface soil and subsoil, but carries a sufficient quantity of angular quartz fragments on the surface to give it a decidedly stony character. The fragments vary in size from pebbles to pieces 5 inches in diameter. They come from quartz veins included in the rocks, giving rise to the Cecil sandy loam. Some stony areas too small to map have been included with the Cecil sandy loam.

The Cecil stony sandy loam occurs in areas of 10 to 20 acres each. Most of it is developed west of Washington in a section extending 3 or 4 miles north and south of the Lexington Road. A few typical areas are found in other parts of the county.

The crops produced are about the same as on the Cecil sandy loam. The yields, under the prevailing tenant system, range close to the minimum reported for that type. The stones interfere slightly with plowing, and are even more troublesome in cultivating. On the more stony areas mowers and binders can not be used.

#### CECIL VERY COARSE SANDY LOAM.

The Cecil very coarse sandy loam, locally spoken of as "gravelly land," is one of the most distinctly defined types encountered in the State. The surface soil, to a depth of 6 to 8 inches, consists of a light-brown to yellowish-brown fine gravel, with an appreciable proportion of very coarse sand and a smaller percentage of sand, silt, and clay. The subsoil is a brick-red, friable, stiff clay, containing a small proportion of coarse sand and fine gravel particles with some

small scales of mica. The particles larger than coarse sand generally average in size about three-fourths that of a grain of corn. In small spots, about outcrops of underlying rock, small fragments of quartz are scattered over the surface.

The type owes its origin to the weathering of a very coarse grained granite or quartz porphyry. The bedrock typically lies from 7 to 20 feet below the surface, but it frequently outcrops. The formation is of limited extent in the State of Georgia.

The Cecil very coarse sandy loam is developed in the northeastern part of the county. This type covers 22.7 square miles. Nearly all of it is included in one area, which begins at Broad River and extends southward along the Lincoln County line for a distance of about 6 miles. The towns of Danburg and Pistol are located on typical developments of this soil.

The surface of the type is smoother than that of any other upland soil. South of the streams there are a few hills, but north of them there is a gentle rise. The topography is in the main gently undulating. Small intermittent or wet-weather streams have cut deep, perpendicularly walled valleys. The drainage is everywhere well established. Terracing is not usually necessary to prevent erosion.

Nearly all the land is cleared of the original forest growth, which consisted of oak, hickory, and shortleaf pine.

Cotton on the Cecil very coarse sandy loam yields from one-fourth to three-fourths bale per acre, corn 12 to 20 bushels, and oats 15 to 30 bushels. Cowpeas give a large yield of seed on this soil. On well-improved land acreage yields of one-half to three-fourths ton of peavine hay are obtained.

The coarse texture and loose structure of the surface soil render plowing and cultivation easy. The type can be plowed at an early date in the spring and soon after heavy rains. The better yields are obtained in wet seasons.

From 200 to 400 pounds per acre of a medium-grade fertilizer is applied to cotton and in some cases to corn. Nitrate of soda and sulphate of ammonia are used by some farmers as a side or top dressing for cotton, corn, and oats.

Many well-established farms are found on this type. Land values range from \$20 an acre upward.

Crops on the Cecil very coarse sandy loam tend toward a small vegetative growth and produce a correspondingly large yield of fruit. Local experiments show that with an application of nitrate of soda or sulphate of ammonia the vegetative growth is increased. The addition of vegetable matter or stable manure has a similar effect.

The following table shows the results of mechanical analyses of samples of the surface soil and subsoil of the Cecil very coarse sandy loam.

*Mechanical analyses of Cecil very coarse sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
254209.....	Soil.....	26.7	18.2	4.6	17.0	14.3	15.5	3.6
254210.....	Subsoil.....	7.1	6.2	3.4	10.5	7.5	22.7	43.2

CECIL COARSE SANDY LOAM.

The surface soil of the Cecil coarse sandy loam consists of a light-brown to yellowish-brown coarse sand to loamy coarse sand. This in places grades into a yellow loamy coarse sand and below this, at 8 to 12 inches, into a friable, stiff, brick-red clay, which extends to depths of more than 3 feet. The subsoil is frequently not as heavy as is typical of the Cecil series, and especially in the upper part may contain a noticeable quantity of small mica particles, as well as a small quantity of coarse sand. The depth of the surface soil does not usually exceed 8 inches, except in an area covering a few acres south of Rayle, where this type grades into and includes small areas of the Appling coarse sandy loam. The surface material is loose, and the soil is easy to cultivate. When some of the heavier subsoil material is turned up with the soil, a mellow coarse sandy loam texture results.

The Cecil coarse sandy loam is mapped only in the western half of the county. One of the largest areas is encountered in the vicinity of Rayle; another important development is mapped in the extreme western part of the county along Dry Fork.

The topography is gently undulating, with a few gullies breaking the otherwise generally smooth surface. Drainage is well established. Little terracing is required to prevent erosion.

This type is derived from inclusions of a coarse-grained gneiss or schist in the general region of occurrence of quartz-bearing rocks. Rock exposures are few.

All the Cecil coarse sandy loam is cleared of the native vegetation and is used for farming. A few well-established farms are located on it. The yields are generally low, mainly on account of the prevailing system of tenant farming. Cotton yields one-fourth to one-half bale per acre, corn 10 to 15 bushels, oats 12 to 15 bushels, and cowpeas one-half to three-fourths ton of hay per acre. On the better farms the yields are considerably higher.

