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Soil Survey
of
Elbert County, Georgia

By

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United States Department of Agriculture

Bureau of Chemistry and Soils
In cooperation with the Georgia State College of Agriculture

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SOIL SURVEY OF ELBERT COUNTY, GEORGIA

By G. L. FULLER, Georgia State College of Agriculture, in Charge, and B. H. HENDRICKSON, United States Department of Agriculture

COUNTY SURVEYED

Elbert County is in the northeastern part of Georgia. (Fig. 1.) Savannah River, which separates South Carolina from Georgia, forms the eastern boundary, and Broad River forms the southern boundary and most of the western. Elberton, the county seat, is about 70 miles northwest of Augusta and 30 miles northeast of Athens. The total area of the county is 364 square miles, or 232,960 acres.

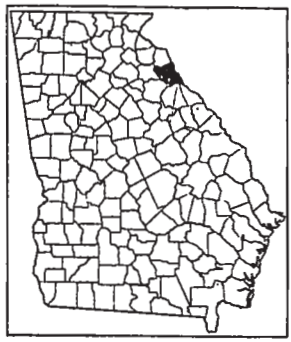

FIGURE 1.—Sketch map showing location of Elbert County, Ga.

Elbert County lies approximately in the middle of the piedmont plateau, and the relief is that of a dissected plain or plateau having an even sky line. The depth of the valleys ranges to 150 feet. A conspicuous exception to the general relief consists of a plain, in the southeastern corner of the county, which is from 200 to 400 feet lower than the level of the plateau. This area is locally known as the "flatwoods" and is less deeply and less completely dissected than the rest of the county. Over most of the county the valleys are narrow and V-shaped. The sharpness of dissection decreases as the lower plateau areas are approached. The high plateau areas are undulating or gently rolling. The highest and broadest plateau remnant begins at the northwest corner of the county at an elevation of about 800 feet and extends southeast past Bowman and Dewyrose to Goss. Between Goss and Elberton it is practically obliterated by encroaching drainage ways with their attendant erosion, but it becomes wider southeast of Elberton for a distance of about 5 miles. Another plateau ridge, 700 or 750 feet above sea level, lies between Beaverdam and Coldwater Creeks, and a third and smaller area lies between Coldwater Creek and Savannah River at about the same elevation. The flatwoods part of the county is characterized by wide flat or gently rolling areas ranging from 300 to 400 feet above sea level, scattered protruding hills, and a few higher areas with sharper relief.

Drainage is well established throughout the county, all drainage eventually reaching Savannah River. In the northern part of the county, the slope from the smooth upland to the river is not steep, but the tributary valleys have steep slopes. At the northeast corner

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of the county the elevation of the upland plateau is about 700 feet, and the river a mile distant ranges in elevation from 450 to 500 feet above sea level. Very little bottom or terrace land lies along Savannah River except about 2 miles above its junction with Broad River, but several large islands occur, consisting of upland, first-bottom, and terrace soils. Toward the south the valley slopes become prevailingly steeper and rougher. The elevation at the point where Broad River joins Savannah River is about 300 feet. Broad River enters the county at an elevation between 550 and 600 feet above sea level, and the crest of the adjacent upland ridge, 1 mile distant, has an elevation of 700 or 750 feet. The valley has steep slopes, and narrow strips of alluvial land occur in the western part of the county, but in the southeastern part the alluvial belt is uniformly wider than along Savannah River.

Elbert County was created from Wilkes County in 1790, and Elberton was established as the county seat in the same year. Previous to this, very early settlements had been made along Savannah and Broad Rivers, chiefly by settlers from Virginia and North Carolina.

The total population of Elbert County as reported by the 1930 census [1] is 18,485, of which 74.8 per cent is classed as rural. The rural population is well distributed throughout the county but is least dense on areas of Iredell soils in the flatwoods section and in the rougher areas bordering the rivers and creeks. According to the 1930 census, Elberton, the county seat, has a population of 4,650, and Bowman, an important town in the northwest corner, numbers 604. Many small settlements, which provide local trading centers, are scattered through the county.

Good railroad facilities are furnished by the main line of the Seaboard Air Line Railway from Atlanta to Washington, D. C.; a branch of the Southern Railway runs from Elberton to Toccoa, Stephens County, where it joins the main line; and the Elberton & Eastern Railroad runs from Elberton to Washington, Ga., where it connects with the Georgia Railroad. State highways have been constructed north to Anderson, S. C., east to Calhoun Falls and Abbeville, S. C., south to Washington, Ga., west to Athens, and northwest to Toccoa. A highway extending southeast to Lincolnton and Augusta is under contemplation.

The highways facilitate the movement of produce to outside markets. Much of the produce of the county, consisting of eggs, poultry, peaches, green beans, potatoes, melons, and strawberries, is carried by truck to Greenville, Calhoun Falls, Abbeville, and Ivy, S. C. Elberton constitutes a good market for locally grown produce, and a curb market has been maintained for some time.

The State highways are surfaced with sand-clay and are well maintained. Most of the county roads are kept in good condition during the summer, but they become badly cut up during the wet winter months, especially in the flatwoods section. Many of the outlying roads are not worked more than once in two or more years. A large amount of granite is quarried and shipped from Elbert County.

