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Soil Survey
of
Abbeville County, South Carolina

By

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and

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Bureau of Chemistry and Soils

In cooperation with the

South Carolina Agricultural Experiment Station

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SOIL SURVEY OF ABBEVILLE COUNTY, SOUTH CAROLINA

By F. R. LESH, in Charge, W. J. GEIB, A. E. SHEARIN, C. H. WONSER, and W. D. LEE

COUNTY SURVEYED

Abbeville County is in the northwestern part of South Carolina (fig. 1). Savannah River forms its western boundary and separates it from the State of Georgia. Saluda River, which forms a part of the eastern boundary, separates it from Laurens County. Abbeville, the county seat, in the southeastern part, is about 58 miles south of Greenville, 90 miles west of Columbia, and 55 miles north of Augusta, Ga. The area of the county is 510 square miles, or 326,400 acres.

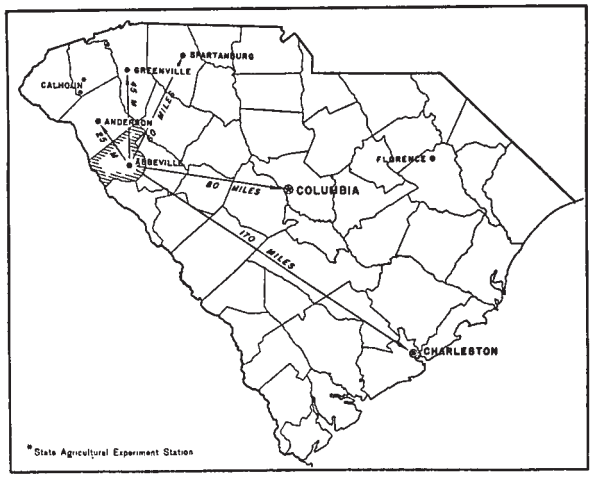


FIGURE 1.—Sketch map showing location of Abbeville County, S. C.

The relief, in general, is that of a denuded plain, which has been thoroughly dissected by drainage, both arising within and flowing through and along the sides of the county. The land ranges from undulating and rolling to strongly rolling, steep, and broken. The larger and more continuous nearly level, undulating, and gently sloping areas lie north and northwest of Abbeville and near Donalds, Due West, Antreville, and Lowndesville. A rather large undulating to gently rolling area, known as the "flatwoods", lies east of Calhoun Falls and comprises a somewhat basinlike area. This flatwoods section is one of the conspicuous features of the general topography. Smaller fairly smooth areas occur throughout the county. The rolling, strongly rolling, and more broken gullied areas lie along Savannah River, Saluda River, and the other large streams.

Surface drainage of the less rolling areas is good, with the exception of the flatwoods, where it is only fair, and subsoil drainage is poor. Drainage of the more rolling country ranges from good to excessive, and erosion is actively removing the surface soils, where

the land is poorly managed, and carving out gullies, some of which are gradually encroaching on the areas of smoother relief.

The elevation above sea level ranges from 391 to 770 feet, but the greater part of the county lies at an elevation of about 500 feet. The stream levels of Savannah and Saluda Rivers range from 90 to 320 feet below the higher plain or the general level of the plateau.

The virgin forest of Abbeville County [1] consisted mainly of large deciduous trees, which stood far apart, and shortleaf pine grew sparingly among them. The forests were practically free from brushy undergrowth, but wild grasses, wild cane, strawberries, crowfoot grass, and wild pea vines grew on the virgin forest floor. The present native vegetation consists chiefly of various species of pine, with old-field pine as the predominating second growth. Oaks of several species, as red, white, scarlet, post, water, and blackjack; hickory; and red cedar are returning as a second growth. Some of the second-growth hardwood is scrubby and of little value for timber. The undergrowth in places is thick and consists of dogwood, redbud, wild plum, locust, sassafras, sumac, scrubby oaks, and a profusion of briers. Lespedeza, carpet grass, crabgrass, broomsedge, and Johnson grass constitute the smaller vegetation. Little correlation is now evident between the present tree growth and the soil types.

The present boundaries of the county include only a small portion of the greater part of northern South Carolina, which was ceded by the Cherokee Indians to the white settlers in 1755. From this large territory, known as the Ninety-Six District, Abbeville County was established in 1793 and constituted approximately 1,000 square miles. Nearly half the area was taken in 1897 to form Greenwood County, and in 1917 a smaller portion was taken to form McCormick County.

The early settlers were of English, German, Scotch, and French descent, who emigrated from Pennsylvania, Maryland, Virginia, and North Carolina or were refugees from the vicinity of Charleston during the Revolutionary War. The era of settlement practically terminated about 1800, but a few people from adjoining counties came later. The Federal census of 1930 reports a total population of 23,323, of which 18,909 people are classed as rural. The average density of population is 45.7 persons a square mile, and settlement is well distributed over the county, except on the more broken and rolling areas bordering Savannah, Rocky, Little, and Saluda Rivers, and lower Long Cane Creek. Slightly more than 50 percent of the present population is native white. For several decades prior to 1930 the Negro population outnumbered the white.

There are no large towns or cities. Abbeville, with a population of 4,414, is the only city and the county seat. The larger towns are Calhoun Falls, Due West, Donalds, Lowndesville, and Antreville, all of which have a post office and a high school. There is a rural post office at Level Land and a rural high school at Sharon, 5 miles southwest of Abbeville. Erskine College is at Due West. The towns and city are the local markets and shipping points for the

[1] RAMSEY, D. HISTORY OF SOUTH CAROLINA FROM ITS FIRST SETTLEMENT IN 1670 TO THE YEAR 1808. v. 1–2, illus. Newberry, S. C. 1855–58.

agricultural products that are not consumed locally. A cotton mill and a cotton-seed oil mill are located at Abbeville and a cotton mill at Calhoun Falls, but most of the cotton is shipped to distant mills either by rail or truck.

The Seaboard Air Line, the Southern, the Piedmont & Northern (electric), and the Charleston & Western Carolina Railways cross the county and furnish sufficient transportation to outside markets. Several bus lines provide transportation to the larger towns of the State. Concrete and oil-bound macadam State highways traverse the county east and west, and from Abbeville northward toward Greenville. Sand-clay and gravel-surfaced State and county highways serve nearly every section. Many of the county roads are graded and sand-clay surfaced, and they are good except during rainy weather. Telephone service is not extensively developed, but rural delivery of mail reaches practically all sections. Schools and churches are conveniently located and are adequate. Well water is obtained at depths ranging from 25 to 60 feet, and spring water is used on many farms.

CLIMATE

The main features of the climate are an average annual precipitation of about 47 inches, a mean annual temperature of 61.5° F., mild winters with only slight snowfalls, long warm summers, few cloudy days, moderate to high evaporation of moisture, and prevaling winds from the west. The climate is continental and is mild

TABLE 1.—*Normal monthly, seasonal, and annual temperature and precipitation at Greenwood, Greenwood County, S. C.*

[Elevation, 671 feet]

Month	Temperature			Precipitation			
	Mean	Absolute maximum	Absolute minimum	Mean	Total amount for the driest year (1929)	Total amount for the wettest year (1925)	Snow, average depth
	°F.	°F.	°F.	*Inches*	*Inches*	*Inches*	*Inches*
December	43.6	76	11	4.37	2.41	4.15	0.5
January	43.0	76	4	3.91	9.54	4.38	.7
February	44.4	80	−5	4.73	2.12	9.22	1.5
Winter	43.7	80	−5	13.01	14.07	17.75	2.7
March	52.7	89	16	4.29	2.16	10.75	.1
April	61.2	96	28	3.11	1.47	5.91	(1)
May	70.3	102	38	3.77	1.21	7.01	.0
Spring	61.4	102	16	11.17	4.84	23.67	.1
June	77.2	105	42	3.03	.96	5.49	.0
July	79.5	109	56	5.21	1.23	4.25	.0
August	78.3	104	53	4.93	1.06	1.03	.0
Summer	78.3	109	42	14.07	3.25	10.77	.0
September	73.4	100	41	3.64	1.58	14.31	.0
October	62.2	99	22	2.93	3.03	12.69	.0
November	51.9	82	19	2.67	3.42	3.34	.2
Fall	62.5	100	19	9.24	8.03	30.34	.2
Year	61.5	109	−5	47.49	30.19	82.53	3.0

[1] Trace.

and healthful. The average length of the frost-free season is 231 days (from Mar. 23 to Nov. 9, inclusive), but killing frosts have occurred as late as April 17 and as early as October 11.

The rainfall is well distributed throughout the year, the greater part falling during the growing season. The fall season is generally dry, and the weather is favorable for harvesting crops. Hailstorms occur occasionally, and extended periods of drought are rather rare. An abundance of rainfall and a long growing season make Abbeville County a good agricultural area from a climatic point of view. Cover crops, a few hardy vegetables, and the lowland pastures usually are not injured by winter freezing. Farm labor may be carried on throughout the greater part of the year.

Table 1 gives the more important climatic data, as recorded by the United States Weather Bureau station at Greenwood in the adjoining county. These data are representative of climatic conditions throughout most of Abbeville County.

AGRICULTURE

The earliest settlement and the beginning of agriculture in the territory now included in Abbeville County took place along the banks of Savannah and Little Rivers and Long Cane Creek more than 180 years ago. The soils of the bottom land were used for pasture, and beef cattle and horses were raised and driven to distant markets. A few years later, settlement of a more permanent character began; corn, oats, rye, wheat, hemp, grapes, and other crops were grown; and hogs, beef cattle, sheep, and horses were raised. Indigo, tobacco, flax, and cotton became commercial agricultural products at a later date. After the invention of the cotton gin and after railroad transportation reached the county, agricultural development increased rapidly. The plantation system of farming prevailed until the Civil War. The plantations were practically self-supporting, as each was a combination cotton, grain, and livestock farm. Products from all or any one of these three sources were produced in abundance for market. Since the Civil War, however, cotton has been produced as a cash crop, almost to the exclusion of other crops and livestock.

Table 2, compiled from the United States census reports, gives the acreage of the principal crops grown in stated years.

TABLE 2.—*Acreage of principal crops in Abbeville County, S. C., in 1899, 1909, 1919, 1929, and 1934*

Crop	1899	1909	1919	1929	1934
	Acres	*Acres*	*Acres*	*Acres*	*Acres*
Corn	40,212	32,935	29,206	19,517	25,880
Wheat	7,712	939	1,792	1,231	4,998
Oats	8,258	9,975	5,534	8,945	10,770
Potatoes	46	119	105	129	155
Sweetpotatoes	668	754	939	318	900
Hay and forage	2,468	6,370	6,064	1,610	8,827
Cotton	94,001	97,092	69,572	45,877	27,511

Abbeville County is essentially agricultural, and cotton for many years has been the principal crop. Since the advent of the cotton

boll weevil about 1920, however, the acreage devoted to this crop has decreased markedly. The acreage devoted to corn in 1929 showed a decrease from the previous census report, but by 1934 the acreage was 6,363 acres larger than in 1929. This is the most important subsistence and feed crop. The acreage in oats and wheat increased between 1929 and 1934, and that devoted to hay and forage also increased in the same years. The average acre yields of each of these crops has increased, which probably indicates a tendency toward better or more intensified farming. The crops grown less extensively include rye, barley, peanuts, vegetables, sorgo, orchard fruits, grapes, small fruits, and pecans, practically all of which are produced for consumption at home or as feed crops.

The State extension service reports that since 1930 the corn, oats, hay, and forage crops have been sufficient to supply home needs, and that wheat is the only important crop that does not meet such requirements.

Table 3, compiled from reports of the Federal census, gives the number and value of domestic animals and poultry in 1920, 1930, and 1935.

TABLE 3.—*Number and value of livestock in Abbeville County, S. C., in 1920, 1930, and 1935*

Livestock	1920		1930		1935	
	Number	*Value*	*Number*	*Value*	*Number*	*Value*
Horses	1,314	$183,447	427	$30,599	306	(1)
Mules	4,947	980,568	3,923	376,329	3,457	(1)
Cattle	9,754	448,771	5,378	247,098	8,155	(1)
Goats	194	1,074	295	672	(1)	(1)
Swine	8,860	120,790	3,856	39,776	5,064	(1)
Poultry	89,504	94,976	60,361	----------	(1)	(1)
Sheep	156	924	1,052	5,480	376	(1)

[1] Not reported.

The number of cattle increased 2,777 between 1930 and 1935, more than half of this increase being cows and heifers 2 years old and over. The number of hogs increased almost one-third during this same period, the actual gain being 1,208 head.

Commercial fertilizer is used by practically every farmer. Home mixing is practiced by some farmers and is advocated by the State extension service. The formulas used in the home-mixed fertilizers are about as follows: 2–8–2,[2] 3–8–3, and 5–12–5, which are similar to those of the ready-mixed fertilizers. The Federal census reports $307,330 spent for fertilizers in 1929. Fertilizers are used on every cultivable soil except the soils developed in the first bottoms. Nitrate of soda is applied by nearly all farmers as a top dressing or side dressing on the young stands of cotton, corn, wheat, and oats. About 60 tons of lime were used in this county in 1930. Very little barnyard manure is produced on the individual farms, except on the dairy farms and on the farms where a considerable number of cattle are kept. About 10 percent of the farmers plow under green-manure crops consisting of vetch and sorgo, and approximately 75 percent use legumes, with small grains and sorgo as companion crops, sown between the cotton and corn rows at the last cultivation.