Land values on the Cecil coarse sandy loam range from \$15 to \$40 an acre.

## CECIL SANDY LOAM.

The surface soil of the Cecil sandy loam is a gray, light-brown or brown loamy sand, which extends to an average depth of about 7 inches. The subsoil is a heavy stiff, friable, red clay many feet in depth. A stratum of yellow, friable loamy sand to a sandy loam, varying in thickness from 2 to 18 inches, intervenes between the surface soil and the heavy red subsoil. This stratum is of greatest thickness in the more sandy areas of the type and of least thickness in the heavier areas.

The surface soil frequently rests immediately upon the red clay, giving rise to a heavy variation of the type locally known as "mulatto land." The lighter areas of the type are locally termed "gray sandy land," and represent a near approach to the Appling sandy loam, differing from that type only in the color of the subsoil. This condition is especially notable in the vicinities of Ophelia, Hills Chapel, and Tignall. Small spots of Appling sandy loam, Cecil clay loam, and Cecil coarse sandy loam are included with the Cecil sandy loam as mapped.

The Cecil sandy loam is extensively developed in the county. With small included areas of other soils the type occupies a strip of territory 5 or 6 miles wide extending through the middle of the county from east to west. A large, somewhat isolated area is developed in the northwestern part of the county about Ophelia and Hills Chapel. Smaller but important areas are mapped in other parts of the county, notably in the southwestern section and in the northern section in the region of Broad River.

The topography is gently rolling to rolling, the country consisting of smooth undulating divides and long, gentle slopes, with a few steep slopes. In the region of its principal occurrence it is found on practically every variation of topography developed, and is not confined to any particular position. In general, the topography is gently rolling to rolling. The surface relief affords ample drainage; and it is necessary to terrace the land against erosion on the steeper slopes.

The soil material of the Cecil sandy loam is derived through the weathering of gneiss or granite gneiss. A formation of this rock extends along the watershed between Broad and Little Rivers in a belt about 6 miles wide. Two extensions of this strip occur in the western part of the county, one to the north and one to the south. Very few rock exposures are found. Schists also enter into the formation of the soils, although no good exposures of schist formations were observed during the progress of the soil survey.

The Cecil sandy loam is practically all cleared. The natural forest growth consists of shortleaf and loblolly pine and the hardwoods, such as oak and hickory. The soil is utilized for the general farm

crops. Cotton yields one-fifth to 1 bale per acre, corn 10 to 30 bushels, oats 15 to 40 bushels, and cowpeas from one-half to 1 ton or more of hay. Fertilizers, of a medium grade, are used universally on cotton and generally on corn. The applications range from 200 to 400 pounds per acre.

Many well-improved farms are on this type. Agricultural conditions in general are fair. This is a valuable type. The surface soil is loose and easy to cultivate. It absorbs moisture readily, and the subsoil is capable of holding large quantities of moisture for the use of growing crops.

Land values on the Cecil sandy loam range from \$25 to \$60 an acre.

While the type here is used for the common farm crops, peaches, tobacco, and truck crops are produced successfully on it in other States.

#### CECIL FINE SANDY LOAM.

The Cecil fine sandy loam, to an average depth of 8 inches, consists of a grayish or medium-brown to reddish-brown, friable, mellow, loamy fine sand or fine sandy loam. This is immediately underlain by the subsoil of stiff, friable red clay, which extends to considerable depth. The subsoil material has a smooth, greasy feel.

The subsoil is uniform over all the areas in the county; the surface soil shows some slight variations. In the southeastern corner of the county it is common to find an ashen-gray fine sand surface soil, and in the vicinity of Washington and Sisson a somewhat higher content of silty material gives a fine sandy loam to loam texture. A reddish-brown fine sandy loam soil is locally developed. A stratum of yellow, smooth, friable fine sandy loam in places intervenes between the surface soil and the heavy red clay subsoil. This condition is especially likely to occur where the type grades into the Appling fine sandy loam. An appreciable quantity of small quartz fragments occurs in small spots. These would have been mapped as Cecil gravelly fine sandy loam if they had been of greater extent.

The Cecil fine sandy loam occurs mainly in the southeastern part of the county in the vicinity of Metasville, Adasburg, and Aonia. A large total acreage of the type is developed southeast of Washington, and a third region of occurrence is in the northern part of the county between Tignall and Pistol. In the western part of the county in the vicinity of Sisson and Lina there are other important areas.

The Cecil fine sandy loam is developed chiefly on comparatively smooth ridges, although in many places it occurs on hilltops and on gentle slopes to stream courses. The topography is usually undulating to gently rolling and, although in the vicinity of Tignall it becomes more hilly, tillage is almost everywhere practicable. The

drainage is good. Terracing is employed in places to prevent erosion, but their use is not generally necessary.

Identification of the rocks from which this type is derived is difficult, as weathering has extended to great depths. No bedrock was seen in even the deepest exposures. A few quartz veins are visible in cuts.

Under natural conditions the Cecil fine sandy loam supports a forest similar to that on the Cecil clay loam. Nearly all the land has been cleared and put in cultivation. The ordinary crops are grown. Cotton and corn yield about as well as on the clay loams. A number of well-equipped farms are located in the fine sandy loam areas.