[1] Soil survey reports are dated as of the year in which the field work was completed. Later census figures are given whenever possible.

CLIMATE

The climate of Elbert County is characterized by long moderately hot summers and comparatively short winters. Although hot spells in summer are frequent, they are of short duration and the nights are usually moderate. Only occasional short periods of freezing weather occur during the winter. The highest temperature recorded, 109° F., occurred in July, although the mean temperature for June, July, and August is 78.8°. The average dates of the first and last killing frosts are October 30 and April 2, respectively. This gives an average frost-free season of 211 days. However, killing frosts have occurred as early as October 11 and as late as April 21.

The mean annual precipitation for Elbert County is high, 50.18 inches. In the driest year on record (1914) only 37.54 inches of rain fell and in the wettest year (1908) there were 69.45 inches of rainfall. Precipitation is well distributed throughout the year for growing crops, the lowest amount occurring during the harvest season (September, October, and November).

At times the summer rainfall is detrimental to the harvesting of grains and the curing of hay crops. Flurries of snow may occur during the winter but the snow soon melts. Farm labor can be performed every month in the year.

Table 1 gives the normal monthly, seasonal, and annual temperature and precipitation, with recorded extremes in each, as compiled from records of the Weather Bureau station at Elberton.

TABLE 1.—*Normal monthly, seasonal, and annual temperature and precipitation at Elberton, Ga.*

[Elevation, 710 feet]

Month	Temperature			Precipitation			
	Mean	Absolute maximum	Absolute minimum	Mean	Total amount for the driest year (1914)	Total amount for the wettest year (1908)	Snow, average depth
	°F.	°F.	°F.	Inches	Inches	Inches	Inches
December	44.6	75	5	4.43	5.00	4.28	0.7
January	43.7	76	5	4.48	1.64	4.52	.5
February	44.6	77	−2	5.49	4.31	6.82	2.2
Winter	44.3	77	−2	14.40	10.95	15.62	3.4
March	54.2	91	14	5.11	2.12	4.97	.1
April	61.9	94	28	3.51	2.61	8.42	(1)
May	71.5	100	35	3.00	.48	1.82	.0
Spring	62.5	100	14	11.62	5.21	15.21	.1
June	77.7	105	46	4.65	3.58	5.51	.0
July	79.7	109	58	5.20	3.21	5.62	.0
August	78.9	101	56	5.28	4.55	19.23	.0
Summer	78.8	109	46	15.13	11.34	30.36	.0
September	74.2	102	41	3.39	1.60	1.41	.0
October	62.9	94	26	2.92	4.19	4.87	(1)
November	52.6	82	20	2.72	4.25	1.98	.3
Fall	63.3	102	20	9.03	10.04	8.26	.3
Year	62.2	109	−2	50.18	37.54	69.45	3.8

(1) Trace.

AGRICULTURE

Agriculture was well established in Elbert County prior to the American Revolution. Pioneers came up Savannah and Broad Rivers and engaged in a self-sustaining type of agriculture. Cattle, hogs, and sheep were raised for food and clothing; and corn, oats, wheat, rye, barley, and tobacco were grown. Cotton also was produced at an early date and rapidly assumed importance as a cash crop, owing to the excellent transportation facilities down Savannah River. A history published in 1849 reports cotton, corn, wheat, rye, oats, and tobacco as the principal crops, with cotton yielding 500 pounds to the acre, corn 3 barrels, or 15 bushels, and wheat 7 bushels. At "The Point" was the town of Petersburg, which was one of the most important towns in the State with large tobacco warehouses, but by 1849 the town had begun to decay and at present no trace of it remains.

The 1880 census reported 1,600 farms in the county and 89.2 per cent of the land of the county in farms, with an average size of 129 acres of which 42 per cent was improved land. The number of farms steadily increased to 3,316 in 1920, but decreased to 2,427 in 1930, probably owing to the agricultural depression in the intervening period. During the last decade there has been a steady decrease in the percentage of the land of the county being farmed, but the percentage of improved land in farms has increased. Farm abandonment, which fluctuates to a certain extent with economic conditions, has been caused in part by agricultural depression and in part by erosion. For a long time sandy fields were cropped without adequate protection against erosion which eventually exposed the clay. The fields were then abandoned and new sandy fields were cleared as the sandy areas were much easier to cultivate. However, uncleared sandy loam areas are becoming scarce, so that fields now abandoned are not replaced by new sandy loam fields, and the tendency is to utilize more of the clay lands. About three-fourths of the farms of the county are operated by tenants. The number of tenant-operated farms has far exceeded the number of owner-operated farms since 1880.

Tobacco was an important crop in the early days, but production decreased until by 1879 only 5 acres were reported in tobacco by the census and very little has been reported since.

The adaptation of the soils of the county to the production of cotton was early recognized, and cotton became the most important cash crop prior to the Civil War. Its acreage has consistently exceeded that of any other crop since that time, and in 1919 it exceeded the combined acreage of all other crops, occupying 54 per cent of all the improved land in the county. By 1924 the acreage had decreased, owing, in part, to the low price of cotton following 1919. But a better type of agriculture is resulting from this decrease in the cotton acreage, for greater diversity in crops has been adopted, together with some increase in the number of livestock raised. In 1919, 27,618 bales of cotton were produced, averaging one-half bale to the acre. In 1924 the acreage and average yield had decreased, but in 1927 the county agent reported one field of 100 acres which produced 107 bales of cotton. In a cotton-growing contest conducted in the county in 1927, the high yield was 8,411 pounds of seed cotton producing 3,516 pounds of lint on 5 acres, an average of 1.4 bales, of 500 pounds

each, to the acre. During the last two years, owing to the dry weather, damage from the boll weevil has been slight.