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

The farms range in size from very small to several thousand acres, and the average size is 80.2 acres.

The Federal census for 1935 reports 27.6 percent of the farms operated by owners, 0.1 percent by managers, and 72.3 percent by tenants. The prevailing system of rental is the share system, in which the landlord furnishes the land, seed, work animals, feed for the work animals, implements, and one-half of the fertilizer, and in return receives one-half of all crops.

The buildings on the better farms are large but of mediocre construction. Many are painted. On the average farm there are a dwelling, a barn for the work animals, and generally buildings or sheds to house feed, cotton, and machinery. The ordinary farm equipment of the tenant consists mainly of one-horse implements—a plow, a spike- or spring-tooth harrow, a fertilizer drill or guano horn, a cotton planter, a corn planter, and a farm wagon. A few farmers have stalk cutters. In cultivating cotton and corn, the farmer uses a one-horse plow with sweeps, shovels, and half shovels, or bull tongues. The better farmers and owner operators use disk harrows, mowing machines, hayrakes, and two-horse plows. Very few use two-horse implements for cultivation or own grain binders or tractors, and a still smaller number own threshing outfits or Martin ditchers. Mules furnish the chief draft power, although some horses and a few tractors are used.

Most of the milk cows are grade Jerseys, and a few dairymen have registered herds of this breed. Some grade Guernseys are on a few farms. Practically all the sheep are of the Hampshire breed. Hogs are largely Poland Chinas and Berkshires.

SOILS AND CROPS

Agriculturally Abbeville County is representative of the piedmont-plateau counties of South Carolina. The soils and their attendant methods of tillage, as well as the crops that are successfully grown, are essentially identical with those of the gray sandy land and red clay land districts. During the early settlement and agricultural development of the northwestern part of the State, and for several generations thereafter, this county ranked first in agriculture. It was the most aristocratic development of upper South Carolina.

Practically every part of the county has at various times been under cultivation, that is, the center of active cultivation of the soils has shifted from place to place. Fields that had been in use for a long time and were considered worn out were abandoned, and new ones were cleared in the forest, until nearly all the land at some time or other has been in crops.

The greatest differences existing in the soils of this county occur in the surface layers which range in texture from sandy loam to clay loam and in color from light gray to brown and red. One common characteristic is the scarcity of organic matter in the surface layers, in either the forested or cultivated state. The subsoils have a common characteristic, in that they are red stiff and usually fairly brittle heavy clays, except in the brown loam soils which are noted for their reddish-brown or yellowish-brown heavy tough plastic clay subsoils.

A fairly large variety of soil-forming materials or rock formations underlie these soils, and they differ greatly in chemical and

physical compositions. Many of the soils have developed from light-colored granites and similar rocks commonly exposed in road cuts and elsewhere; others are underlain by hard heavy black rocks referred to by many persons as niggerheads; and a few have developed from a fine-grained schist rock which somewhat resembles fine-grained sandstone.

With the exception of the bottom lands along many of the larger streams throughout the county and the flatwoods, or brown loam soils, occurring largely in the southwestern part east of Calhoun Falls, surface drainage of the land ranges from good to excessive, and subsoil drainage also is good. The brown loam soils have only fair surface drainage and poor internal drainage.

The relief of Abbeville County is that of an undulating plain that becomes more rolling as it approaches the larger streams, where it ranges from strongly rolling to hilly and broken above the first-bottom land.

Before agricultural development began, the vegetation consisted chiefly of a wide variety of deciduous trees, mainly several species of oaks, hickory, chestnut, elm, walnut, and poplar. Some cedar grew on the better drained uplands, and on the wetter land, willow, beech, birch, ash, black gum, sweetgum, and a few sycamores. In the virgin stand very few shortleaf pines grew in association with the deciduous trees.

The Federal census for 1935 reports 78.8 percent of the county in farms, and 109,181 acres as the total crop land. From these figures it is estimated that about one-third of the county is actually devoted to cultivated crops, approximately one-sixth is in pasture, and the rest is in abandoned fields and forest land which has been cut over or is too broken and severely eroded to be used for pasture or cultivated crops. Such land is now reforesting to shortleaf and old-field pines, together with a few scattered oaks, and a fair undergrowth, where not destroyed by fire.

Practically all the mechantable timber has been cut, and the present forests consist chiefly of small second-growth pines. The more recently abandoned land supports little vegetation except wild and tame grasses, broomsedge, and briers.

Large areas of the more rolling and hilly land are so severely washed, eroded, and gullied that the entire soil mass has in many places been removed down to the parent material. These areas have reached such a condition that reclamation for agricultural purposes is not practical under present economic conditions. It would be possible, however, with a great expenditure of time, money, and labor, to reclaim some of this land. Almost complete abandonment and subsequent erosion has taken place over extensive areas along the western, eastern, and southeastern borders, as well as along the larger streams in the interior. Erosion has not been the primary cause for abandonment of farm land but has frequently resulted from allowing the bare fields to lie idle. Desertion of farm land may be attributed largely to the advent of the boll weevil about 1920 and also to the marked decline in cotton prices, which began shortly afterward, and to their continued steady decline.

The present agriculture consists primarily in the production of cotton. Other crops, which occupy smaller acreages, are corn, oats, wheat, hay and forage, potatoes, and barley, listed in order of their

importance. These crops are grown to greater or less extent on all the cultivable soils, but cotton is not grown on meadow (Congaree material). The gray sandy land is preferable for cotton under boll-weevil conditions, because these soils warm up earlier in the spring, may be prepared and planted sooner, and mature a crop earlier than the heavy clay soils. These soils are also preferable because of the ease with which they may be worked under variable moisture conditions, with light implements and work animals.

Of the total farm land under actual cultivation, 50 percent is devoted to cotton, 25 percent to corn, and the rest to all other crops. The hay and forage crops commonly grown are cowpeas and sorgo, and soybeans or vetch and oats, the combination crop being planted after the oat crop is harvested. On many farms sorgo, potatoes, or both occupy probably 12½ percent of the land under cultivation.[3]

The 1935 Federal census reports that 27,511 acres were planted to cotton in 1934 and that the yield was about one-third of a bale an acre. At the present time, in fact ever since the invention of the cotton gin, cotton is the one reliable cash crop and is the basis of the agriculture of the county. The soils and the climate are suitable for growing cotton, and, with liberal applications of commercial fertilizers, a fair yield is obtained. Cotton is not a perishable crop and may be stored at a low cost for several years, so that advantage may be taken of the fluctuating market prices. It can always be sold at any time for cash at nearby markets. It is recognized among bankers and merchants as first-class security, either for a cash loan or for credit. As it has been grown as the chief crop for many years, the production and handling of cotton is thoroughly understood by the farmer and his helpers under almost every climatic and economic condition. Although such crops as corn, oats, wheat, or hay may be almost entirely planted and harvested by machinery this is not the case with a cotton crop; but to offset the fact that machinery has not been perfected to harvest the cotton, cheap labor is available to perform the task. As very little farm equipment is required to plant, grow, and harvest a crop of cotton, the investment and overhead expense of a cotton grower is reduced to a minimum.

Corn was planted on 25,880 acres in 1934. This crop is grown exclusively for consumption on the farm—to feed work animals and poultry, to fatten a few hogs, and to provide a small quantity of meal for the home. Of late years the crop has been sufficient to supply the local demand. Corn is grown on every soil on which cotton is grown and, in addition, on the bottom lands. Large yields are obtained on the soils of the first bottoms without the use of fertilizer, but the hazard of losing the crop by floods must be taken into account.

Oats are produced, both for the grain and for the roughage they furnish when cut green for hay. Oats, as a rule, are a part of the hay crop in such combinations as vetch and oats or soybeans and oats. The combined acreage of all hay and forage crops grown in 1934 was 8,827 acres. These crops are sufficient to meet the farmers' needs. They are commonly grown on such soils as will produce cotton.

[3] Figures supplied by the extension service agent of this county.

On many farms, truck crops, sorgo, orchard fruits, grapes, and small fruits are produced in sufficient quantities to supply the needs of the home and a small excess for sale at the local markets. Pecans are adapted to the soils of this county, and a few commercial orchards have been planted. Practically all these minor crops are adapted to the soils and climate, but the lack of good nearby markets and the general feeling among the farmers that they must have a strictly dependable cash crop forbid their extensive production. Within the last few years an increasing tendency has developed, especially among the owner operators and the better tenants, to produce enough feed for the livestock and to more nearly approach a self-supporting status than has prevailed heretofore.

Feeding of livestock is practiced on very few farms and only on a small scale. A few farmers are raising beef cattle, 12 are raising lambs and sheep for mutton and wool, 12 are raising hogs for market, and about 100 are selling whole milk, but only 6 have dairy herds numbering more than 6 cows. Poultry and eggs are produced on many farms for local markets. Very little, if any, meat is shipped out of the county.[4]

The scene of the most active agriculture is north and west of Abbeville; in the vicinities of Donalds, Due West, and Antreville; in the section between Antreville and Lowndesville; and east of Calhoun Falls as far as Little River. This distribution of active cultivation is owing primarily to soil characteristics and other factors that affect tillage.

Taking into consideration their characteristics, their agrcultural use, and their crop adaptations, the soils may be classed in four broad groups as follows: (1) Light-gray sandy loam soils, (2) heavy red clay loam soils, (3) brown loam soils, and (4) miscellaneous land types. A high proportion of the soils show lack of uniformity, that is, they have textural, color, and other variations within very short horizontal distances—a condition common to the soils of the piedmont-plateau section.

In the following pages the soils are described in detail, and their agricultural importance is discussed; their distribution is shown on the accompanying soil map; and their acreage and proportionate extent are given in table 4.

TABLE 4.—*Acreage and proportionate extent of the soils mapped in Abbeville County, S. C.*

Soil type	Acres	Per-cent	Soil type	Acres	Per-cent
Cecil sandy loam	9,984	3.1	Davidson clay loam, schist phase	2,048	0.6
Cecil sandy loam, mixed phase	39,808	12.2	Georgeville silty clay loam	1,856	.6
Cecil fine sandy loam	1,920	.6	Mecklenburg loam	9,472	2.9
Cecil fine sandy loam, mixed phase	12,864	3.9	Mecklenburg loam, mixed phase	2,688	.8
Cecil coarse sandy loam	1,024	.3	Iredell loam	12,544	3.8
Cecil coarse sandy loam, mixed phase	10,112	3.1	Wickham fine sandy loam	320	.1
Appling sandy loam	5,248	1.6	Wilkes sandy loam	22,656	7.0
Appling coarse sandy loam	3,392	1.0	Worsham sandy loam	1,344	.4
Durham sandy loam	2,752	.8	Cecil clay loam, broken phase	36,416	11.2
Georgeville fine sandy loam	1,024	.3	Meadow (Congaree material)	25,344	7.8
Cecil clay loam	109,120	33.4	Cecil clay loam, stony phase	1,920	.6
Davidson clay loam	9,408	2.9	Orange silt loam	576	.2
Davidson clay loam, sandy phase	2,560	.8	Total	326,400	

[4] Data supplied by the extension service agent of this county.

LIGHT-GRAY SANDY LOAM SOILS

The light-gray sandy loam soils occupy 26.9 percent of the county. They include all the soils commonly referred to as "gray land." A very large proportion of these soils is in active cultivation. The group includes all the types and mixed phases of the Cecil series except Cecil clay loam and its broken and stony phases, all the Appling and Durham soils, and the fine sandy loam of the Georgeville series. Most areas of these soils are in the northern two-thirds of the county on the interstream divides, where erosion is not severe. The relief ranges from undulating through gently rolling to moderately rolling and gently sloping. All the soils are naturally well drained, owing to the sandy texture and mellow friable structure of the surface layers, the moderately friable subsoils, and the relatively high position which the soils occupy. Scattered over the surface of practically every soil of this group are more or less small angular quartz fragments which range in diameter from one-half inch to 4 inches. The fragments occur almost entirely in the surface soil. Throughout the northern half of the county the fragments occur in sufficient quantities to be shown by symbols on the soil map, but they are not sufficiently abundant to seriously interfere with cultivation.

These sandy loam soils are easy to work with light implements and light draft power, yet they lend themselves admirably to the use of improved machinery. Terracing is essential on the more rolling and sloping fields, to prevent surface washing, gullying, and subsequent damage to growing crops. The ridge type of terrace and contour cultivation is commonly used (pl. 1), although the broad-based terrace would probably be more efficient and more satisfactory.