The Cecil fine sandy loam is a good general-farming soil. It is loose and mellow and can be kept in good tilth. It clods if plowed when wet, but the clods are easily broken down in subsequent cultivation. Land of this type ranges from \$20 to \$40 an acre.

#### CECIL STONY FINE SANDY LOAM.

Areas in Cecil fine sandy loam color marked with stone symbols represent the Cecil stony fine sandy loam. The fine-earth material of this soil is similar to the material of the Cecil fine sandy loam, the surface soil being a light-brown to reddish-brown, mellow, smooth, loamy fine sand, and the subsoil a stiff red clay. The distinguishing characteristic is the presence of white quartz fragments in sufficient quantity to affect the agricultural value of the type.

This type is encountered in fairly large areas. It occurs chiefly on knolls, and there are many areas too small to show on the map. The largest areas lie within 6 miles of Aonia. A number of smaller areas occur less than 3 miles southeast of Washington. A rather large area is found west of Pistol, in the northern part of the county.

The Cecil stony fine sandy loam is more difficult to cultivate than the fine sandy loam. The same crops, excepting the small grains, are grown as on the fine sandy loam, but the average yield is lower.

#### CECIL CLAY LOAM.

The soil of the Cecil clay loam consists of a reddish-brown to brownish-red, friable clay loam, with an average depth of about 6 to 8 inches. There is generally a distinct line of demarcation between the surface soil and the subsoil, which consists of a brick-red or deep-red, dense, compact clay. When wet the subsoil is slightly plastic and tenacious.

There are several minor variations in the surface soil of this type. In about 10 per cent of the total area the soil, to a depth of 2 or 3 inches, is a heavy sandy loam. In the southeastern part of the

county, in areas locally called "mulatto lands," there is a veneering of fine sandy loam 2 or 3 inches thick. Small gall spots where the clay subsoil is exposed, as well as patches of sandy loam and fine sandy loam texture, too small to separate, are included with the type as mapped. In the subsoil there is practically no variation except about 4 miles east of Washington, where the red clay is somewhat more friable than typical, because of its larger percentage of sand.

Except in the southeastern part of the county, where the disintegration of outcropping quartz veins has scattered fragments over the surface the type is remarkably free from stones. Knolls of stony soil, too small to map, are common in this section of the county.

The Cecil clay loam is the most extensive soil type in the county, and is one of the most extensive strong general-farming soils of the Piedmont section of the State. It occurs in large uninterrupted areas in all parts of the county, except in the belt of sandy soils extending across the county east and west.

The type occurs largely on broad, gently undulating divides, on narrower, more undulating divides, and on knolls and slopes. In general, the topography is gently rolling. The areas are interrupted by stream valleys, slopes of which are long and gentle. In the northwestern part of the county the topography becomes more strongly rolling to hilly, especially along the streams. Hilly country is also encountered along Little River in the southern part of the county. A small acreage of broken land occurs about the heads of some of the streams.

The surface relief throughout the type gives good drainage, and there are no low or poorly drained spots. Terracing to prevent erosion is necessary only in the steeper positions.

The Cecil clay loam is derived presumably from a fine-grained schist. Exposures of rock were seen only in a few places, and here it is questionable whether the rock exposed is the formation that gives rise to this soil. Gneiss was observed in a few road cuts, but only in areas in the general region of sandy soils, and here the type owes its origin to the removal of the sandy soil material by erosion.

The native forest growth on the Cecil clay loam was predominantly hardwoods, oak, and hickory, with shortleaf and loblolly pine second in importance. Nearly all the timber has been removed, and practically all the land is under cultivation. Agricultural conditions on the type are good. All the common crops of the county are grown, including cotton, corn, cowpeas, and oats. Alfalfa and red and crimson clover are grown, but in a rather experimental way. Cotton is the most important crop.

Yields of cotton range from one-fourth to three-fourths bale per acre, with an application of 200 pounds per acre of a medium-grade fertilizer. Where better methods of farming are employed a bale

or more of cotton per acre is not an uncommon yield. Corn yields from 8 to 40 bushels per acre, depending upon the efficiency of the methods used. Oats yield 12 to 40 bushels per acre. Cowpeas produce from one-half ton to 1½ tons of hay to the acre. Alfalfa in four experimental fields has given an average total yield of about 4 tons of hay per acre, and red clover and crimson clover, also grown experimentally, have given good returns.

The Cecil clay loam is a strong, productive soil for general farming purposes. It is difficult to till properly and requires heavy implements and work stock for satisfactory results. It clods if plowed when too wet. The type is retentive of moisture, but often the surface is not in condition to absorb rainfall readily and much is lost in the run-off.

Land values on the Cecil clay loam range from \$20 to \$60 an acre, the price varying with the location and state of improvement.

Deep plowing and the turning under of organic matter tend to keep the soil loose and friable. The seed bed should be thoroughly pulverized before planting, as this not only favors the germination of seed and the growth of plants, but also greatly aids subsequent cultivation.

#### CECIL CLAY.

The Cecil clay, to a depth of 2 or 3 inches, consists of a deep-red, heavy clay loam. Beneath this and extending to a depth of many feet is a heavy, friable, intensely red clay. When the land is freshly plowed the subsoil is turned up and the fields have a bright-red color, the type differing from the other members of the series in this respect. In a few places, as on knolls and slopes, the shallow clay loam soil is lacking.