Corn has always been the most important feed crop grown and at present a small part of the crop is sold for cash. It has always occupied an acreage second only to cotton. In 1879, 20,369 acres were reported in corn yielding 10.4 bushels to the acre. In 1919 an average yield of 12.9 bushels was produced on 26,561 acres, and in 1924 24,095 acres of corn produced an average yield of 9.6 bushels. Excellent yields of this crop have been obtained on first and second bottom lands. The county agent reports one field which has produced more than 100 bushels to the acre each year for seven successive years and another field which produced 115 bushels to the acre in a corn-growing contest.

Oats and wheat have always been grown, but the acreage has gradually decreased since the first census reports. In 1879 there were 7,688 acres in wheat and 5,552 acres in oats, but by 1924 there were only 1,554 acres in wheat and 1,953 acres in oats. The acre yield of oats has gradually increased, yields ranging from 30 to 40 bushels to the acre being common on well-tilled and early fall-planted fields. Wheat has averaged about 7 bushels to the acre, according to census returns, but the county agent reports yields as high as 40 bushels to the acre on some fields.

In 1924, 895 acres of peanuts yielding 10,881 bushels were grown for market, but the county agent reports that the growing of this crop has been practically discontinued, following a drop in price.

Sweetpotatoes have been marketed for some time, and recently the acreage devoted to both potatoes and sweetpotatoes has been increased to supply near-by markets, mainly in South Carolina. The census of 1925 reported 502 acres of sweetpotatoes yielding 32,507 bushels in 1924, an average of 65 bushels to the acre. In the same year potatoes averaged about 50 bushels to the acre. Peaches are a cash crop on a few farms. In 1924, 28,668 trees of all ages were reported, and the production was 18,406 bushels of fruit. If marketing methods can be improved peach production should provide an excellent cash income. Owing to recent efforts of the county agent, alfalfa is assuming importance as a cash crop. Only 25 acres were reported in alfalfa by the census in 1924, and the county agent reported 475 acres devoted to this crop in 1927. From three to five cuttings a year are obtained, yielding about 1 ton at each cutting. The soils on which alfalfa is most successfully grown include those in greatest need of organic matter and physical improvement, and such a crop is recommended. Pitt's clover (*Trifolium striatum*)[2] is being introduced in the county for use as hay and for soil improvement. One thousand acres devoted to this crop were reported by the county agent in 1927. This clover is cut for hay and will reseed itself, making an excellent soil-

[2] According to information from the Bureau of Plant Industry, U. S. Department of Agriculture, Pitt's clover was reported in New Jersey by the Gray Herbarium of Harvard University in 1880, but apparently attracted little interest until it was discovered near Bowman, Ga., on the farm of D. J. Pitts, who found it in a field of crimson clover but paid little attention to it until the clover reseeded itself. It is generally thought that this clover was an admixture in the crimson clover seed used by Mr. Pitts, as it has been reported in England and Germany. He became interested in developing it as a possible substitute for crimson clover to be used as a winter pasture and cover crop. This clover is reported as giving only one-half the growth of crimson clover the first year, but reseeding the land much better than the latter, and producing approximately three-fourths the yield of crimson clover after the second year. There have not been a sufficient number of tests to indicate the value of this clover in other sections of the United States.

improvement crop. Considerable hay from the creek and river bottoms, consisting largely of Bermuda and Dallis grasses, is sold on the local markets. The census for 1924 reported 3,471 acres of hay, producing 2,711 tons. Part of the hay crops are sold locally, with the exception of alfalfa which is shipped out of the county. In the same year 3,077 acres of grains were cut green and 1,307 acres were planted to annual legumes, including cowpeas, soybeans, and vetch. Vetch is commonly grown with oats, and velvetbeans with corn, for fodder. Sorgo has been grown for a long time, both for sirup and for rough forage.

In addition to the more general farm crops, considerable interest in truck crops for local and near-by South Carolina markets has been aroused, especially since new bridges and highways place South Carolina cities within easy reach by trucks. A curb market in Elberton has absorbed some surplus garden and fruit crops, including peaches, green beans, potatoes, sweetpotatoes, melons, strawberries, sorgo sirup, and garden produce. The 13,153 apple trees, 2,149 pecan trees, 1,752 pear trees, 449 plum trees, and 1,232 grapevines reported in 1924, produced fruits and nuts which were used mainly for home consumption.

Following the decline in the price of cotton, increased interest was aroused in beef and dairy products. A few good herds of purebred Herefords and Shorthorns are kept, and the number is increasing. The county agent reports about 5,000 milk cows in 1927. The dairy cows are mostly grade Jerseys with a few Holsteins and Guernseys. About 20 purebred Jersey bulls were distributed through the county in the same year. The dairy industry of the county has been greatly enhanced by the establishment of a modern creamery at Elberton in 1927. During November, this creamery, which manufactures butter only, handled about $3,400 worth of cream. Cream stations were started at Bowman and Elberton in February, and by December 31 they had handled $40,000 worth of cream.