The soils of this group are naturally very low in organic matter. They contain a large quantity of white quartz sand and consequently are light gray or gray. Field tests show them to range from moderately to strongly acid throughout. They range in texture from fine sandy loam through sandy loam to coarse sandy loam. Leaching of soluble plant nutrients has been extreme, but the physical properties of the soils are such that they respond readily to fertilization and produce the most profitable crops over a period of years. Their light texture, excellent surface drainage, and good internal drainage enable them to warm up several days earlier in the spring than is possible with the heavy red clay loam soils, and they can be cultivated under a wide range of moisture conditions.

Crops growing on these soils with sandy topsoils are better able to withstand periods of moderate drought than are crops growing on soils with heavy clay loam surface soils. The subsoils of these soils are dominantly stiff but brittle clays, and they range in color from red to yellow. The subsoils of the Cecil soils are stiff but brittle red clay; of the Appling soils are yellowish-red or reddish-yellow stiff but brittle clay, in the lower parts mottled or streaked yellow and red stiff but brittle clay; of the Durham soil is yellow or deep-yellow friable crumbly clay; and of the Georgeville soil is red stiff yet friable smooth silty clay. The subsoils of all these soils are of such texture, structure, and consistence as to absorb and retain a rather large proportion of the rainfall, thus affording a moisture

reserve for the overlying sandy surface layers. The potash content of this clay layer is high, and the layer is also the zone of concentration of the other plant nutrients.

A large proportion of the cotton, sweetpotato, vegetable, small-grain, corn, and hay crops is produced on these soils. The fact that these soils may be worked, without bad effects, when their moisture content is high and that they warm up early in the spring, makes them ideal soils for cotton under boll-weevil conditions. Although no tobacco and very few peanuts are grown in this county, there seems to be no reason why these crops, as well as orchard fruits, small fruits, pecans, grapes, and vegetables, cannot be produced on the sandy soils, as such crops are grown successfully on similar soils in more northern and more southern latitudes of the piedmont plateau.

Cecil sandy loam.—Cecil sandy loam is one of the best soils in the county for the production of cotton, small grains, corn, hay, vegetables, and fruits. It is the most desirable crop land from the points of view of high average yields during either wet or dry growing seasons and the ease with which it may be handled under a wide range of moisture conditions.

The 3- to 6-inch surface layer in cultivated fields when dry is gray or grayish-yellow and when moist is darker gray or reddish-yellow friable loam or sandy loam. Spots or small areas of yellowish red and light red occur where the sandy covering has been thinned by erosion and the red subsoil material has been plowed up, thereby influencing the color of the surface layer. The surface layer is underlain by yellow or faintly reddish yellow sandy loam or heavy sandy loam, which extends to a depth ranging from 10 to 15 inches. The texture of this soil, as well as that of its mixed phase, is variable. It is a medium sand containing a comparatively high percentage of either coarse sand or fine sand. The upper part of the subsoil is reddish-yellow or yellowish-red moderately heavy but friable sandy clay or heavy sandy clay, which, at a depth ranging from 12 to 15 inches passes into red stiff but brittle clay, and this continues to a depth ranging from 50 to 60 inches, below which it grades into lighter red, streaked with yellow and gray, friable clay. This clay is underlain by red, mottled or streaked with yellow, light-brown, and gray, friable decomposed coarse-grained granite.

In a few places at the bases of the slopes the sandy loam has accumulated to a depth ranging from 15 to 20 inches, as the result of surface wash and colluvial action. Throughout the areas of Cecil sandy loam are small spots where small angular quartz fragments occur on the surface and mixed with the surface soil. These spots are shown by gravel smybols. Spots of red clay loam are of frequent occurrence in the sandy loam areas, in places where surface erosion has been active.

The relief ranges from almost level to undulating and gently rolling. The land lies favorably for farming operations and the use of improved machinery. It is everywhere well drained, only the more sloping areas being subject to sheet erosion.

Cecil sandy loam has a total area of 15.6 square miles. It occurs in rather small bodies widely scattered throughout the central and

northern parts of the county and is most prominently developed north and northwest of Due West near the county boundary, and north and south of Abbeville.

The principal crops are cotton, corn, oats, hay, and forage; and the minor crops are sweetpotatoes, potatoes, wheat, rye, soybeans, vetch, sorgo, orchard fruits, and garden vegetables. Perhaps 90 percent of the land is under cultivation. About 50 percent of the cultivated land is used for cotton, 20 percent for corn, 10 percent for oats, 10 percent for hay, and 10 percent for miscellaneous crops.

Cotton yields from 200 to 350 pounds of lint an acre, corn 10 to 20 bushels, oats 20 to 45 bushels, and hay 1½ to 2 tons. Yields of other crops are usually higher than the average for the county.

The fertilizers generally used on this soil are 3–8–3 or 4–10–4 mixtures, and they are usually home mixed. Occasionally a 4–12–4 mixture is used, and guano is used by some farmers. Nitrate of soda is generally used as a side dressing or top dressing. Very little lime is used except to obtain a stand of alfalfa. Cotton receives an acre application ranging from 150 to 400 pounds of a 3–8–3 or 4–10–4 mixture, with 75 or 100 pounds of nitrate of soda as a side dressing; corn, 100 to 150 pounds of 3–8–3 or guano, with from 50 to 100 pounds of nitrate of soda as a side dressing when the plants are about 20 inches high; and oats, as a rule, are not fertilized at the time of sowing, but receive from 50 to 100 pounds of nitrate of soda in the spring when the plants are about 4 inches high. The hay crop, except the oats which are cut green, is never fertilized.

Cecil sandy loam, mixed phase.—The mixed phase of Cecil sandy loam differs from the typical soil chiefly in the lack of uniformity in the thickness of the sandy loam surface layer or, locally, the almost entire absence of a sandy loam topsoil overlying the red clay subsoil. The sandy covering may range from a mere film to 8 or more inches in thickness within very short horizontal distances. Fields devoid of vegetation during the winter present a decidedly spotted appearance, and, although the gray or grayish-yellow mellow friable sandy loam predominates, the soil is unevenly spotted with irregular-shaped streaks or areas of yellowish-red or light-red sandy clay loam and clay loam. When the soil is wet the red color of the clay exposures appears darker, and the spotted appearance of the field is intensified. Plowing or otherwise disturbing the surface of a field composed of Cecil sandy loam, mixed phase, has a similar effect on the color. In some places a dry surface soil or an undisturbed bare field may appear to be typical Cecil sandy loam, yet when wet or after plowing it will take on a decidedly spotted appearance. The frequency with which the yellowish-red or light-red areas occur makes it impractical to separate them on the soil map, and the name "mixed phase" is used to designate this condition of the surface soil.

Where the surface soil is sandy loam and its underlying layer sandy clay loam, the soil is similar in every respect to typical Cecil sandy loam. In the areas of yellowish-red or light-red sandy clay loam or clay loam (galled spots, as they are called locally), the surface layer is very similar to that of Cecil clay loam which is described later in this report.

The relief of soil of the mixed phase is slightly more undulating, sloping, and rolling, and surface drainage is more rapid, resulting in washing or sheet erosion. On account of its more rolling relief, terracing is more essential on this soil than on the typical soil.

The extent of the mixed phase is considerably greater than that of typical Cecil sandy loam. It comprises an area of 62.2 square miles, or 12.2 percent of the total area of the county. It is most prominently developed in the vicinity of Due West and northeast of Lowndesville near the county boundary.

This is an important agricultural soil. The various crops grown occupy about the same proportionate acreages as on the typical soil, and they are planted and fertilized similarly. Crop yields average perhaps 5 percent lower than on the typical soil.

Cecil fine sandy loam.—Cecil fine sandy loam has a light-gray, gray, or light grayish-brown friable fine sandy loam or very fine sandy loam surface soil to a depth ranging from 6 to 10 inches. The subsoil begins as yellowish-red or reddish-yellow friable fine sandy clay or clay loam, but at a depth ranging from 16 to 20 inches passes into red stiff brittle clay which is similar to the material in the lower part of the subsoil of Cecil sandy loam. Field tests indicate that this soil is slightly more acid throughout its surface soil and subsoil layers than is Cecil sandy loam.

Cecil fine sandy loam is not an extensive soil. The largest bodies lie south of Due West. Areas are widely scattered over the central and northern parts of the county. Practically all the land is under cultivation, and it is about as productive, under similar fertilizer treatment, as Cecil sandy loam. It is used for the same crops and in about the same acreage ratios as the sandy loam.

Cecil fine sandy loam, mixed phase.—The mixed phase of Cecil fine sandy loam, under field conditions, has a general surface appearance very similar in every respect to the gray and yellowish-red spotted appearance of the mixed phase of Cecil sandy loam. The texture of the gray surface soil is fine sandy loam or very fine sandy loam, and that of the yellowish-red soil is fine sandy clay or clay loam. The same crops, receiving similar fertilizer treatment, are grown on Cecil fine sandy loam, mixed phase, and crop yields are similar to those on the mixed phase of Cecil sandy loam.

Cecil coarse sandy loam.—Cecil coarse sandy loam occurs in small widely scattered bodies. It is of small extent and not important agriculturally, but most of it is under cultivation.

The 6- to 10-inch surface soil is gray, pale-yellow, or grayish-yellow coarse sandy loam containing some fine gravel. In places the lower part of the surface soil may be slightly reddish yellow sandy clay loam or coarse sandy clay loam. The subsoil is red friable brittle clay containing some coarse quartz sand. This layer, in most places, is not so dark red as the corresponding layer of Cecil sandy loam. At a depth ranging from 30 to 40 inches the red clay grades into lighter red and more friable clay which is underlain, at a depth ranging from 50 to 60 inches, by mingled gray, yellow, and brownish-red soft decomposed rock.

The greater part of this soil occurs in undulating or gently rolling areas. Both surface and internal drainage are good, owing to the

relief and to the porous structure of the subsoil. Where bare fields have not been disturbed for some time, the coarse sand particles are very noticeable on the surface.

The crops grown, their respective acreage ratios, the fertilizer treatment, and the cultural methods practiced are very similar to those for Cecil sandy loam, but crop yields are from 5 to 10 percent lower than on that soil.

Cecil coarse sandy loam, mixed phase.—The mixed phase of Cecil coarse sandy loam is a fairly extensive soil occupying 15.8 square miles. It is an important agricultural soil. The largest areas lie northwest of Due West, between Abbeville and Calhoun Falls, and in the section between the Piedmont & Northern Railway and Saluda River.

This soil resembles Cecil sandy loam, mixed phase, in all characteristics except the texture of its topsoil, which ranges from coarse sandy loam to very coarse sandy loam in the sandier areas and from coarse sandy clay loam to clay loam in the exposed or "galled" areas. The relief in some places is slightly more rolling than that of the mixed phase of Cecil sandy loam. The crops grown and the yields obtained are the same as those on typical Cecil coarse sandy loam, and the fertilizer treatment and cultural methods used are very similar.

Appling sandy loam.—The surface soil of Appling sandy loam in cultivated fields when dry is light-gray or pale-yellow mellow friable light sandy loam or sandy loam, to a depth of 6 or 8 inches, underlain by grayish-yellow or yellow friable sandy loam to a depth of about 14 inches. The subsoil, extending to a depth of about 20 inches, is yellowish-red or brownish-yellow stiff but brittle sandy clay which, at a depth ranging from 20 to 24 inches, passes into streaked or banded red, yellow, and gray stiff but brittle clay that is slightly more friable than the overlying layer. At a depth of 30 or more inches, mingled light-yellow, light-red, and gray material consisting of soft decomposed rock is present.

In places where erosion has removed a part of the surface layer, the reddish-yellow subsoil is exposed. The subsoil of the Appling soils in this county is very variable. In many places the reddish-yellow subsurface layer is lacking, and mottled red and yellow stiff brittle clay underlies the surface soil. In places the gray or pale-yellow sandy loam surface layer ranges from 10 to 15 inches in thickness. The relief, the surface and internal drainage, and the geographic positions the soil occupies in relation to other soils are very similar to the relief, position, and drainage of Cecil sandy loam.

A few small areas of Appling fine sandy loam are included with Appling sandy loam, as they occur in close association with Appling sandy loam, and their total area is too small to warrant separation on the soil map.

Appling sandy loam is developed in small areas southwest of Abbeville in the vicinities of Sharon High School and the county farm, north of Abbeville in the vicinity of Cold Spring School, between Due West and Donalds, north of Donalds at the point where the Piedmont & Northern Railway crosses the Abbeville-Anderson

County line, in the vicinities of Antreville and Watts, and widely scattered over the county, except in the southwestern part between Watts and Savannah River.

This is a rather important agricultural soil. About 75 percent of it is under cultivation, a small part is in pasture, and the rest is forested largely with hardwoods, old-field pine, and shortleaf pine. The land is used for growing all crops common to the county and is considered one of the good soils. On account of the light sandy loam surface soil and porous structure, the land may be cultivated sooner after rains and warms up earlier in the spring than the heavy clay loam soils.