The Cecil clay is developed in areas ranging in extent from 2 or 3 to 300 or more acres, the smaller patches being included on the map with other types of the series. The most important areas are in the southern part of the county in the vicinity of Little River station, about a mile west of Washington, and along Fishing Creek north of Washington. The type generally occurs on high ridges or on slopes about the heads of gullies or along streams. All the type is well drained.

The type is derived from crystalline rocks, which are weathered to a considerable depth. No rock exposures were observed in the course of the soil survey, and the type is free from stony material. The heavy texture is probably the result of erosion which has carried away much of the surface material, but the type also appears to be derived from rocks carrying a relatively small percentage of quartz, as may be noted in the vicinity of Little River station.

All the Cecil clay is cleared and farmed. Cotton produces a small, short stalk, but fruits rather heavily in proportion. Yields

range from one-fifth to three-fourths bale per acre, depending upon the methods of cultivation and the seasonal conditions. Corn yields are low, generally between 10 and 15 bushels per acre. The type is adapted to small grains, grasses, and the clovers.

The Cecil clay is handled in the same manner as the Cecil clay loam. The heavy texture of the soil makes strong implements and heavy work stock necessary. The working of the soil is limited to a narrow range of moisture conditions. When it is plowed in a wet condition heavy clods are formed which may not be broken down in a season of cultivation. Moist seasons produce the best yields. Land of the Cecil clay sells at \$15 to \$50 an acre.

Like the Cecil clay loam, this type needs the incorporation of organic matter, deeper plowing, and more thorough soil pulverization. Liming would probably improve the physical condition. The heavy nature of the surface material tends to prevent the ready absorption of rainfall, and on this account crops suffer from drought, although the surface soil and subsoil are absorptive when moist.

#### APPLING COARSE SANDY LOAM.

The surface soil of the Appling coarse sandy loam consists of 7 inches of gray to yellowish-gray, coarse loamy sand. The subsoil in the upper part is a yellow, loose, coarse sandy loam, but becomes heavier with depth and passes at about 18 inches into a coarse sandy clay, reddish yellow or yellow in color and mottled with dull red. This material continues to a depth of 3 feet or more. The surface of the type is generally free from stones.

Small areas of Appling sandy loam and Cecil coarse sandy loam, ranging in extent from 2 to 5 acres, are included with the type as mapped, on account of their small size.

The Appling coarse sandy loam is mapped in several important areas in the western part of the county, the largest two being in the vicinity of Fairy Ridge mine and at Rayle. Smaller areas also are encountered here. In the northeastern part of the county areas occur in which the surface material is considerably coarser than typical.

The surface of this type is generally smoothly undulating, the areas being interrupted only by a few steep-sided stream gullies. Drainage conditions are good.

The Appling coarse sandy loam is derived, through weathering, from a coarse-grained gneiss. Little of the parent rock is seen, except in a few boulderlike outcrops.

All the Appling coarse sandy loam has been cleared of the original forest, which consisted chiefly of shortleaf and loblolly pine, with some hardwoods. A number of well-improved farms are found on the type. It is adapted to practically the same crops as the Appling

sandy loam. Cotton, with the aid of 200 pounds per acre of low-grade fertilizer, yields from one-fourth to one-half bale per acre. Corn yields 10 to 15 bushels per acre, and cowpeas one-fourth to three-fourths ton of hay. On the better improved farms the yields are somewhat higher.

The Appling coarse sandy loam produces the best yields in moderately dry years. In wet seasons the soil absorbs a large quantity of water, which is held back by the hard substratum, and crops suffer from excess moisture.

*Appling coarse sandy loam, plastic-subsoil phase.*—The Appling coarse sandy loam, plastic-subsoil phase, differs from the typical Appling coarse sandy loam in the character of the subsoil. This difference is sufficient to warrant the establishing of a distinct series, but owing to the small area of the soil and its irregular occurrence within the typical Appling coarse sandy loam, it is treated as a phase of that type.

The surface soil consists of 7 or 8 inches of gray to yellowish-gray, loose, coarse loamy sand. The subsoil in the upper part is a yellow, friable coarse sand, which grades into a coarse sandy clay and extends to a depth of 15 to 24 inches. A distinct line of demarcation divides this upper friable material and the lower part—a mottled yellow, red, and gray, heavy plastic, sticky clay extending to depths of 36 inches or more. The subsoil is dense and impervious.

In small spots the lower subsoil is a bluish-gray, plastic clay, and in other places a mottled, compact, coarse sandy clay. In both these variations the material lacks the friability of the typical Appling coarse sandy loam subsoil.

The plastic-subsoil phase is confined to the southwestern part of the county, the largest area lying between the Greensboro Road and Little River, in the vicinity of Tyrone. An important area lies just north of Kettle Creek about  $1\frac{1}{2}$  miles north of Tyrone, and small areas are located along Little Kettle Creek.

This phase probably owes its origin to the influence of two closely associated rocks; one a coarse-grained granite or granite-gneiss, the other a diorite, of porphyritic structure, containing a quantity of large quartz grains. The latter gives the heavy plastic material forming the deeper subsoil.

The topography is undulating to gently rolling. There is ample relief for good surface drainage, but the heavy subsoil retards the movement of moisture and, consequently, in wet seasons the friable soil in the upper part of the 3-foot section becomes water-logged.