In 1925 there were 74,005 chickens in the county. For the last three years one carload of poultry a month, mainly fryers, hens, and turkeys, has been shipped to northern markets. The county agent reports that plans have been made to ship a carload of eggs a week during the spring and summer months. In 1924, 4,559 hogs were raised mainly for home use, practically none of the meat being shipped. Poland China, Duroc, and Berkshire are the favorite breeds. Four or five small flocks of sheep and three or four small flocks of goats were in the county in 1927. Some bees are kept.

Although no strict system of planting certain crops on certain soils is practiced in Elbert County, some soils are recognized by the farmers as being better suited to certain crops. Corn is known to yield far better on the Congaree, Wickham, and Altavista soils; Davidson clay loam and Cecil clay loam are more generally used for alfalfa than the sandy soils; the Congaree soils are preferred for melons; and the Madison soils are preferable for cotton.

Very little fall plowing is done except for small grains which are sown in the fall. A small acreage of land for corn and cotton is plowed during the winter, but most of it is plowed in the spring. Grain which is drilled in usually withstands the winter freezes better than that which is broadcast, but both methods of sowing are common.

Repeated cropping to the same crop is common practice throughout the county, but about one-third of the farmers practice a crop rotation. The rotation in general use consists of cotton followed by wheat or oats which is followed by corn. Another common rotation consists of cotton followed by corn and this by field peas. Crimson clover, Pitt's clover, vetch, and velvetbeans are used to some extent as soil-improvement crops.

The cost of fertilizers used in Elbert County increased steadily from $36,170 in 1879 to $388,357 in 1919, but by 1924 the total cost of fertilizers (including lime) dropped to $208,651. The decrease is probably due in part to the decreased cost of the fertilizer but mainly to the decreased acreage of cotton which receives most of the fertilizer purchased. Commercial fertilizers were used by 93 per cent of the farmers in 1924. The kinds of fertilizers used on cotton consisted largely of 2–8–2 [3] and 2–8–3 mixtures, until more recently when 3–9–3 and 4–10–4 became the predominating analyses, a few farmers using fertilizers of higher analyses. Lime has been used on several of the soils, principally for the production of alfalfa.

The condition of buildings on the farms of Elbert County varies widely between those on owner-operated farms and those on tenant-operated farms. Many good frame houses, well painted and with attractive surroundings, are seen. Little barn room is provided or needed except on some of the better-equipped farms, on which considerable livestock is carried. Most of the farm machinery is allowed to stand without shelter throughout the year. It is reported that there has been a great improvement in the type of farm machinery used on many of the farms in the last few years. Larger and more efficient machinery than was common on the farms 10 years ago is more general, and a few farmers have tractor outfits with the attendant heavier tillage implements which are needed for best results on the heavier soils. There were in the county in 1925, 3,519 mules, the most common work animals. Only a comparatively few horses are used in farm work.

Most of the farm laborers are colored, and such labor is somewhat scarce owing to the exodus of many negroes to northern cities. However, it is reported that many are now returning and are receiving somewhat higher pay than formerly. In 1925, $47,795 was reported spent for labor by 14.2 per cent of the farmers.

The average area of the farms in the county is 57.8 acres. Several land holdings include from 1,000 to 4,000 acres, part of which is farmed, but the majority of farms range from 20 to 49 acres in size.

In 1925 it was reported that 73.3 per cent of all the farms in the county were operated by tenants. The most common form of rental is classed as "standing rental," by which system the tenant furnishes work animals, implements, fertilizer, seed, and labor and returns a fixed portion of the crop as rental to the landowner, depending on the quality and quantity of land rented. Another system, nearly as common, is one in which the owner furnishes the implements, work animals, livestock feed, one-half the fertilizer, and one-half the seed and usually receives one-third of the corn and one-fourth of the cotton. Only 1 per cent of the tenant farms are rented for cash. Of the farm owners in the county in 1925, 87.6 per cent were whites and

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

12.4 per cent were negroes, whereas of the tenants, about half were whites and the other half negroes.

SOIL SERIES AND TYPES

The soils of Elbert County are classified into soil series, and each series is designated by a proper name. The soils of each series have the same general profile characteristics. The subsoil has the same sequence of layers, the color, structure, and consistence of each layer being uniform for all members of the series. All members of each series have been formed in the same manner under similar conditions and are derived from the same kind of material. The series is divided into soil types on the basis of the texture of the surface soil. The different soils in the county have, so far as possible, been described as occurring in wooded areas or areas which have never been cultivated, because this represents the natural conditions, whereas the condition after cultivation varies with the kind of tillage practiced. In addition to the soil types, several phases of types are shown on the map. The phases represent minor variations from the typical soil. On the map of Elbert County, 12 soil series are shown which have been separated into 15 soil types and 4 phases of types besides 1 miscellaneous soil separation.