About 60 percent of the cultivated land is used for cotton, 20 to 30 percent for corn, 10 to 20 percent for oats, and the rest for hay, vegetables, orchard fruits, small fruits, and pecans. The fertilizer treatment and cultural methods are about the same as those practiced on Cecil sandy loam, but crop yields are in general slightly lower. This soil is well adapted to sweetpotatoes, vegetables, peaches, pears, pecans, and small fruits, all of which give good returns with reasonable care in treatment. It is a good bright-leaf tobacco soil, and large yields of this crop are obtained on Appling soils in the piedmont sections of North Carolina. The deficiency of organic matter in this soil is greater than in Cecil sandy loam, owing to more rapid leaching from the porous surface layer and the friable and porous subsurface layer.

Appling coarse sandy loam.—Appling coarse sandy loam is closely associated with Appling sandy loam. The largest developments are south and west of Abbeville, near Watts, and in the northeastern part of the county northeast of Due West.

This soil is similar to Appling sandy loam, but it is coarser in texture, that is, it contains a higher percentage of coarse or very coarse sand in the topsoil. The subsoil layers are almost identical with the corresponding layers of Appling sandy loam. The general color of the surface soil, its appearance in cultivated fields, the relief, the surface and internal drainage, and the relative position of this soil with respect to other soils, are all very similar to those features of Appling sandy loam.

Appling coarse sandy loam is important in the agriculture of this county and is used to about the same extent as Appling sandy loam. The crops grown are in about the same acreage ratio, and the fertilizer treatment and cultural methods used are very similar to those on Cecil sandy loam, but crop yields are usually slightly lower.

Durham sandy loam.—Durham sandy loam is a soil of very small extent in Abbeville County. It is closely associated with the Appling soils. The relief is almost level or undulating.

Most of Durham sandy loam is sandy loam in texture, but a few small bodies of Durham coarse sandy loam are included in mapping. Most of these included areas lie south of Broadmouth Church and east of Winona School. Included areas of Durham fine sandy loam are east of Cold Spring School and in the vicinity of Bethlehem Church. Small bodies of both included soils are widely scattered over the county, except the southwestern part.

In forested areas the surface of Durham sandy loam is covered by a thin coating of leaf mold. Here the surface soil consists of a 1- or 2-inch layer of gray loamy sand containing a small quantity of organic matter, underlain by grayish-yellow or pale-yellow mellow sandy loam to a depth of 10 or 12 inches, where light-yellow or yellow sandy clay material is reached, and this extends to a depth of about 16 inches. The subsoil is yellow friable crumbly clay which, at a depth of about 20 or 22 inches, contains a few splotches of red, and at a depth ranging from 30 to 35 inches passes into light-red, yellow, and light-gray streaked or banded friable clay. In cultivated fields the surface soil, to a depth of 5 or 7 inches, is light-gray or grayish-yellow loamy sand or light sandy loam, and below this depth both surface soil and subsoil are like the soil in forested areas. In a few places the surface soil is coarse loamy sand or light sandy loam, and the coarse sand particles and fine gravel are very noticeable.

A large proportion of this land is cultivated. The crops grown, fertilizer treatment, and cultural methods on this soil are very similar to those on Cecil sandy loam, but the yields are slightly lower. Durham sandy loam is especially suited to the production of bright-leaf tobacco in North Carolina and Virginia.

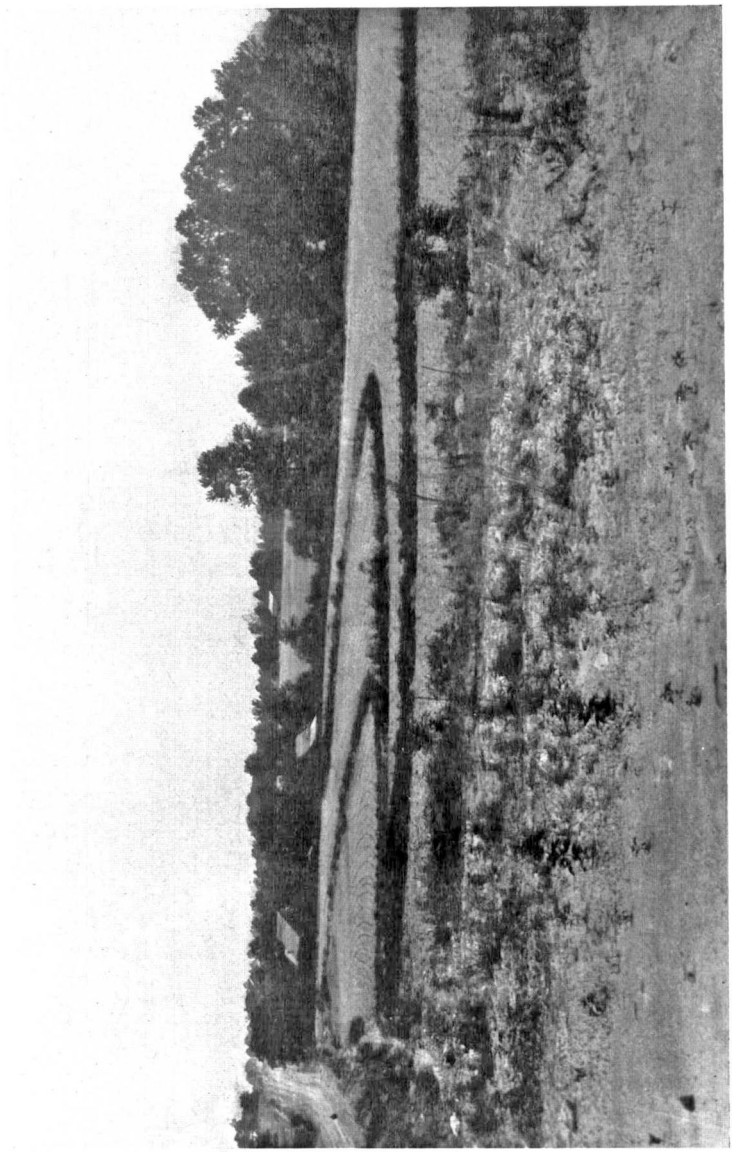
Georgeville fine sandy loam.—The 1- or 2-inch surface layer of Georgeville fine sandy loam in forested areas is gray fine sandy loam or very fine sandy loam, which is covered by a thin layer of leaf mold. Underlying the gray layer is yellowish-red or brownish-yellow fine sandy loam which continues to a depth of 6 or 8 inches, and beneath this is a 2- to 4-inch layer of yellowish-red friable fine sandy clay or silty clay loam. The subsoil is red smooth stiff brittle silty clay which, at a depth ranging from 36 to 42 inches, grades into light-red or yellowish-red more friable heavy silt loam or silty clay. At various depths between 6 and 8 feet the subsoil passes into variegated yellow, gray, purple, and purplish-red soft decomposed slate rock. The surface soil in plowed fields is grayish yellow or reddish yellow. The depth to the decomposed slate rock is variable and ranges from less than 4 to more than 9 feet.

This soil occupies smooth ridges and gentle slopes, and the relief is undulating. Surface drainage is good, but subsoil drainage is rather slow. Owing to its small extent, this is not an important agricultural soil. It occurs in many small areas near the Abbeville-McCormick County line between Little River and Hillman Creek. Approximately 50 percent of the land is cultivated, and the rest is forested with hardwoods, such as white, red, and post oaks, hickory, dogwood, cedar, shortleaf pine, and old-field pine. Much of the forested area has recently been cut over, and the remaining trees are small.

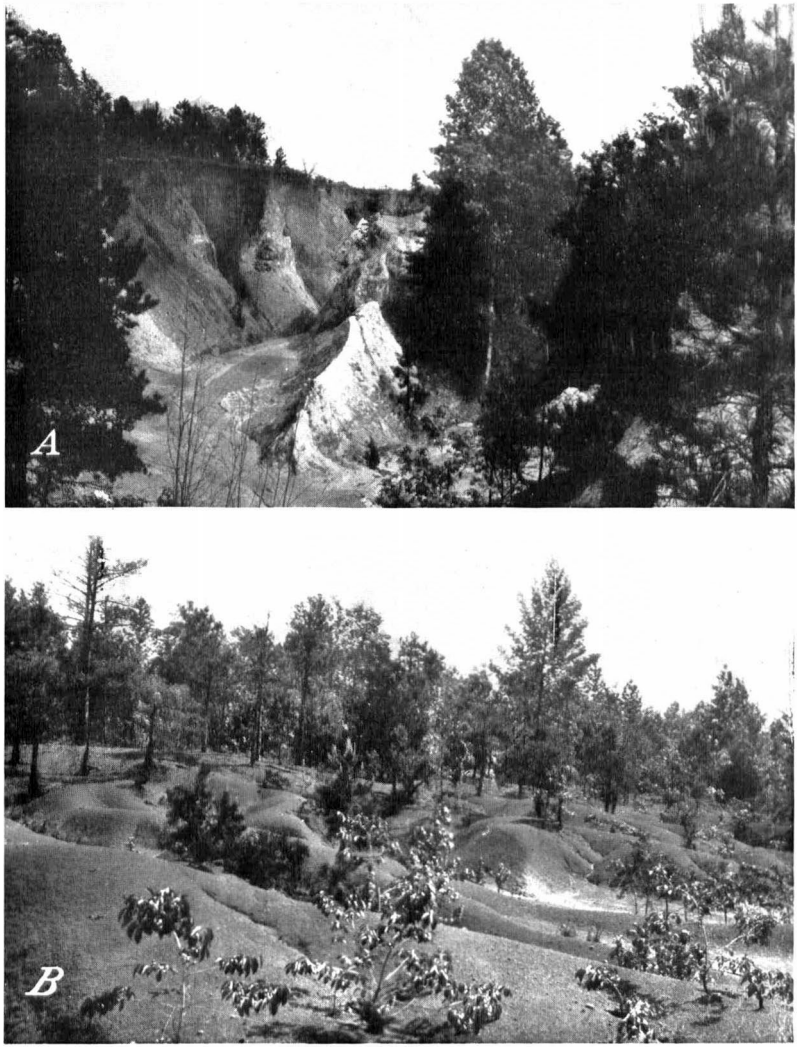
The same crops are grown in about the same acreage ratios and are fertilized and cultivated in a similar manner as on Cecil sandy loam. Yields of cotton are about 15 percent lower, and yields of other crops are about the same.

HEAVY RED CLAY LOAM SOILS

The combined area of the soils included in this group is 195.3 square miles, or 38.3 percent of the total area of the county. David-



Ridge terracing and contour cultivation on Cecil sandy loam.



A, Vertical-walled gullies resulting from severe erosion in Cecil clay loam in the more rolling and rougher parts of the county; *B*, eroded Davidson clay loam showing rounded, or dome-shaped, ridges and intervening U-shaped gullies.

son clay loam and the sandy and schist phases of this type, Cecil clay loam, and Georgeville silty clay loam constitute these "red clay lands", as they are locally known. This is the most extensive group of soils in the county, but a much smaller proportion of the acreage is devoted to cultivated crops than of the light-gray sandy loam soils. The heavy red clay loam soils occur largely in the western, southern, and eastern parts of the county, and they are more or less generally distributed over the entire county in both large and small bodies.

The general relief of the soils of this group ranges from nearly level or undulating in some of the Davidson and Cecil soils to rolling, strongly rolling, or hilly in some of the Cecil and Georgeville soils. Surface drainage ranges from good to excessive, and erosion has been active. The surface soils are clay loam or heavy clay loam and become rather hard during dry weather, making it difficult for rain water to penetrate quickly and deeply, consequently, the surface run-off is much greater than from any light-gray sandy loam soil. Terracing is more necessary and is practiced more extensively on these clay lands than on any other soil in the county. The heavy character of the surface soils, which are slow to drain and dry out in the spring, causes these soils to be termed late soils. These soils have a narrow range of moisture conditions within which they may be worked, and care must be exercised not to plow or cultivate them when there is too much moisture in the ground. Otherwise clods will be formed that will remain throughout the growing season. During droughts plants growing on these clay soils suffer from lack of moisture several days sooner than those on the sandy loam soils. These clay soils are more difficult to bring into good tilth than the sandy loam soils, and they require stronger draft power and heavier implements, in order to obtain the best results.

The red clay lands are the most fertile soils in the county, that is, they have the highest content of soluble plant nutrients naturally supplied by the parent materials from which they have been developed, and they retain these nutrients because of their high clay and silt content. The red or dark-red clay loam or heavy clay loam surface soils and the heavy stiff but brittle clay subsoils are very retentive of such portions of the plant nutrients as are not currently assimilated by the growing plants. Commercial fertilizers applied to these soils generally contain less potash than fertilizers used on other soils of the county. Although they naturally have a large store of plant nutrients, the organic-matter content is low, owing largely to the practice of clean cultivation and to the fact that very small quantities of plant remains are added to the soil.

An important difference between Cecil clay loam and Davidson clay loam is in the chemical composition. Cecil clay loam has, especially in the subsoil, a high content of potash and a small content of lime, whereas Davidson clay loam has a comparatively large content of lime and manganese and a comparatively low content of potash. This difference is sufficient to influence the agricultural value to the extent that the Davidson soils are the best soils in the piedmont plateau for the production of alfalfa.