Nearly all the land of this phase is cleared of the native vegetation and is utilized for farming. The common crops of the county are grown, and give moderate yields. Cotton yields from one-fourth to three-fourths bale per acre, the yield depending upon the methods

of culture used. Corn yields 8 to 20 bushels an acre and oats from 11 to 30 bushels.

Land values on the Appling coarse sandy loam, plastic-subsoil phase, range from \$20 to \$60 an acre, depending upon the improvements. Most of the land is farmed by tenants.

Improvement of the internal drainage is the most important step in increasing the productiveness of this land. This can be accomplished by placing tile drains just above the level of the plastic subsoil stratum. This would prevent crops from drowning in wet seasons and would tend to make permanent conditions similar to those prevailing in moderately dry seasons, when the best yields are obtained.

Cotton and oats are subject to rust on this soil, and corn and other plants frequently turn yellow early in the season. It has been found in other localities that the use of potash in the form of kainit counteracts this tendency.

The soil is benefited by rotating crops and by the addition of organic matter, which, in the absence of stable manure, may best be accomplished by green manuring.

#### APPLING SANDY LOAM.

The surface soil of the Appling sandy loam consists of a grayish, loose, friable loamy sand 7 or 8 inches deep. The subsoil in the upper part is a yellow, friable loamy sand or sandy loam. This gradually becomes heavier with depth and passes between 12 and 24 inches into a yellow or reddish-yellow, friable sandy clay, mottled with light red and in places with gray. At 30 to 36 inches the color becomes light red, streaked with yellow. The texture is uniformly a sandy clay, but the material in places is hard and compact in structure. In all the large areas of the type it is common to find spots in which the sandy clay portion of the subsoil lies at a depth below 28 inches. Such areas are locally called "deep sandy land."

The type usually merges gradually into the Cecil sandy loam and it is in many places necessary to separate the two types on the map with an arbitrary line. Areas of the Cecil sandy loam varying in size from a fraction of an acre to 2 or 3 acres are included with the type as mapped. Small areas occur in which the subsoil is a pale-yellow sandy loam to sandy clay. Such areas would be mapped as Durham soils, if of sufficient extent and importance to be shown separately.

The type is free from stones, except in two areas of small extent, where the outcropping of quartz veins has given rise to stony land.

The Appling sandy loam comprises a large part of the "gray sandy lands" of the county. It is most extensively developed in the region of sandy soils which extends across the county along the divide between Broad and Little Rivers. The largest areas lie in

the western part of the county, in a section extending from Sisson through Centerville to Thaxton. The type also occurs at Tignall and to the east of this place. An important area lies in the north-western part of the county between Ophelia and Hills Chapel. Areas of less importance are scattered throughout the county.

The soil material of the Appling sandy loam is derived through the weathering of gneiss or granite-gneiss similar to that which gives rise to the Cecil sandy loam. Differences in weathering are believed to have caused the difference of color in the subsoils of the two series, which is the basis of their separation. The bedrock outcrops frequently in the form of small boulders.

The surface of the Appling sandy loam comprises broad, smooth ridges and gentle slopes. There are few steep slopes. The soil has a higher elevation than the surrounding country, being found on the summits of watersheds. The topography promotes surface drainage, and the soil and subsoil, which are rather open and porous, readily absorb the rainfall, so that erosion is not active. Nevertheless the compact sandy clay substratum apparently prevents the free internal movement of water, and crops suffer from an excess of moisture in wet seasons. The best yields of all the crops are obtained in moderately dry years.

The agricultural conditions prevailing over this type are good. Only a small acreage remains in the original forest, which consisted of shortleaf and loblolly pine, and various hardwoods, including oak, hickory, and dogwood.

The type is utilized for general farming. Cotton yields from one-fifth to three-fourths bale per acre, corn 8 to 20 bushels, oats 10 to 30 bushels, and cowpeas one-fourth to three-fourths ton of hay per acre. Commercial fertilizers are used on all crops. The prevailing low yields can be attributed in large part to the inefficient methods used by tenant farmers.

Land values on the Appling sandy loam range from \$25 to \$50 an acre, depending upon the location and improvements.

The greatest need of the type is the incorporation of organic matter. This can be accomplished by turning under green crops. Legumes, such as cowpeas, are especially good crops for plowing under. Where economic conditions warrant this intensive use the Appling sandy loam can best be utilized for truck growing. It is a warm, early soil. Its value as a general-farming soil is lower than that of the corresponding type of the Cecil series.

#### APPLING FINE SANDY LOAM.

The surface soil of Appling fine sandy loam consists of 5 to 8 inches of pale-gray to light brownish gray, friable, loose, mellow loamy fine sand, or light fine sandy loam. The subsoil in the upper

part is a loose, yellow fine sandy loam. This passes at a depth of about 18 inches into a yellow or reddish-yellow, friable fine sandy clay, mottled with streaks and blotches of red and in many places of grayish colors.

In many places the lower part of the soil section, from 24 to 36 inches below the surface, is light red in color with a large proportion of yellow mottlings. Another variation from the typical soil occurs in narrow strips along drainage courses where the subsoil is somewhat plastic and heavy, approaching in texture the subsoil of the Iredell series. These developments occur in patches too small to map, as do also small included areas of the Durham fine sandy loam.