In the descriptions of the soil layers, terms are used which have definite meanings but which may not be readily understood. By surface soil is meant not merely the soil to plow depth, but rather the layer of lighter-textured soil which overlies a heavier-textured layer and may be but 4 or 5 inches thick or may be 20 inches thick. The texture of each soil type is determined by the percentage of sand, silt, and clay contained in the surface soil. Other explanations of terms employed to describe the different soil characteristics are as follows: "Brittle," fragments which break with a clean fracture when dry; "impervious," soil having little or no penetration by air or water; "loose," soil particles which are incoherent and have maximum pore space; "mellow," material which is weakly coherent but will not pack.

In the following pages of this report the soils of Elbert County are described in detail, and their agricultural possibilities are discussed; the accompanying soil map shows their distribution in the county; and Table 2 gives the acreage and proportionate extent of each soil type.

TABLE 2.—*Acreage and proportionate extent of the soils mapped in Elbert County, Ga.*

Type of soil	Acres	Per cent	Type of soil	Acres	Per cent
Cecil sandy loam	29,632	25.8	Durham sandy loam	448	0.2
Mixed phase	30,592		Wilkes sandy loam	13,824	5.9
Cecil clay loam	38,016	31.5	Wickham sandy loam	704	.3
Steep phase	35,456		Altavista fine sandy loam	192	.1
Iredell loam	22,464	12.0	Congaree fine sandy loam	4,544	2.0
Gravelly phase	5,568		Congaree silt loam	2,880	1.2
Madison sandy loam	6,592	2.8	Congaree silty clay loam	768	.3
Madison gravelly sandy loam, mixed phase	11,520	5.0	Worsham sandy loam	1,536	.7
Davidson clay loam	3,712	1.6	Meadow (Congaree material)	11,584	5.0
Mecklenburg loam	6,272	2.7	Total	232,960	
Appling sandy loam	6,656	2.9			

CECIL SANDY LOAM

In forested areas the surface soil of Cecil sandy loam is characterized by a 1 or 2 inch surface layer of dark-gray sandy loam which is yellowish gray when air-dry and contains considerable partly decomposed organic matter. This passes quickly into grayish-yellow sandy loam which extends to a depth ranging from 5 to 12 inches below the surface. Underlying this is a third or subsurface layer of reddish-yellow light sandy clay from 2 to 4 inches thick. The material of this layer is friable and the air-dry lumps readily break in the fingers. This is a gradational layer between the surface soil and the subsoil, and in some places it is absent. In nearly level or gently undulating areas the layer attains its greatest thickness, whereas in most areas with sharper relief it is absent, leaving a sharp line of demarcation between the grayish-yellow surface soil and the red subsoil. In cultivated fields the surface soil is yellowish-gray sandy loam, in some places marked with reddish-yellow spots. In large smooth areas the surface soil contains a noticeably larger amount of fine material, and as the relief becomes sharper the proportion of coarser material increases, until, in narrow strips on ridges and on decided slopes, much coarse sand is in evidence on the surface and in a few places the texture is coarse sandy loam.

The subsoil is red clay—light red when dry, dark red when wet. The cut surface is yellowish red or reddish yellow. The material is stiff and brittle and breaks into large irregular lumps which readily break into small granules which, when air-dry, are crushed with considerable difficulty by the fingers. When wet the clay is moderately sticky. Coarse quartz grains are scattered throughout the subsoil which extends to a depth ranging from 24 inches to 6 or more feet and grades into light-red friable clay containing a large quantity of fine mica scales. Scattered quartz grains and partly weathered fragments of the parent rock are also present. This layer ranges in thickness from 8 to 20 or more inches. It grades into finely mottled white, red, and yellow soft very friable material consisting of disintegrated and partly decomposed granite or gneiss, and this at varying depths grades into harder rock.

As mapped, this soil includes scattered spots in which the surface soil has been removed by erosion, exposing the red clay subsoil. A few areas occur in which the surface soil is very gravelly, and where these areas are large enough they are indicated on the soil map by gravel symbols. Most of the gravel is angular white quartz from 1 to 3 inches in diameter, although a few fragments of quartz or granite may exceed 1 foot in diameter. In most places the quantity of gravel is small but in a few small areas it is so great as to seriously impede cultivation. The soil is usually gravelly north of Mill Shoal Creek and near the county line west of Bowman. West of Bowman much of the gravel is brown, owing to incrustation with iron.

Included with this soil in the areas north and west of Bowman, north of Mill Shoal Creek, and northwest of Ruckersville, are small areas in which rock approaches within a few inches of the surface, and the surface soil consists of coarse-grained, partly disintegrated granite. East of Liberty Church small spots of Appling sandy loam and Durham sandy loam are included in mapping.

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Many comparatively large areas of Cecil sandy loam are mapped in Elbert County, comprising a total area of approximately 47 square miles. The largest areas are near the county line north and west of Bowman, 2 miles south of Bowman, near Dewyrose and Deep Creek Church, 3 miles southeast of Elberton, extending from the vicinity of Fain's Store to Montevideo, and from Evergreen School west past Harmony Church and Concord Church to Liberty Church. Many small areas occur throughout the county but only a few are in the southeast quarter, east and southeast of Petersburg School.

Most areas of Cecil sandy loam occupy positions of high, undulating or gently sloping relief, but north of Mill Shoal Creek the areas have a sharper relief. This soil commonly occupies the high crests of broad ridges lying between drainage ways, and they are subject to comparatively little erosion. Drainage is excellent, both on the surface and internally. Some areas require a moderate amount of terracing to prevent surface erosion.