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The acidity of the Davidson soils ranges from slight to moderate, and of the Cecil and Georgeville soils from moderate to high.[5]

Because the Davidson soils are especially adapted to alfalfa and legumes they are usually chosen for these crops. All the members of this group are better adapted to small grains and legumes, but cotton is grown to some extent on all of them. Although they are not so well adapted to the production of cotton, and the yields over a period of years are not large, the demand for a cash crop and the fact that many farms include no other soils on which to grow crops, necessitates the use of this less desirable land for cotton. Probably not more than 30 percent of the total area of these soils is under cultivation.

Rock fragments and small boulders, largely of white quartz, granite, and black rock (diorite), which range in diameter from one-half inch to several inches, and small fragments of quartz occur here and there on the surface, in places in sufficient quantity to warrant their indication by symbol on the soil map. Most of the gravelly areas of these soils are not extensive, and on none of them is the quantity of gravel sufficient to interfere with cultivation to an appreciable extent.

Cecil clay loam.—Cecil clay loam is the most extensive soil in the county, and it is important agriculturally. It occupies an area of 170.5 square miles, or 33.4 percent of the total area of the county. It occurs in both large and small areas of irregular outline throughout all sections, particularly in the western, northern, and eastern parts. The relief ranges from gently rolling and rolling to very rolling and hilly. Surface drainage ranges from good to excessive, and erosion is rather active, especially on the steeper slopes (pl. 2, *A*). Owing to the heavy character of the clay loam surface soil, the land cannot be worked nearly so easily as the sandy loam soils.

Between 30 and 40 percent of this soil is in cultivation, a large proportion is in abandoned fields, and some of the land is in second-growth forest consisting largely of old-field and shortleaf pines, white, post, and blackjack oaks, and some hickory, cedar, and other trees. Some of the land is used for pasture.

The 4- to 6-inch surface soil of Cecil clay loam is brown or reddish-brown clay loam, and in wooded areas it has a thin coating of brown leaf mold over the surface. In plowed fields the surface layer is reddish-brown or red friable clay loam or heavy clay loam. The subsoil is red stiff but brittle clay and is much heavier than the surface layer. At a depth ranging from 36 to 42 inches, this material passes into lighter red and more friable brittle clay that in many places has a slick, greasy feel caused by the presence of fine mica scales. At a depth ranging from 4 to 5½ feet soft decomposed rock, having a mingled yellow, brownish-red, and gray color, is present.

Included on the map with Cecil clay loam are a few small areas of Cecil clay. Such areas have a red or reddish-brown rather heavy clay surface soil which, at a depth ranging from 3 to 5 inches, grades into the red stiff clay. A few areas of Cecil clay have a noticeable quantity of small angular quartz fragments scattered over the surface and mixed with the soil material.

[5] Field test made with the Hellige soil tester.

The principal crops grown on Cecil clay loam are cotton, corn, oats, and cowpeas and sorgo for hay and forage. From 40 to 50 percent of the cultivated land is devoted to cotton, 15 to 25 percent to corn, 10 to 20 percent to oats, and the rest to hay—generally oats and vetch, or cowpeas and sorgo. Garden vegetables, sorgo, potatoes, and sweetpotatoes are produced for consumption at home.

The commercial fertilizer in general use is a 3–8–3 or 2–8–2 mixture. Cotton receives an acre application ranging from 200 to 300 pounds at planting time and 50 pounds of nitrate of soda when it is chopped, and corn from 75 to 100 pounds at planting time and 50 pounds of nitrate of soda when it is about 15 inches high. Fertilizer is seldom used for oats at planting time, but a top dressing ranging from 50 to 75 pounds of nitrate of soda is applied in the spring. The hay crops, excepts oats cut green for hay, are seldom fertilized. Acre yields of cotton range from 150 to 280 pounds of lint, corn 12 to 20 bushels, oats 10 to 25 bushels, and hay 1 to 1½ tons.

Davidson clay loam.—Davidson clay loam differs from Cecil clay loam in that it has a 3- or 4-inch dark-red or reddish-brown surface layer of loam or heavy loam in the cultivated areas. This is underlain, to a depth of 8 or 10 inches, by dark reddish-brown heavy loam or clay loam. The subsoil is dark-red or maroon heavy, stiff, smooth clay, which is practically free of sand or quartz particles, extending to a depth ranging from 40 to 45 inches; and this, in turn, is underlain, to a depth ranging from 5 to 6 feet, by light-red or red brittle clay containing yellow mottlings. In most places below a depth of 6 feet ocherous-yellow, yellow, light-red, and gray soft decomposed basic rock material is present.

Locally, spots or small areas occur, in which the surface soil is dark-brown or reddish-brown loam or clay loam, extending to a depth ranging from 8 to 12 inches. This included soil does not scour from the plow and is called "push land." It is a good soil. In a few places small angular quartz fragments are on the surface, and a few small rounded black concretions or accretions of manganese are in the subsoil.

Davidson clay loam is a fairly extensive and important agricultural soil. The largest developments occur in a more or less intermittent rim around the lower lying Mecklenburg and Iredell soils of the flatwoods in the southwestern part of the county, and less extensive bodies are scattered throughout other sections occupied by soils of this group.

Because of the less rolling relief and the heavy character of the surface soil and subsoil, drainage, especially subsoil drainage, is slow. This soil is rather slow to warm up in spring, and considerable care must be exercised in working the land, as there is a rather narrow range of moisture conditions in which it may be plowed and cultivated without difficulty.

Davidson clay loam is naturally one of the strongest soils in the county. The same crops, in about the same acreage ratios, are grown on it as on Cecil clay loam, and crop yields, with the exception of yields of cotton, which are usually about 5 percent lower, range from 5 to 10 percent higher. It is a choice soil on which to grow alfalfa, clover, and legumes and is well suited to wheat, oats, corn,

and grasses. It requires a fertilizer carrying a high content of potash.

Davidson clay loam, sandy phase.—The sandy phase of Davidson clay loam differs from Davidson clay loam, in that the 4- to 6-inch surface layer is dark-red or reddish-brown sandy loam or heavy sandy loam. It is underlain by the usual dark reddish-brown clay loam which continues to a depth of 8 or 10 inches. The subsoil is dark-red or maroon heavy stiff brittle clay. The sandy loam surface layer, although sufficiently light textured to make the soil a little more easily worked than typical Davidson clay loam, does not increase its producing power, and the two soils are used for the same crops in about the same acreage ratios.

Soil of this phase is of small extent. The largest bodies are in the vicinity of Pratt on the Southern Railway. Areas are widely scattered over the sections occupied by soils of this group, and all are closely associated with typical Davidson clay loam. Soil of this phase occupies similar relief as Davidson clay loam, and nearly all the land is cultivated.

Davidson clay loam, schist phase.—The schist phase of Davidson clay loam differs from typical Davidson clay loam largely in the content of fine particles of mica which imparts a more friable consistence to both the surface soil and subsoil. The surface, subsurface, and subsoil layers differ from the corresponding layers in the typical soil, in that all contain a rather large quantity of fine mica scales which increase in numbers with increase in depth. The soft decomposed dark basic schist material underlying the subsoil in many places has a distinctly greasy slick feel, owing to the high content of mica. Another difference is that the dark-red or maroon subsoil layer has a purple cast which continues downward to the underlying distinctly yellow or light-yellow decomposed rock.

This soil is slightly less extensive than the sandy phase of Davidson clay loam. The same crops, in about the same acreage ratios, are grown, fertilized, and cultivated in the same way as on Davidson clay loam, and the yields are similar.

Georgeville silty clay loam.—In wooded virgin areas the upper layer of the surface soil of Georgeville silty clay loam is light-gray or grayish-yellow silt loam 2 or 3 inches thick. A thin coating of leafmold and forest litter covers this layer in forested areas. In cultivated fields the surface soil is yellowish-red or light-red heavy silt loam or silty clay loam, extending to a depth of 6 or 8 inches, where red stiff friable smooth silty clay is reached. This layer extends to a depth ranging from 35 to 45 inches and passes into yellowish-red or light-red friable smooth silt loam or silty clay loam, splotched with yellow or ocherous yellow and having a smooth slick talclike feel. At a depth ranging from 5 to 8 feet the subsoil is underlain by streaked or variegated yellow, gray, purple, and purplish-red soft smooth decomposed slate rock. In a few places a noticeable quantity of white or brown-stained angular quartz fragments, ranging in diameter from one-fourth inch to 2 inches, are scattered over the surface.

This soil is closely associated with Georgeville fine sandy loam. Practically all of it occurs in several small areas east of Little River

along and near the southern county boundary. It occurs on interstream divides and on slopes to the drainageways, and the relief ranges from undulating to strongly rolling.

This is not an important agricultural soil. Perhaps only 10 or 15 percent is used for the same crops as those grown on Cecil clay loam, in similar acreage ratios, but with lower yields. The rest of the land supports a growth of white, post, willow, and water oaks, shortleaf pine, old-field pine, some hickory, and some cedar.

BROWN LOAM SOILS

The brown loam soils cover an area of 39.1 square miles, or 7.6 percent of the total area of the county. Included in this group are soils of the Mecklenburg, Iredell, and Wickham series. Wickham fine sandy loam was placed in the group because of its brown or red color and its use for crops. It has a stiff but brittle subsoil. The most extensive development of these soils is in the flatwoods section, between Calhoun Falls and Little River on both sides of the Calhoun Falls-Abbeville highway. Fairly large developments occur partly within the town limits of Abbeville; east of Cana along the Seaboard Air Line Railway; along Bass, John, and Dry Creeks northeast of Abbeville; along Calhoun Creek, Little River, and Penny Creek northwest of Abbeville; and about 3 miles southeast of Lowndesville. A few smaller areas are widely scattered over the county.

The relief of the soils of this group ranges from nearly level and undulating to gently rolling and sloping. Within the flatwoods section, perhaps 50 percent of the Iredell and 75 percent of the Mecklenburg soils are tilled. Elsewhere a considerable portion of the Iredell soil is used largely for pasture or is reforesting to blackjack oak, locust, cedar, old-field pine, shortleaf pine, and a rather dense undergrowth. The Mecklenburg soil outside of the flatwoods section is probably cultivated in the same relative percentage. Surface drainage of all these soils ranges from fair to good, but internal drainage is poor, especially in the Iredell soils, owing to the heavy waxy impervious character of the subsoil layers.

The surface soils of the members of this group, with the exception of Wickham fine sandy loam, are loams, ranging in color from dark gray through brown to reddish brown. They range from slightly to moderately acid. The subsoils are reddish-brown, yellowish-brown, or brownish-yellow heavy stiff waxy sticky plastic impervious clays.

As on the heavy clay soils of the preceding group, cotton is grown from necessity and not on account of its adaptability to these soils. These soils are decidedly suited to grain, corn, hay, and forage, as these crops are capable of withstanding rather severe droughts. In wet seasons, however, almost total crop failures are common. The range in moisture conditions within which these soils may be worked satisfactorily is extremely narrow.

Angular quartz fragments occur locally on the surface of these soils in sufficient quantities to warrant indication on the soil map. Loose basic rocks, locally known as niggerheads, and rock outcrops are rather common and have been indicated on the map by stone and rock-outcrop symbols, respectively. The percentage of rough broken

land is very small, and such areas are mapped with the broken phase of Cecil clay loam.

Mecklenburg loam.—Mecklenburg loam is fairly extensive and is a rather important agricultural soil. The most extensive development is in the southwestern part of the county between the Charleston & Western Carolina Railway and Little River. Areas occur in a belt about 3 miles south of Lowndesville, extending from Savannah River to Morrow Creek, and along and near the eastern boundary northeast of Abbeville. The relief ranges from gently rolling to sloping.

This soil is, in general, closely associated with Davidson clay loam, occupying relatively lower positions; or with Iredell loam, occupying relatively higher positions. In other words, it occupies an intermediate topographic position between Davidson clay loam and Iredell loam.

The 4- to 6-inch surface soil is brown or reddish-brown friable loam containing a rather large quantity of well-decomposed organic matter. It is underlain, to a depth of 8 or 10 inches, by lighter brown loam containing less organic matter and less fine material. The subsoil, to a depth ranging from 18 to 24 inches, is reddish-brown or yellowish-brown heavy stiff moderately plastic clay specked with black flaky accumulations of iron and manganese. This layer, in turn, is underlain by variegated light-yellow, light-brown, reddish-brown, and gray, specked and streaked with black, partly decomposed rock material. At a depth ranging from 30 to 36 inches is green, specked with black, soft decomposed dark basic rock material. Locally small rounded pellets of iron and manganese concretions are present on the surface and within the surface layers.

This soil as mapped includes areas which have characteristics resembling Davidson clay loam, especially around the borders of areas adjoining that soil. The surface layers in such places closely resemble those of the Davidson soil, and the subsoil layers tend to be dark red rather than reddish brown, but the clay is heavy, stiff, and slightly plastic. When exposed the subsoil material shrinks extensively, forming wide cracks, a characteristic of the Mecklenburg subsoil.