The Appling fine sandy loam is confined to the region of fine sandy soils in the southeastern part of the county. The largest areas are encountered in the vicinity of Adasburg.

The topography is undulating to gently rolling, with no steep slopes or deep ravines even along the drainage courses. Practically all the type can be cultivated. With one exception, the areas are elevated above the immediately surrounding country. The use of terraces to prevent erosion is not generally necessary, although the topography is such as to promote surface drainage.

The Appling fine sandy loam is derived from a fine-grained granite gneiss and a fine-grained schist. The latter formation does not outcrop, weathering having extended to a considerable depth.

The crops grown and the yields obtained on the Appling fine sandy loam are practically the same as on the sandy loam type.

The type in general is fairly well improved. Land values range from \$20 to \$40 an acre.

#### IREDELL FINE SANDY LOAM.

The surface soil of the Iredell fine sandy loam consists of a mellow, smooth, loamy fine sand to fine sandy loam, 7 or 8 inches deep, varying in color from ashen gray or bluish gray in low positions to brown in the better drained situations. The upper subsoil usually is a yellow, friable fine sandy loam, but gradually becomes heavier as the depth increases, and passes at 12 to 24 inches into a heavy, plastic, sticky, tough clay, brownish yellow, with a distinct greenish or olive tinge. This material quickly grades into the rotten diorite rock. The heavy texture and the color in the lower part of the 3-foot section are distinguishing characteristics of this type. Mottlings of drab, yellow, gray, and, in places, of red are common.

About 30 per cent of the total area mapped as Iredell fine sandy loam consists of soil which is not typical, the nonconforming material being included with this type because its characteristics more closely resemble those of the Iredell fine sandy loam than of any other type mapped. There are also included with the type patches of

stony soil, as well as small areas of the Appling and Cecil fine sandy loam, and areas in which the subsoil is a plastic, reddish or brilliant-red clay (Mecklenburg series).

The Iredell fine sandy loam is mapped in many small areas, containing from 10 to 1,000 acres or more. The type is practically restricted to a strip of country in the southeastern part of the county, extending westward about 6 miles from the Lincoln County line and from Little River northward to Fishing Creek.

The type generally occupies relatively low situations and has a flat to gently undulating topography. Drainage conditions are imperfect on account of the lack of relief and the plastic nature of the subsoil, which arrests the downward passage of water. Crops suffer during wet seasons, and the best yields are obtained in years of light rainfall.

The natural forest growth on the Iredell fine sandy loam consists of shortleaf and loblolly pine and hardwoods, mainly oak and hickory. A comparatively small acreage of the type has been cleared and put under cultivation. Corn and cotton are the chief crops, and the yields of each are comparatively light. The type is used largely for pasture, as it supports an abundance of grass, mainly Bermuda grass, broom sedge, and lespedeza.

The Iredell fine sandy loam is better suited for general farming than for intensive crops.

#### IREDELL LOAM.

The Iredell loam has a brown or dark-brown loam surface soil extending to an average depth of about 8 inches. The subsoil is a stiff, tough, plastic clay of a yellowish-brown to greenish-yellow color. At a depth of 20 to 24 inches this material grades into a greenish, plastic clay, which gradually passes into the decomposed diorite rock.

As mapped this soil includes some variations. It is common to find a light-brown or tan-colored stratum of plastic clay in the upper 8 inches of the subsoil, and this when turned up by plowing gives the surface soil a distinct brown color. Small spots occur where the surface soil is a sandy loam. In the subsoil mottlings of red are common, and in a few areas the subsoil is deep brownish red in color. Such areas represent Mecklenburg soils which are not separated, on account of their small extent. Other variations consist of areas in which the soil is nearly black and still others of areas in which the subsoil, though having the typical greenish color, is not plastic. In the southwestern part of the county the surface soil is more sandy than typical.

In small areas angular fragments of fine and coarse grained diabase and diorite are scattered over the surface of the type and

mixed with the subsoil material. Brownish-black accretions, about the size of a pea, are also commonly scattered over the surface.

An extensive area of the Iredell loam is mapped in the northern part of the county near Norman. A number of smaller but important areas are encountered in this section of the county in the vicinity of Pistol Creek. The second most important region of occurrence is in the southern extremity of the county in the vicinity of Little River station and Ficklin. The type is also prominently developed in the western part of the county along Dry Fork near Fairy Ridge mine. Here a small area with a distinctly red soil, similar to that of the Cecil clay loam, is included.

The topography is gently undulating to level, being more even than the surrounding country, though there is sufficient relief to insure surface run-off, but the internal drainage is deficient, as the result of the plastic, impervious subsoil. The position is somewhat lower than that of the adjacent soils. The drainage courses are not marked by valley slopes as in the surrounding country, and the areas are locally referred to as "flatwoods." The type is cold and is safely tillable only within a narrow range of moisture content. Crops mature comparatively late.

The Iredell loam is derived through the weathering of dark or greenish-colored basic and sub-basic rocks, such as diorite and diabase. The bedrock is commonly exposed in road cuts.

The type has been largely cleared of its native forest growth within late years, but there are some areas of timber remaining. The growth consists of various hardwoods and shortleaf pine. There is a luxuriant growth of native grasses.