This is one of the most extensively cultivated soils in the county, probably more than 75 per cent being used for crop production. The principal crops are cotton and corn, and small areas are in oats, wheat, sweetpotatoes, peaches, and alfalfa and other hay crops. Cotton averages about one-half bale to the acre, although some areas produce less owing to poor tillage and improper fertilization. However, the soil is capable of producing much better yields, as was demonstrated by a 5-acre cotton contest reported by the county agent in 1927. The highest yield in the contest was obtained on Cecil sandy loam where 8,411 pounds of seed cotton, or 3,516 pounds of lint, were obtained. Corn yields are reported to average about 15 bushels to the acre and oats about 30 bushels, although yields as high as 90 bushels of oats have been obtained.

Fertilizers of various kinds and in various quantities are universally used on cotton. About 600 pounds of a 4–12–4 mixture is recommended by the county agent, and it is reported that muriate of potash gives better results than kainit. Oats, wheat, and corn commonly receive 50 pounds of nitrate of soda to the acre, although a few farmers use 100 pounds. The greatest need of this soil is increased organic matter in the surface soil, either from barnyard manure or green-manure crops.

Cecil sandy loam, mixed phase.—Cecil sandy loam, mixed phase represents semieroded areas in which the surface soil has been washed away, exposing the red clay subsoil in spots. This condition presents such a mixture of spots of Cecil clay loam scattered throughout the sandy loam areas that it is impossible to show the two soils separately, and all are included as the mixed phase of the sandy loam. Every field presents a spotted appearance, with some gray spots and some red spots.

Most of this mixed soil occurs in areas which are or have been under cultivation and which are subject to active surface erosion, although not so subject to gullying as Cecil clay loam. Active erosion is evidenced in abandoned fields by the presence of gravel on pedestals from 1 to 3 inches high. A few areas, in which angular quartz gravel covers the surface, are indicated on the map by gravel symbols. In most places the quantity of the gravel is not sufficient to seriously interfere with cultivation.

Soil of this phase occurs throughout the county. It aggregates nearly 48 square miles but occurs in no large areas. The largest areas are those occupying the slopes of drainage ways which are heading into areas of Cecil sandy loam, as the area southwest of Dewyrose. Typical areas occur as strips between areas of Cecil sandy loam and Cecil clay loam, and many areas border stream channels.

Internal drainage is good but surface drainage is too free, requiring terracing and winter cover crops to check surface erosion. About half the land is cultivated, its suitability for cultivation being determined by the extent to which erosion has progressed. An excellent surface soil can be prepared by deep plowing and tilling, and by protection from erosion, but such tillage methods are limited on many farms, owing to lack of adequate machinery.

The uses, adaptations, and fertilizer requirements of the mixed phase are similar to those for the typical soil.

In Table 3 are given the results of mechanical analyses of samples of the surface soil, the subsurface soil, and several layers of the subsoil of typical Cecil sandy loam.

TABLE 3.—*Mechanical analyses of Cecil sandy loam*[1]

No.	Description	Fine gravel	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt	Clay
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
258601	Surface soil, 0 to 2 inches	4.5	22.8	16.2	18.8	8.9	18.1	10.6
258602	Subsurface soil, 2 to 9 inches	3.6	19.3	16.4	19.2	9.6	19.6	12.3
258603	Subsoil, 9 to 12 inches	2.5	15.3	13.7	17.5	7.5	20.2	23.2
258604	Subsoil, 12 to 38 inches	2.1	9.2	5.6	6.8	4.3	13.7	58.3
258605	Subsoil, 38 to 54 inches	3.1	12.6	6.8	12.7	10.4	20.0	34.4
258606	Subsoil, 54+ inches	6.2	18.1	8.9	15.7	9.3	21.0	20.7

[1] After treatment with hydrogen peroxide.

CECIL CLAY LOAM

In virgin areas, the surface soil of Cecil clay loam consists of a 2 to 4 inch layer of brownish-red heavy sandy loam grading into dark-red friable and crumbly clay loam which extends to a depth ranging from 4 to 8 inches below the surface. In cultivated fields the surface soil is red clay loam. The subsoil is a stiff and brittle red clay which has textural and structural characteristics similar to the subsoil of Cecil sandy loam. This layer extends to a depth ranging from 20 inches to more than 6 feet below the surface and grades into a lighter-red clay layer, from 8 to 20 or more inches thick, which is more friable and contains a noticeable amount of mica. It is underlain by mottled very friable partly decomposed granite or gneiss.

Over much of the county Cecil clay loam is the product of extensive sheet erosion on former Cecil sandy loam areas. Consequently there is little uniformity in the texture or depth of the surface soil. In places it is entirely absent and the red clay subsoil is exposed. The methods of tillage practiced on this land have caused wide variations in its character. Where plowed deep and protected from erosion an excellent friable clay loam surface soil is maintained, but where plowed to only a slight depth without protection, as is commonly done, the surface soil is shallow heavy clay loam which is readily washed away, exposing the subsoil.