Also included with mapped areas of this soil, especially where it adjoins Iredell loam, are areas in which the surface soil is brown or reddish brown, but the subsoil tends toward the yellowish-brown or brownish-yellow heavy waxy plastic clay characteristic of the Iredell subsoil.

Approximately 60 or 70 percent of this land is under cultivation, and most of the remainder is in second-growth forest consisting of various oaks, hickory, cedar, shortleaf pine, and old-field pine. A small part is used for pasture land. This is the most productive soil in the county when the rainfall is favorable, and it is well adapted to all the crops commonly grown. The acreages devoted to cotton, corn, oats, and hay are similar to the acreage ratios for the county as a whole. Cotton yields from 250 to 300 pounds an acre, corn 20 to 25 bushels, oats 20 to 30 bushels, hay 1¼ to 1½ tons, and wheat 8 to 12 bushels. The fertilizer commonly used is a 3–8–3 mixture, and nitrate of soda is applied as a side dressing on the

growing crops. The quantities of each applied to the several crops are similar to those used on Davidson clay loam. This soil is very suitable for growing small grains, and the proportionate acreage devoted to these crops is perhaps greater than the average for the county.

Mecklenburg loam, mixed phase.—The mixed phase of Mecklenburg loam differs from the typical soil in that the soil over some areas is decidedly lacking in uniformity of color, texture, and thickness of the surface layer, and the common characteristics in the subsoil. Small areas of Appling, Durham, Cecil, Iredell, and Wilkes soils, ranging in texture from sandy loam, heavy sandy loam, and loam to sandy clay loam, occur within very short horizontal distances, intricately intermixed with the Mecklenburg soil which is the predominating soil. Were it not for the fact that the areas included in this classification are composed of soil predominating in the characteristics of Mecklenburg loam, they might well be classified as Wilkes sandy loam, as the land represents a soil condition rather than a definite soil type.

The relief of this soil is similar to that of Mecklenburg loam. Only a few small areas of this mixed soil are cultivated. They are fertilized in about the same way as typical Mecklenburg loam areas, but the yields are slightly lower, except in the better areas. The largest bodies of this soil lie between Shanklin Creek and Calhoun Creek northwest of Abbeville.

Iredell loam.—The surface soil of Iredell loam, locally called pipe-clay land, consists of a 6- or 8-inch layer of grayish-brown or brown loam containing a moderate quantity of organic matter, underlain by light-yellow or light grayish-yellow heavy fine sandy loam or loam, to a depth ranging from 10 to 14 inches, in which are numerous small iron and manganese concretions. The subsoil is yellowish-brown or brownish-yellow heavy sticky waxy highly plastic impervious clay extending to a depth ranging from 26 to 30 inches. Beneath the subsoil the material is green or greenish-yellow decomposed basic rock. The color of the clay subsoil of Iredell loam, if exposed to the atmosphere, changes to brown or rust brown, and when dry the material cracks into large irregular-shaped lumps. In many places the subsoil is turned up in plowed fields, after which it oxidizes and turns reddish brown or rust brown. In many places in plowed fields the surface soil is almost identical in appearance with that of the Mecklenburg soils, especially in the flatwoods section. In places where drainage is poor the gray surface soil has a green or drab cast.

Many variations occur here and there in this soil. Locally the iron and manganese concretions may be numerous, and in other places there are none. The depth of the surface layer differs according to the extent that erosion has been active. In many places the heavy clay lies almost at the surface, and in some places the soft decomposed greenish-yellow rock is only a few inches below the surface. Included with mapped areas of this soil are scattered small bodies of sandy loam and clay loam. Rock outcrops and niggerheads are common and are indicated on the soil map by symbols.

Iredell loam occurs in association with Mecklenburg loam. The relief ranges from almost level to undulating, and surface drainage

is good, except in swales and low places where the channels are not established. Underdrainage is poor, owing to the heavy impervious clay subsoil.

Perhaps 40 percent of this soil is cultivated. About 30 percent of the cultivated land is used for cotton, 30 percent for corn, and 30 percent for oats, hay, and forage crops. Much of the uncultivated land is used for pasture, and the rest is reforesting to shortleaf pine, old-field pine, cedar, oaks, locust, some hickory, and gum. With a favorable season, that is, a rather dry one, the crops grown on this soil produce yields equal to the average for the county. Kainit is used to prevent rust and frenching of the cotton and corn, but otherwise less fertilizer is used on this soil than on Mecklenburg loam. Like the Mecklenburg soil, Iredell loam is well suited to small grains, hay, forage crops, and pasture grasses. It is not a desirable soil for cotton under boll-weevil conditions.

Wickham fine sandy loam.—The 6- to 8-inch surface soil of Wickham fine sandy loam is mellow friable light reddish-brown fine sandy loam. The subsoil is reddish-brown firm but friable sandy clay extending to a depth ranging from 30 to 36 inches, beneath which the material is reddish-yellow clay.

This soil occurs on the terraces, or second bottoms. It lies from 5 to 25 feet above normal stream level and is not subject to overflow except during periods of extremely high water. The total area of Wickham fine sandy loam is small. Areas occur along Savannah and Saluda Rivers and Long Cane Creek. Less than one-half of the land is cultivated to the same crops as those grown on the adjoining Cecil clay loam areas. Crop yields are about the same as on that soil, and the soil is similarly handled. This is a good agricultural soil and one which can be built up to a fair state of productivity.

MISCELLANEOUS LAND TYPES

This group includes Wilkes sandy loam, Worsham sandy loam, Cecil clay loam, broken phase, Cecil clay loam, stony phase, Orange silt loam, and Meadow (Congaree material). None of these types, phases, or soil conditions may be satisfactorily classified in any soil group. The less disturbed members of the group resemble definite soil types, but none is typical of the individual type which it most nearly resembles. The combined area is 137.9 square miles. With the exception of one or two members no soil of this group is suited to cultivation, and these are not dependable farm land. Their best possible use is for forestry or for grazing purposes. A very large proportion of the land is now in forest consisting of shortleaf pine, old-field pine, water, white, and blackjack oaks, beech, walnut, hickory, cedar, maple, sycamore, and poplar; and the undergrowth, which in many places is dense, includes locust, dogwood, redbud, and sumac, with wild cane, broomsedge, and briers on the wetter areas.

Wilkes sandy loam.—Wilkes sandy loam is developed mainly on rather steep slopes, and the relief is rolling, steep, and broken, with only a very few smooth areas. Surface drainage, owing to the relief, ranges from good to excessive, and numerous vertical-walled gullies and severely eroded areas occur throughout this soil.

This is one of the more extensive of the miscellaneous land types. It is widely distributed over the county wherever erosion has been

severe, particularly in the western and southern parts, and in most places is associated with Cecil clay loam, broken phase. Many of the areas are small, but some rather extensive bodies occur along the Savannah, Rocky, and Little River watersheds. Practically none of this soil is cultivated, and only a few areas are used for pasture. The best possible use for the land is forestry.

In places where the soil has been in forest for some time, the surface soil is covered by a thin layer of organic matter, leafmold, and forest litter. The 1- or 2-inch surface layer consists of gray sandy loam which contains a small quantity of organic matter. It is underlain by grayish-yellow or pale-yellow friable sandy loam to a depth ranging from 8 to 12 inches, where yellow or brownish-yellow friable sandy loam material is reached, and this continues to a depth of about 14 or 16 inches. The subsoil is brownish-yellow or mottled gray, brown, and yellow heavy plastic sticky clay. At a depth ranging from 25 to 36 inches the subsoil grades into gray or greenish-gray decomposed rock.

The surface soil and subsoil undergo extreme variations within very short horizontal distances. In many places they are similar to corresponding layers of the Durham, Appling, and Cecil soils, and the lower part of the subsoil may be similar to that of the Iredell or Mecklenburg soils. To the mixed character of the rock materials which underlie this soil may be attributed the variability in color, texture, and sequence of the several layers, or horizons. This soil represents a soil condition rather than a definite soil type.

The very small cultivated area is devoted to corn, hay, and forage crops. Yields are less than the average for the county.

Worsham sandy loam.—Worsham sandy loam is one of the less extensive soils. It occurs in very small widely scattered bodies, more of which are associated with the Appling and Durham soils than with the Cecil soils. Its principal occurrence is at the heads of or along small intermittent and indistinct drainageways. The relief is nearly flat or gently sloping toward the small drains. The land is poorly drained and seepy, containing wet-weather springs, and much of it lies at the bases of slopes and receives the surface waters from the higher areas. A very small proportion of this soil is cultivated, but most of it is used as pasture as it affords excellent summer grazing.

The surface layer is gray or dark-gray sandy loam, ranging from 4 to 6 inches in thickness, which contains a fair quantity of organic matter. In many places, especially where this soil adjoins areas of the Cecil soils, some red material has washed from higher ground and been deposited, to a thickness ranging from 2 to 5 inches, over the gray or dark-gray layer. The gray sandy loam is underlain by a layer of gray or light-drab sandy loam to a depth ranging from 10 to 15 inches. The subsoil in most places is gray or drab slightly plastic sandy clay or clay, containing light-yellow and blue mottlings, although the material is variable, in places being almost white or light-gray clay with a few yellowish-brown mottlings and in other places being distinctly dark gray smooth sticky clay. The best use for Worsham sandy loam is pasture and forestry.

Cecil clay loam, broken phase.—The broken phase of Cecil clay loam is largely a soil condition in the Cecil, Davidson, and Mecklen-

burg soils, that has been brought about by excessive surface drainage and consequent rather severe erosion which has taken place largely on areas of more rolling and hilly relief. In many places gullies with vertical-walled sides range from 10 to more than 15 feet in depth in the more severely eroded sections. Cecil clay loam, broken phase, occurs in all parts of the county, except the southwestern part in the flatwoods section.

The surface soil and in many places the subsoil of the clay loam, loam, and sandy loam types of the Cecil, Davidson, and Mecklenburg series have been entirely removed, leaving the partly decomposed parent materials exposed. In places where erosion has not been so extremely severe, the gullies are V-shaped in the Cecil and Mecklenburg soils, but the intervening ridges as well as the gullies in the Davidson soils are rounded, that is, the ridges are dome shaped rather than inverted V-shaped (pl. 2, *B*).

In places where the surface soil and subsoil have not been washed away, they are similar in color, texture, structure, and sequence of horizons to those features of the soils within which they occur. This soil is not adapted to crop production. A small part of the land is used for pasture, but it supports a scant growth of small vegetation. The best use for land in this condition is forestry, and the tree growth is very similar to that on Wilkes sandy loam. The area occupied by this soil is large and is increasing rapidly.

Meadow (Congaree material).—Meadow (Congaree material) comprises a mixture of soil materials so varied in color, texture, structure, and sequence of the several soil layers, or horizons, that no separation can be made into definite soil types. It is composed of recent alluvial materials, together with a small amount of colluvial wash from contiguous slopes. The material ranges in texture from coarse sand, sand, fine sand, and very fine sand to silt, silty clay, clay loam, and clay. The color of the surface soil may be brown, light brown, gray, pale yellow, light red, or red. Both the surface soil and subsoil may contain pale-yellow, gray, or almost white mica scales.

Notwithstanding the mixed condition, typical areas of Congaree sandy loam, fine sandy loam, very fine sandy loam, silt loam, silty clay loam, and clay loam occur within mapped areas of this soil. Such areas might properly be differentiated, but they are too small to be separated on a small-scale map.

Meadow occupies the first bottoms of nearly all the larger streams as well as the smaller drainageways. It occurs in strips ranging in width from a few feet to one-half mile or more. It lies only a few feet above the normal stream level and is subject to frequent overflow and the addition of new material with each overflow. The relief is nearly level or sloping toward the stream or in the direction of stream flow.

Perhaps 20 or 25 percent of this land is used for the production of corn, and a small acreage is used for forage crops, such as oats and vetch, cowpeas, and sorgo. Acre yields of corn range from 25 to 50 bushels and of forage crops from 1½ to 2 tons. Yields of corn are high, compared with the average yields for the county as a whole. A large proportion of the land is used for summer pasture or is forested.

Many farmers who own first-bottom land have cleared it of forest growth, and they are keeping the stream channels clean in order that during heavy rains the stream flow will remain in its original course and not flood the entire bottom. The cleared bottoms are almost without exception used for corn or for pasture land. The spots of silt loam, fine sandy loam, and silty clay, if drained, are capable of producing from 30 to 60 bushels of corn an acre without the aid of fertilizer.

Cecil clay loam, stony phase.—The stony phase of Cecil clay loam differs from typical Cecil clay loam chiefly in the large quantities of angular quartz fragments, stones, and boulders within the soil mass and strewn over the surface. The fragments range in size from one-fourth inch to 2 inches in diameter and the granite or quartz mica schist stones and boulders from a few inches to more than 3 feet. In addition, the sandy clay loam or clay loam surface layer is lighter red than the typical soil and generally contains considerable quantities of mica scales and grayish-purple or brownish-purple quartz mica schist fragments, together with the gravel, stones, and boulders characteristic of the phase. The subsoil is light-red friable sandy clay or clay, and it also contains many mica and quartz mica schist scales and fragments. Rock outcrops, which are numerous, are indicated on the map by symbols.