The Iredell loam in this county is a recently developed soil. It was formerly considered of little value, but is now used in the production of all the common crops, of which good yields are obtained. Corn yields from 15 to 40 bushels an acre, oats 20 to 40 bushels, and cowpeas from one-half ton to 1¼ tons of hay an acre. Cotton yields range from one-fourth to 1 bale per acre. Cotton rusts badly on this soil, but the use of kainit as a fertilizer keeps this disease within control. Crimson clover has been grown in a small way with good results.

Fertilizers are generally used on cotton, but are very seldom used for the other farm crops.

A number of well-improved farms are established on the Iredell loam. The value of the land ranges from \$15 to \$40 an acre.

The characteristics of this type make it more suitable for general farming than for special types of agriculture, such as trucking.

#### CONGAREE SANDY LOAM.

The Congaree sandy loam as mapped in this county is quite variable. The surface soil is usually a light-brown to brown sand or

sandy loam. The subsoil is of about the same texture and color as the surface soil, but contains sections of gray-colored soil. The material throughout the 3-foot profile is typically smooth and friable, and contains large quantities of mica particles. The surface soil in places consists of patches of sand and reddish-brown sandy clay loam, as well as of silty clay loam. The subsoil is even more variable than the surface soil, owing to the successive deposition of differently textured material by floods, the various strata ranging from fine sand to silty clay in texture and showing no regular arrangement in the different areas.

The Congaree sandy loam is an alluvial soil, the material having been carried from the surrounding uplands and deposited along the stream courses in times of overflow. The type as mapped occurs in narrow strips along the upper reaches of the streams, especially those rising in the wide belt of sandy soils which extends across the county. Farther downstream the type grades into the silty clay loam of this series, and between the typical sandy loam and silty clay loam there may be a zone a mile or two in width wherein the two soils are intricately mixed.

The Congaree sandy loam has a flat, gently sloping surface. The type is subject to overflows, but under normal conditions it has good drainage. The stream channels are only about 3 to 7 feet lower than the surface of the type, and it is washed and sanded in spots during heavy overflows. Crops are likely to suffer severe damage under such conditions, and consequently much of the type is used for pasture, the native grasses affording good pasturage except in the "sanded" areas.

The native forest growth on the Congaree sandy loam consists of alder, willow, water oak, and sycamore, with a little pine. Hardwoods are not as abundant as on the silty clay loam of this series. Most of the timber has been removed.

The type, where farmed, is used almost exclusively for corn production. Yields of 15 to 50 bushels an acre are obtained. Sorghum and cowpeas produce good yields of forage. Sugar cane and sorghum also are grown for sirup.

No fertilizers are used on this type, as it is naturally productive and is enriched by sediments deposited at each inundation.

#### CONGAREE SILTY CLAY LOAM.

The surface soil of the Congaree silty clay loam to a depth of 8 to 12 inches is usually a brownish-red or dark reddish brown, mellow, smooth, friable silty clay loam. The subsoil differs little from the soil, except in color, which is slightly redder, and over about 30 or 40 per cent of the area mapped even this difference does not exist. Both soil and subsoil contain divided mica.

Some notable variations occur. In places immediately along the streams the soil is more sandy than typical. This variation is common in the areas mapped along Little River. On Broad River, in the northeastern part of the county, the surface soil is a reddish-brown very fine sandy loam. Irregularities in the form of thin strata and lenses of sand and fine sand are more common in the subsoil than in the surface soil. In places a gray to drabish-gray color, as well as mottlings of gray and yellow, occur in the lower subsoil.

The Congaree silty clay loam is the most extensive bottom-land soil in the county. It occurs in narrow strips along the larger streams. The largest continuous area is found along Dry Fork and Long Creek, which form the northwestern boundary of the county. The soil is typically developed along Clark Creek, along which, about 3 miles north of Bessie, lie the widest areas. There are also typical areas along Fishing Creek and its tributaries, as well as on Upton, Kemp, Rocky, Beaverdam, and Kettle Creeks.

This type occupies level to flat areas, lying 3 to 15 feet above the stream channels. The surface is generally smooth, but in a few cases, especially along Little River and some of the larger creeks, the general evenness of the surface is interrupted by old stream channels and bayous. Drainage conditions are poor, and the type is subject to frequent overflows.

The soil material of the Congaree silty clay loam is purely of local origin, having been derived through the erosion of the upland soils and subsequent depositions of sediments by the streams during periods of overflow. The sediments deposited at the present time consist almost entirely of red clay. Layers of red clay as much as one-fifth of an inch in thickness cover the surface after floods. As a consequence, the surface soil is in many places heavier in texture than the subsoil.

A forest growth of water oak, white oak, hickory, sycamore, elm, poplar, ash, sweet gum, and black gum, with some maple, occupies more than 20 per cent of the area of the type. The greater part of the cleared or treeless area is used as pasture and hay land. Corn, the most important cultivated crop, yields 20 to 60 bushels an acre. Cow-peas make a luxuriant growth, yielding from three-fourths ton to 2 tons of hay per acre. No cotton is grown. Fertilizers are never used on this type.

The Congaree silty clay loam is naturally a strong, productive soil, but on account of overflows the type is not used as extensively as it would otherwise be. The danger of flooding could be lessened by keeping the streams clear of obstructions and this with artificial drainage would reclaim a large acreage of productive soil, constituting the best corn soil in the county.