Here and there, at the base of a Cecil clay loam slope, is a narrow margin of Cecil sandy loam in which the surface soil is undoubtedly of colluvial origin. Included with the soil in mapping is a narrow band, from 100 to 300 feet wide, bordering the first bottom of Broad River north of Steel Bridge, in which the soil is red clay loam or silty clay loam of colluvial material to a depth ranging from 10 to 28 inches. One mile east of Mattox Bridge on Broad River and near the Hart County line on Savannah River are small areas occupying benchlike positions, but which show little alluvial deposition except in a few places where rounded gravel are scattered over the surface. Small included spots of the Madison soils occur northwest of Gregg Shoals on Savannah River, north of Coldwater Creek, and 1½ miles southwest of Limo Church.

About 59 square miles of this soil are mapped in Elbert County, the largest development being in the central part of the county in the vicinity of Elberton and westward along the Seaboard Air Line Railway. Small areas occur throughout the county, but very little of the soil is in the western part, west of Hardcash and Match, or in the southeast part in the flatwoods section.

This soil occupies slopes which range from gentle to steep, and it also occurs in rolling and hilly areas. Internal drainage is good, but surface drainage is too free. Some areas are badly cut by gullies, although most of the severely gullied areas are included in Cecil clay loam, steep phase. Following abandonment, fields are soon seriously damaged by gullying. For successful tillage the soil requires adequate terracing and protection by winter cover crops.

The percentage of abandonment is greater on this soil than on any of the other good agricultural soils in the county, with the possible exception of Davidson clay loam. Probably not more than 30 per cent of the land is farmed. However, most of the soil could be farmed and would make one of the most productive soils in the county if plowed deep in the fall and tilled well. It is seriously in need of more organic matter in the surface soil to improve the structure and to increase the nitrogen content. This can be supplied either by applications of stable manure or by plowing under a green-manure crop, preferably a legume, regularly in a definite crop rotation.

The crops grown include cotton, corn, oats, wheat, peaches, sorghum, alfalfa, and other hay crops. The county agent reports that alfalfa does very well on areas of this soil which are in a good state of cultivation. Crop yields are influenced to a marked degree by tillage methods. Where plowed to only a slight depth the soil suffers abnormally during dry weather, whereas areas plowed deep in the fall suffer less than Cecil sandy loam in dry weather. During wet weather the deeply plowed land will not wash and gully so badly as the areas plowed to only a slight depth.

Fertilizers used are similar to those used on Cecil sandy loam.

Some areas of this soil are best suited to reforestation because of the extent to which they have become gullied. Such areas can be reforested with shortleaf and loblolly pines.

Cecil clay loam, steep phase.—Cecil clay loam, steep phase, comprises areas of Cecil clay loam which are of steeper, rougher relief than the typical soil, having slopes which are subject to excessive erosion when cleared. This soil includes mainly steep slopes and

narrow ridges which are unsuitable for the cultivation of general farm crops except in small areas of 2 acres or less on the crests of a few ridges or near the bases of slopes. Owing to the character of the relief there is considerable variation both in the profile development and in the kinds of soils included with this phase. Along Broad River between Mattox Bridge and Dove Creek, the phase includes areas of Cecil sandy loam and its mixed phase occurring on the steep slopes. Areas also occur throughout the phase in which rock comes within 5 to 10 inches of the surface, and some few areas are rocky on the surface. Along Broad River northwest of Steel Bridge, areas of the Madison soils which are steep and usually rocky are included, and east of Beaverdam Mill on the south side of Beaverdam Creek, included soils of the Wilkes series occur at the bases of the slopes.

Soil of the steep phase occupies approximately 55 square miles in the county. It occurs extensively along Broad and Savannah Rivers and along Beaverdam, Coldwater, Van, and Dove Creeks. Large areas are east of Elberton, south of Oglesby, and east and northeast of Ruckersville.

Not more than 5 per cent of the land is cultivated. Most of it is forested with shortleaf pine and loblolly pine, together with white oak, red oak, hickory, and other hardwoods. This soil is best adapted to reforestation, or in places, where it can be seeded and terraced, to pasture.

IREDELL LOAM

In forested areas Iredell loam, locally called "flatwoods soil," or "blackjack-oak land," has a 1 to 3 inch surface layer of brownish-gray loam. Many small rounded iron accretions, from one-sixteenth to one-eighth inch in diameter, a few being one-fourth inch, occur on the surface and through this layer. The subsurface layer is light-gray loam, yellowish gray when dry, extending from 5 to 18 inches below the surface. This layer also contains many small rounded iron accretions. In places very few concretions occur on the surface but most of them are at the contact of the surface soil with the subsoil in a zone of iron concentration. Here and there considerable small angular quartz gravel 1 inch or less in diameter occur on the surface and to less extent through the soil. In cultivated fields the surface soil is gray or brownish-gray loam, being lighter gray in areas where the surface soil is deeper and where it contains fewer pebbles in the upper part. In places the pebbles are absent.

The subsoil is brownish-yellow, in places greenish-yellow, clay which is very heavy, tenacious, plastic, and impervious. On exposure it becomes rust brown, in many places having a yellow or green cast. The subsoil in exposed cuts checks into irregular lumps which cling to the wall. These lumps become so hard that they are broken with great difficulty into fragments which can not be pulverized between the fingers. The air-dry fragments and lumps take on a smooth silky polish when rubbed hard. The subsoil ranges in depth from 20 to 40 inches below the surface and grades into mingled yellow and green disintegrated partly decomposed basic rocks which in most places pass quickly into the hard rock. Veins of white quartz rock penetrate the diorite, gabbro, chlorite schist, and basalt porphyry.