This is not an extensive soil. The largest bodies are on Little Mountain and in that vicinity, and small areas are widely scattered throughout the county in the parts occupied by the heavy red clay loam soils. The relief ranges from sloping to steep. This is a nonagricultural soil and is reforesting to trees similar to those growing on the broken phase of Cecil clay loam. The best use for this land is forestry.

Orange silt loam.—The 6- to 8-inch surface soil of Orange silt loam is gray smooth floury silt loam which when dry is very light gray or almost white at the surface. The subsoil is mottled light-gray, brown, red, and yellow heavy plastic clay to a depth ranging from 18 to 24 inches. This material is underlain by light-yellow or grayish-yellow very heavy plastic tough clay to a depth ranging from 30 to 40 inches. This soil is variable throughout its entire profile. In places the slate rock may outcrop on the surface, and in other places the soil material may terminate abruptly on slate rock at a depth ranging from 18 to 24 inches. The surface layer is reasonably uniform, but the subsoil is variable. It may be mottled light-gray and red silt or silty clay in the upper part, highly plastic heavy, mottled or variegated drab, red, and reddish-brown clay in the lower part, and may pass abruptly into gray slate rock at a slight depth.

This soil occurs within areas of the Georgeville soils, and it is of very small extent. It is poorly drained and is largely nonagricultural, perhaps only 10 percent of its total area being cultivated, chiefly to corn and oats. Crop yields are low. A small acreage of the uncultivated land is used for pasture, and the rest is returning to a forest cover similar to that growing on Georgeville silty clay loam. The best use for Orange silt loam is for the scant pasture it affords or for forestry.

LAND USE AND METHODS

The capabilities of the various soils have never been fully realized or appreciated by many of the landowners. The inherent qualities of many of the soils render them susceptible to a rather high state of improvement, and their productivity can be easily maintained through proper management of the land. In the past, thousands of acres of soil having a steep relief should never have been cleared of the tree growth and allowed to wash and gully, thereby becoming unsuited or practically ruined for agricultural purposes. The prevailing one-crop system has in a large measure been responsible for such a result.

Under boll-weevil activity the farmers are using the light sandy loams of various textures for the production of the greater part of the cotton, because larger yields can be obtained than are possible on the red clay loams which are inherently stronger soils. Davidson clay loam, Cecil clay loam, and Georgeville silty clay loam are used to less extent for cotton than they were 15 or 20 years ago, and at present these soils are being used largely for the production of small grains, forage crops, and corn.

Most of the crops are fertilized to greater or less extent, although the land planted to cotton receives the greater part of the fertilizer purchased. Fertilizer experiments have been conducted in North Carolina and South Carolina on soils similar to the soils in Abbeville County, and some of the results are given in table 5. These data were compiled as the results of experiments carried on by the North Carolina Agricultural Experiment Station and the North Carolina State College of Agriculture and Engineering. They give the fertilizer mixtures recommended for corn, small grains, and legumes on several soils in the piedmont plateau. The soils of this county do not differ greatly from the same soils in other parts of the piedmont plateau and may be expected to give similar results with similar fertilizer treatment.

TABLE 5.—*Recommendations for the use of fertilizer for corn, small grains, and legumes on several soils in Abbeville County, S. C.*

Soil type	Fertilizer recommended for—		
	Corn	Small grains	Legumes
	Pounds	*Pounds*	*Pounds*
Cecil sandy loam	400 to 500 of 5–10–3	400 to 500 of 4–10–0, 5–10–0, or 5–10–3.	400 to 500 of 2–10–4
Cecil sandy loam, mixed phase	do	do	do
Cecil clay loam	do	400 to 500 of 5–10–3	[1] 400 to 500 to 2–10–4
Appling sandy loam	400 to 500 of 4–10–4		

[1] With the addition of sufficient lime to overcome the acidity of the soil.

The South Carolina Agricultural Experiment Station and Clemson Agricultural College recommend generally for cotton on soils such as occur in this county the following acre applications: 500 pounds of 4–10–4 or 600 pounds of 4–10–2 complete fertilizers and 100 pounds of nitrate of soda at time of planting, which is to be supplemented by side applications of nitrogen in the form of sulphate of ammonia or 100 pounds of nitrate of soda 3 weeks after chopping the cotton.

Potash, in the form of kainit, is especially recommended on the Mecklenburg and Iredell soils to prevent the frenching of corn or rust in cotton. The soils are not greatly in need of lime, except on land which is being fitted for alfalfa or crimson clover, where from 1 to 2 tons of lime an acre is generally necessary, in order to obtain a good stand of either legume. Data obtained and compiled by the South Carolina Agricultural Experiment Station indicate that liming in this State, as a whole, is unprofitable unless a definite crop rotation is practiced.[6]

The use of lime is not generally recommended for South Carolina soils, unless some systematic program of soil building is being followed. The application of about one ton of ground limestone an acre once every three or four years is a factor in permanent soil building, and this amount is advisable where regular rotations are practiced.

The Georgia State College of Agriculture carried on experiments with Cecil, Davidson, and Iredell soils similar to the soils of this county and found liming to be profitable where a 3-year crop rotation was practiced. The largest increases in yields were obtained from Cecil sandy loam.

In 1930, the dying of cotton plants in early spring was serious and widespread, and this condition was found to be due to acidity of the soils. The trouble was overcome by mixing 500 pounds of finely ground dolomitic limestone with each ton of commercial fertilizer. The mixture was applied with the fertilizer drill.

The following crops and varieties of each are recommended as adaptable to the soils of Abbeville County: Cotton—Humco-Cleveland or Wannamaker Cleveland, as a short-staple variety for wilt-free land, and Dixie Triumph, as a short-staple variety for wilt-infested soils; Lightning Express, Deltatype Webber, and Carolina Foster, which are long-staple varieties; corn—Douthit, Hastings Prolific, Pee Dee No. 5, Coker Garrick, Coker Williamson, Lowman Yellow, and Reid Yellow Dent; oats—Fulghum, Appler, Hastings Hundred Bushel, and Red Rustproof; rye for grain—Abruzzi-Coker and Abruzzi 155; wheat for winter and early spring grazing—Alabama Bluestem and Fulcaster.

No definite system of crop rotation is practiced, as it is difficult to practice rotations in sections where one crop (cotton) usually occupies one-half of the cultivated land. The better farmers use a system whereby the corn and oat acreages are shifted about so that once in 4 or 5 years the entire farm has been in corn or oats one season. The practice of growing companion crops is general throughout many parts of the county. About 75 percent of the farmers sow vetch and oats or vetch and rye in the cotton and corn middles at the last cultivation. About 10 percent of the farmers plow under green-manure crops which generally consist of vetch and sorgo. These practices are recommended by the county extension service. The following rotation would aid in maintaining soil fertility: First year, cotton, with a companion crop of vetch and oats or vetch and rye sown at the last cultivation of the cotton, to be turned under; second year, corn with companion crops to be

[6] BUIE, T. S., and JEFFORDS, S. L. WINTER COVER CROPS. Clemson Agr. Col. S. C., Ext. Circ. 70, 8 pp., illus. 1925.

cut the following year for hay; third year, wheat or oats for grain. Wherever possible a rotation should be practiced whereby the acreage commonly devoted to cotton is in wheat and rye, or cowpeas and cane 1 year and the cowpeas and cane turned under when possible for green manure; second year, corn and oats as separate crops; third year, cotton.

All the soils, especially the Davidson, Cecil, Appling, and Durham, are lacking in organic matter. This deficiency can be overcome by growing and plowing under such leguminous crops as vetch and soybeans. Where companion cropping is practiced, as a large percentage of the farmers are now doing, if these crops were turned under instead of cut for feed, they would aid materially in increasing the organic content of the surface soils. This would make the clay loam soils more loose and friable, which would result in easier handling and aid in the absorption of rain water. Additions of organic matter in the sandy loam soils, by turning under legumes, would reduce greatly the quantity of nitrogen needed, which ordinarily must be supplied from a commercial source.

Terracing has been practiced for a long time on practically all the more rolling cultivated land. This is very essential on the sandy loam soils to prevent washing away of the sandy surface layers. On the clay loam soils it is necessary, not only to prevent damage to the growing crops during heavy summer rains, but to prevent the complete washing away of the surface layers. The razorback, or ridge, type of terrace is used almost entirely (pl. 1). On many of the less rolling fields, the broad-based type of terrace might be used to advantage, and straight-line planting and cultivation could be practiced instead of the contour system.

The gradual cutting back of gullies into cultivated fields is a serious menace to the land now under cultivation. Gullying may easily be prevented by piling brush, stones, stalks, or trash in the channels and creating small dams wherein materials from surface wash may accumulate. Such areas of accumulated materials should be seeded and kept in sod and used continually for pasture land, or at least until surface washing ceases.

Deep plowing is not advisable on the sandy soils, but it would prove beneficial on the clay loam soils, provided sufficiently heavy machinery and work animals were available. Turning over the heavy Cecil, Davidson, or Mecklenburg clay loams and heavy loams to a depth of 8 or 10 inches would liberate considerable quantities of stored mineral plant nutrients, and, in addition, the absorption of rainfall would be increased and the tilth of the soil improved.

Some of the soils are adapted to crops which are not grown in the county at present. Appling sandy loam, Durham sandy loam, and Cecil sandy loam are used for tobacco in other parts of the piedmont plateau, and no reason is apparent why this crop could not be grown with success here. Truck crops, orchard fruits, and small fruits are adapted to these soils and to a large extent would find a ready local market.

The following bulletins and circulars will provide helpful information for the cultivation of the soils in Abbeville County:

Clemson Agricultural College (S. C.) Extension Service Bulletin 86, Cotton Fertilizers; Circulars 66, Fertilizer for Corn; 70, Winter

Cover Crops; 75, Cotton Varieties; 79, Side Applications of Ammonia for Cotton; and 89, Corn Production; Experiment Station Bulletins 242, Small Grain Experiments, and 245, Cotton Fertilizer Experiments; North Carolina Agricultural Experiment Station Agronomy Information Circular 2, Fertilizers Recommended for Important Crops of North Carolina Based Upon Field Experiments; and Georgia State College of Agriculture Extension Bulletin 271, Use of Agricultural Lime in Georgia.

Abbeville County offers good opportunities to prospective settlers. It has a desirable climate and large areas of cheap yet suitable land for growing cotton and grains, or for dairy farming.

SOILS AND THEIR INTERPRETATION

Abbeville County lies wholly in the Red and Yellow soils region of the United States, and in that physiographic section known as the piedmont plateau, which extends from New Jersey to Alabama. Elevations within the county range from about 400 to 770 feet above sea level. This county is situated nearly 300 miles inland from the ocean, and its climate is primarily continental. The relief ranges from almost level to strongly rolling. Owing to the favorable relief and to the open porous character of the predominant surface soils, natural surface drainage ranges from good to excessive. Internal drainage is generally good, except in the Iredell and Mecklenburg soils.

A rather uniform forest growth, consisting largely of deciduous trees, was supported by the soils before agricultural development began in the county, and as these soils were developed under forest conditions, they never had more than a thin veneer of leafmold and a little organic matter in the topmost 1- to 4-inch layer of the A horizon. This rapidly disappeared when active cultivation began.

Leaching and erosion have been active factors in the removal of organic matter and mineral plant nutrients, especially in this section where the rainfall is rather heavy and the temperature warm throughout the greater part of the year. Much of the land is usually destitute of vegetation during the winter, it is seldom frozen for more than a few hours or days at any one time, and during the growing season it is used largely for clean-cultivated crops, all which features tend to aid and accelerate leaching or loss through erosive action of the plant nutrients. Without exception the A horizons contain less soluble plant nutrients and less finer materials than the B horizons. The accumulation of free carbonate of lime in the solum is prevented, even though calcium is present in the rocks and rock materials from which the soils are derived. Eluviation is strongly evidenced in the more sandy soils by the almost total or partial absence of the finer materials in the A horizons and their accumulation in the B horizons.

The soils range from mildly acid to strongly acid. Those underlain by granites, gneisses, and slate rocks are for the most part strongly acid. They include the Appling, Durham, Orange, and Georgeville soils. The Cecil soils are less acid. The soils underlain by the dark-colored basic rocks—Mecklenburg loam and Davidson clay loam—are only slightly acid.

Table 6 gives the results of determinations of the pH values of three soils. These determinations were made in the laboratories of the Bureau of Chemistry and Soils by the hydrogen-electrode method.