## WICKHAM SANDY LOAM.

Areas shown on the map in Congaree silty clay loam color marked with inclusion symbol represent the Wickham sandy loam. This type has a brownish-red to reddish-brown, friable, mellow sandy loam surface soil about 7 inches deep. The subsoil in the upper part is a reddish, friable sandy loam, gradually becoming heavier with increase in depth and passing at about 15 or 18 inches into a red, friable sandy clay. The surface soil contains much fine material and grades close to a fine sandy loam in texture.

The Wickham sandy loam is closely associated with the Cecil sandy loam, from which it differs in manner of formation and in having a friable sandy clay subsoil. It differs from the Congaree sandy loam in being a second-bottom soil, not subject to overflow.

Two small areas of Wickham sandy loam are encountered along Little River about 2 miles west of Fishdam Ford, and two other areas are mapped in the northeastern part of the county along Broad River.

The material composing this soil type represents old alluvium, originating from Piedmont crystalline-rock formations, which was deposited by the streams in earlier times when they flowed at higher levels than at present. The type now lies well above overflow, standing 10 to 20 feet above high-water mark of the streams.

The type occupies nearly flat areas with a slight slope toward the stream. The areas are well drained. Originally a forest of hardwoods covered these areas, but they have all been cleared and have been under cultivation since the earliest settlement of the county.

This soil is in most places naturally productive, but farming is carried on by tenants and the highest yields possible are not obtained. Cotton yields one-fourth to three-fourths bale per acre, corn 12 to 25 bushels, and oats about 15 to 25 bushels. With proper treatment the type would be one of the most productive in the county.

## MEADOW (CONGAREE MATERIAL).

Meadow (Congaree material) represents first-bottom alluvial soils so variable in texture that definite separation into types can not be made.

The greater part of the area is composed of sand flats, in which the material consists of coarse sand and fine gravel interbedded with layers of silt and clay. The coarse material is derived chiefly from the surrounding Cecil very coarse sandy loam areas of the uplands.

Meadow (Congaree material) is most extensive along Morris and Newford Creeks, in the northeastern part of the county. One or two small areas are encountered along other creeks.

No farming is done on this soil. It supports a forest growth chiefly of alder and willow, with a few pine and oak trees. The land has little agricultural value, as water spreads over it after rains, carrying with it sandy material from near-by areas of other soil. The topography is flat and the drainage is poor.

As mapped, Meadow (Congaree material) includes a few small areas of Congaree silty clay loam and Congaree sandy loam, where cultivation can be carried on with success.

#### SUMMARY.

Wilkes County, Georgia, is situated in the northeastern part of the State, in the Piedmont Plateau. It has an area of 479 square miles, or 306,560 acres.

The topography in general is gently rolling, and there is very little broken country. The county lies within the basin of the Savannah River, and the drainage is well established.

Wilkes County is one of the original seven counties of the State. It was first settled about 1773. In 1910 the rural population was 20,376, giving a density of about 43 persons to the square mile. Washington is the county seat. Many small settlements and trading points are scattered over the county. The chief markets are Atlanta and Augusta. Part of the county lacks railroad facilities.

The climate is characterized by mild winters, with occasional cold periods, and warm summers. The mean annual precipitation of 48.82 inches is well distributed throughout the year and is ample for all the crops.

The agriculture of the county is based upon cotton production. The county produces about 25,000 bales of cotton annually, or somewhat less than one-half bale per acre. Corn, oats, and cowpeas are important crops, but they are not grown in sufficient quantities to supply the local needs. Live-stock products are not sufficient for the local consumption. The production of pork is increasing.

Exclusive of Meadow (Congaree material), 17 types of soil are mapped. All but three types are upland soils derived through the weathering of the underlying crystalline rocks. Two types are alluvial first-bottom soils, and one type is an alluvial terrace soil. The soils are grouped in five series. The Cecil series, including nine types, is the most extensive.

The Cecil very coarse sandy loam is an unusually coarse textured soil. It is an early type and is used with good results for general farming.

The Cecil coarse sandy loam is a desirable soil, wholly in cultivation.

The Cecil sandy loam is an extensive type. It is well suited for general farming, as well as for trucking.

The Cecil fine sandy loam is a general-farming type, heavier in texture than the sandy loam and lighter than the clay loam.

The Cecil clay loam is the most extensive type in the county. It is adapted to general farming, and is a strong, productive soil.

The Cecil clay is a strong soil, but of little agricultural importance, owing to its small extent.

The stony soils of the Cecil series generally are inferior to the other types on account of the stone content, which interferes with cultivation and the use of harvesting machinery.

The Appling soils, the coarse sandy loam, sandy loam, and fine sandy loam, are generally lighter in color and in texture than those of the Cecil series. They are successfully used for general farming, but are better suited for truck growing, where economic conditions favor this special industry. The best yields on these types are obtained in dry seasons.

The Iredell fine sandy loam and loam types are characterized by their heavy, plastic, sticky subsoils. Cotton is inclined to rust on these soils. They are well suited to the production of small grains and grasses.

The Congaree sandy loam and silty clay loam types are first-bottom, alluvial soils. They are well suited to corn and hay production and for use as pasture land.

The Wickham sandy loam is an inextensive terrace soil of high natural productiveness.

Meadow (Congaree material) comprises sand flats which occur along several of the streams. The areas are not suitable for use as farm land.

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