TABLE 6.—*pH determinations on three soil profiles from Abbeville County, S. C.*

Soil type and sample no.	Depth	pH	Soil type and sample no.	Depth	pH
Durham sandy loam:	*Inches*		Appling sandy loam:	*Inches*	
244001	0 - 1½	4.7	244007	0- 6	5.3
244002	1½-11	5.3	244008	6-14	5.0
244003	11 -16	5.3	244009	14-17	5.1
244004	16 -22	5.0	244010	17-26	5.4
244005	22 -35	5.0	244011	26-42	5.4
244006	35 -50+	5.1	244012	42+	4.8
Mecklenburg loam:					
244029	0 - 5	6.2			
244030	5 -10	6.2			
244031	10 -20	6.4			
244032	20 -28	6.4			
244033	28+	6.7			

Erosion and gullying have reached serious proportions in many places where the land is poorly managed. The sandy material has been almost, if not entirely, removed from large areas, and severe washing and gullying have in many places entirely removed the soil material or solum down to the partly decomposed rock. An enormous total area of once tillable land has been rendered almost useless except for forestry. Erosion has been most active and destructive on the Cecil, Davidson, and Wilkes soils.

The geological or rock formations which underlie the soils of the county vary widely in their mineralogical composition. They are largely igneous in origin and consist of fine-grained, medium-grained, and coarse-grained acidic rocks, such as granites, gneisses, mica schist, and Carolina slates, and the basic rocks, such as diorite, diabase, gabbro, and hornblende schist. Bedrock occurs at a depth ranging from a few feet to 50 or more feet, and the disintegrated or decomposed rock material in places lies from 3 to 12 feet below the surface. The characteristics of the soils, which are largely inherent, are influenced to a noticeable degree by the respective underlying geological formations. Variations in the color, texture, and structure of the several soils are due, to a large extent, to the composition of their respective parent rocks, to internal drainage and aeration, and to surface drainage and erosion. Rock fragments, a few boulders, and rock outcrops are present on the surface in places, and rather large areas of gravelly soil occur in the northern and central parts of the county.

The general or regional profiles of the sandy loams of the Cecil, Durham, and Appling series are very similar, except in color. These soils are the well-developed and normally mature soils, and they have a comparatively light textured A horizon which is underlain by the heavier textured uniformly colored well-oxidized B horizon. Beneath the B horizon is a third layer, or C horizon, which varies considerably in texture, is everywhere lighter than the overlying B horizon, but in many places is heavier than the A horizon. Because the C horizon is composed of partly decomposed or disintegrated rock materials, it is extremely variable, not only in texture, but in color and structure.

All the soils, with the exception of the narrow strips of recent alluvial material, have been formed in place, through the soil-forming processes, from the weathered material of the underlying rock formations, and a direct relationship exists between the soil profiles and the respective underlying rocks.

The soils may be classified in three distinct groups: (1) The Cecil, Appling, Durham, and Worsham soils which are derived, through the soil-forming processes, from the weathered products of fine-grained (approaching aphanitic) granites and gneisses, mica schist, quartz mica schist, and of coarse-grained, light-colored aplitic granites and gneisses; (2) the Davidson, Mecklenburg, and Iredell soils which in a similar manner have been derived from diorite, diabase, gabbro, and quartz-free hornblende schist; and (3) the Georgeville and Orange soils which are resultant from the weathered products of fine-textured slates (known as Carolina slates) and associated fine-grained rocks.

The Cecil, Durham, Appling, and Worsham soils, although underlain by similar rocks, differ in color and consistence, especially in the B horizons. The red color of the B horizon in the Cecil soils may be caused by the high content of iron compounds in the parent material. The contrasting yellow color of the B horizon of the Durham soils is due to a relatively lower percentage of iron compounds in the rocks from which this material is derived, or the iron may be in different form. Another controlling factor in the color of the B horizons of the Cecil and Durham soils may be the degree of hydration of the iron compounds which have been determined to be ferric oxides—the more highly hydrated oxides being yellow and the least hydrated red. The fine mottlings and streakings of reddish yellow and yellow in the B horizon of the Appling soils may be attributed either to unequal distribution of the iron oxides or to the unequal hydration of these, rather than to poor drainage. The gray, dark-gray, or drab B horizon of the Worsham soils is almost entirely due to poor drainage conditions and the consequent partial or complete saturation of this layer.

The soils, which, through the soil-forming processes, have been derived from the weathered products of dark basic rocks, such as diorite, diabase, gabbro, and quartz-free hornblende schist, are peculiar in that they represent both mature and young soils, as Davidson, Mecklenburg, and Iredell, the last mentioned being the youngest. These soils are intimately associated in geographic occurrence. The differences in the soil profiles are due to the stage of development and the degree of oxidation and hydration of the materials from which they are derived. The dark-red color of the Davidson soils, both in the A and B horizons, indicates the complete degree of oxidation of the iron compounds. The Iredell soils, with a gray A horizon and a brownish-yellow extremely heavy highly plastic colloidal clay B horizon, which passes abruptly into the greenish-yellow soft decomposed diorite at a depth ranging from 15 to 30 inches, indicate poor drainage and consequent slow oxidation.

The soils of the Georgeville and Orange series are of small extent. These soils are derived from weathered materials of fine-textured Carolina slates and associated rocks. The surface soils,

or A horizons, are either smooth floury gray silt loam or smooth red silty clay loam. The B horizon in the Georgeville soils is smooth silty clay. The uniform red color and smooth uniform texture of the material in this layer indicates good surface and internal drainage and the resultant rather complete aeration and oxidation, as well as the degree of hydration of the iron compounds contained in the parent rock. The Orange soil is derived from materials weathered from fine-grained rock associated with the slates. It is a young soil, in which the A horizon resembles that of the Georgeville soils, but the B horizon is variable and in many characteristics resembles the B horizon of the Iredell soils.

Meadow (Congaree material) is a deposit of recent alluvial material on the first bottoms along the streams. It consists of materials which have been washed from the uplands, carried down by heavy rains, and deposited at times when the streams overflow their normal channels. The material is so recent in age and drainage is so poor that a normal soil profile has not developed.

The soils of Abbeville County may best be illustrated by descriptions of individual profiles, observed under forested conditions, of a few important normally developed soils.

Following is a description of a profile of Durham sandy loam as observed 1¾ miles north of Antreville:

A_1. 0 to 1½ inches, gray loamy sand containing a small quantity of organic matter, with a thin layer of leafmold and forest litter on the surface.

A_2. 1½ to 11 inches, grayish-yellow or pale-yellow mellow and friable sandy loam having a single-grain structure, and containing some sand which ranges in texture between medium and coarse.

A_3. 11 to 16 inches, yellow friable crumbly sandy clay.

B_1. 16 to 22 inches, yellow friable crumbly clay containing a few small quartz fragments and a few roots.

B_2. 22 to 35 inches, yellow, with a few spots or splotches of red, friable clay.

C_1. 35 to 50 inches +, gray, streaked or banded with light red and yellow, friable clay containing some sand, a few very small mica scales, and decomposed granite.

Following is a description of a profile of Cecil sandy loam, as observed 4½ miles northwest of Due West and three-fourths mile west of Keowee Church:

A_1. 0 to 3 inches, gray or grayish-yellow mellow and friable loam or sandy loam, having a single-grained structure and a small content of leafmold, organic matter, and fine roots.

A_2. 3 to 12 inches, light-yellow or yellow sandy loam or heavy sandy loam, in which are a few sharp quartz fragments and fine roots.

B_1. 12 to 16 inches, yellowish-red or reddish-yellow fairly compact yet friable clay loam containing some quartz sand particles and a few small quartz fragments.

B_2. 16 to 34 inches, red stiff but brittle clay, slightly compact but breaking readily and crumbling to a granular mass.

C. 34 inches +, light-red, mottled or streaked with yellow, light-brown, and gray, disintegrated and partly decomposed coarse-grained granite.

Cecil coarse sandy loam, Cecil fine sandy loam, and Cecil clay loam differ from Cecil sandy loam largely in the texture of the solum. The mixed phases of three types of the Cecil series mapped are due entirely to surface washing and sheet erosion. They differ from their respective types in that the A horizons of the mixed phases are lacking in uniformity of color, texture, and thickness.

The Appling soils may be considered intermediate in their color profile between the Durham soils with their yellow B horizons and the Cecil soils with their red B horizons. In structural characteristics the solum of the Appling soils is very similar to that of the Cecil soils.

Following is a description of a profile of Davidson clay loam, as observed three-fourths mile north of Calhoun Falls on the Lowndesville-Calhoun Falls Highway, which is representative of this soil:

A_1. 0 to 3 inches, dark-brown loam containing considerable organic matter and small roots, overlain by a thin layer of brown leafmold.

A_2. 3 to 8 inches, brown or reddish-brown friable heavy loam or clay loam, containing much well-decomposed organic matter, a few quartz fragments, and a few small plant roots.

B_1. 8 to 42 inches, dark-red or maroon heavy stiff smooth clay, a cut surface of which is yellowish red. This material is comparatively sand free, as contrasted with the B horizon of Cecil clay loam, and breaks into irregular-shaped lumps that can readily be crushed to small sharp irregular fragments forming a granular mass. In this layer are a few small rounded black manganese concretions ranging from one-sixteenth to one-eighth inch in diameter. These, as well as the finer material in the B horizon, effervesce with a weak solution of hydrogen peroxide.

B_2. 42 to 74 inches, light-red or red, in most places streaked or splotched with yellow, stiff but brittle and friable clay which is much more friable than that in the overlying B_1 horizon. A cut surface of this layer produces a smearing of the yellow over the red, and a yellowish-red or light-red color results.

C_1. 74 to 98 inches, light-red, highly mottled with ocherous-yellow, light-yellow, light-brown, purple, and light-gray, well-decomposed diorite rock material.

C_2. 98 inches +, variegated ocherous-yellow, yellow, and gray soft decomposed basic rock material.

Davidson clay loam, schist phase, differs from typical Davidson clay loam in that the phase is derived largely, if not entirely, from quartz-free hornblende schist and contains considerable mica. Davidson clay loam, sandy phase, differs from typical Davidson clay loam in that the A horizon is sandy loam or heavy sandy loam.

SUMMARY

Abbeville County is in the northwestern part of South Carolina and borders Savannah River which forms the Georgia-South Carolina State line. Abbeville, the county seat, is 58 miles south of Greenville. The total area of the county is 510 square miles.

The relief is that of a deeply and thoroughly dissected plain. The mean elevation is about 500 feet above sea level, although local differences in elevation range from 391 to 770 feet. The relief ranges from nearly level to strongly rolling and hilly. Drainage, both stream development and soil drainage, ranges from good to excessive in the uplands, except in a portion of the southwestern part of the county—the flatwoods. Most of the narrow strips of first-bottom land are imperfectly drained.

The land was originally forested, largely with deciduous trees, and there was a small proportion of pines.

The salient features of the climate are nearly 50 inches of well-distributed rainfall, a frost-free period of 231 days, and a difference of only about 35° between the mean summer and mean winter temperatures.

Transportation facilities include four railways, several paved State highways, and sand-clay and graveled State and county roads, which serve nearly all parts of the county.

This county is essentially agricultural. Cotton is produced as a cash crop and is decidedly the most important crop grown, both as regards acreage and value. Corn is by far the most extensively grown subsistence crop, and small-grain and hay crops are less important. Livestock raising is carried on to a small extent.

The soils have been an important factor in determining the prevailing type of agriculture. As compared with soils of the Middle West and Northern States, those of Abbeville County are not highly productive of grass, corn, hay, and other feed crops. Both soils and climatic conditions favor the production of cotton.

The soils differ widely in color, drainage, structure, and in such conditions as relief, erosion, and stoniness. On the basis of these and other features bearing a close relationship to agriculture, they have been classified and outlined on the accompanying soil map into 11 soil series, including 16 soil types and 8 phases of types, in addition to 1 miscellaneous classification. The more important soils are the Cecil, Appling, Durham, Davidson, Mecklenburg, and Iredell. On a basis of certain soil characteristics, which bear a very close relationship to productivity and crop adaptation, the soils of the county are divided into four land-use groups.

The light-gray sandy loam soils include all the well-drained sandy loams, except Wilkes sandy loam. The greater part of the cotton crop is grown on the soils of this group, and they comprise the choice crop land of the county.

The heavy red clay loam soils include Cecil clay loam, Georgeville silty clay loam, and Davidson clay loam, with its sandy phase and schist phase. These soils are somewhat better adapted to small grains and legumes than to cotton, especially under boll-weevil conditions. The Davidson soils are especially adapted to alfalfa.

The brown loam soils include Iredell loam, Wickham fine sandy loam, and Mecklenburg loam and its mixed phase. These soils are in general better adapted to grasses and small grains than to cotton.

The miscellaneous land types consist of the stony and broken phases of Cecil clay loam, Wilkes sandy loam, Worsham sandy loam, Orange silt loam, and meadow (Congaree material). The land included in these soils is better adapted to pasture or forestry.

The factors restricting the adaptability and use of the different soils are erosion, poor drainage or frequent overflow, stoniness, and poor physical characteristics.

The elevation, relief, natural drainage, and climate afford healthful living conditions. Springs and small streams are abundant, and good water is easily obtained for both home and farm use from shallow wells.

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