In many places where chlorite schist occurs it penetrates the subsoil to within a few inches of the surface and here and there outcrops.

Locally in ditches and cuts heavy black shiny minerals wash out of this soil and accumulate. They are sufficiently magnetic to affect a compass and also contain considerable manganese in places. Such materials occur in the vicinity between Flatwoods Chapel, Beulah School, and Cade Chapel. East of Fortsonia and east of Evergreen School, numerous small spots of Mecklenburg loam too small to show on the map are included with Iredell loam in mapping. There are also a few small spots of clay loam texture in this vicinity and south of Fortsonia east of the highway. South of Hunters Chapel is an area in which the surface soil consists of gray fine sandy loam to a depth ranging from 8 to 14 inches. Had this area been more extensive it would have been mapped as Iredell fine sandy loam.

There are about 35 square miles of Iredell loam in Elbert County, occurring almost exclusively in comparatively large unbroken areas in the southeast quarter in that section locally known as the flatwoods, and two small areas are in the northeast part 1¼ miles southeast and 2 miles east of Evergreen School, respectively.

Areas of this soil are smooth, undulating, and nearly level. They occupy the lowest elevations of any of the upland soils in the county, distinctly lower than the bordering Cecil soils or the associated Davidson soils. The relief in most places is slight, and streams have cut but shallow channels. There is a sharp rise from areas of this soil to the surrounding Cecil soils and to areas of Davidson clay loam. This gives rise to the local name, flatwoods soil.

Surface drainage in most areas is adequate, but internal drainage is practically prohibited by the heavy impervious clay subsoil.

Approximately 50 per cent of the land is cultivated and is used for all the general crops of the county. It is reported that excellent crops of cotton, corn, and oats are produced. This is considered a better soil for cotton and corn in moderately dry or very dry years than the surrounding Cecil soils, but in wet years it is difficult to till. The soil will withstand severe droughts if the surface soil is well tilled, but during wet seasons a rank growth of grass and weeds, which are difficult to control, tends to smother the crops. The value of this soil for crop production is controlled largely by the depth of the surface soil. It is also reported that areas having a quantity of iron pebbles or a small amount of quartz gravel, sufficient to give the surface soil a brown cast, are much easier to till and prove highly productive.

It is reported that cotton tends to mature later on this soil than on the Cecil soils, and the picking season extends over a longer period of time. The last of the crop often fails to mature, and maturing could possibly be hastened by increasing the amount of phosphoric acid in the fertilizer application. According to local reports, Iredell loam was considered entirely unsuited to cotton production until experiments with potash fertilizers demonstrated it to be one of the best cotton soils. In the 5-acre cotton contest conducted in 1927, the field on Iredell loam produced 5,351 pounds of seed cotton, or 2,217 pounds of lint. The county agent asserts that the soil can be made to average at least 1 bale to the acre, and he reported 100 acres which produced 107 bales in 1927.

The kind and rate of application of fertilizers vary, but all carry a high content of potash, as cotton rusts badly where potash is not used. During the World War no deleterious effect was observed on cotton by omitting the potash for two years, but after that it rusted badly and the rust continued until the use of potash was resumed. One farmer reported using 400 pounds to the acre of a mixture of 200 pounds of kainit and 200 pounds of ready-mixed 4–10–4 fertilizer, and another reported using 400 pounds of a 5–7–5 mixture to the acre. Kainit is reported to give better results than muriate of potash. The fertilizer recommended by the county agent is about 600 pounds of a mixture consisting of 1,000 pounds of superphosphate (acid phosphate), 1,000 pounds of kainit, and 1,000 pounds of cottonseed meal.

The uncultivated areas of this soil support a heavy growth of oaks, hickory, and other hardwoods, together with a good growth of shortleaf pine and some loblolly pine. The oaks include a considerable proportion of blackjack.

Iredell loam, gravelly phase.—Iredell loam, gravelly phase, differs from typical Iredell loam in the presence of a large quantity of angular quartz gravel, ranging from 1 to 6 inches in diameter, on the surface and through the soil. The subsoil is usually rather thin and is, in places, penetrated by the parent rock, fragments of which are intermixed with the quartz on the surface. The quantity of rock fragments is in most places sufficient to seriously impede cultivation and, together with the shallowness of the surface soil and subsoil, renders most of the land better suited to forestry than to agriculture.

In a few places as south of Memorial Bridge across Savannah River and 2½ miles southwest of Fortsonia, bowlders occur on the surface. In the last-mentioned area many large bowlders are of basalt porphyry.

Included with this gravelly soil are a few small areas, bordering Savannah River near Calhoun Ferry, in which the soil is Mecklenburg loam. These areas are very hilly and are unsuited to cultivation.

Iredell loam, gravelly phase, occupies 8.7 square miles in the southeast corner of the county, associated with typical Iredell loam. The largest areas are south of Memorial Bridge, 3 miles west of Cade Chapel, and about 1½ miles north of Fortsonia.

The relief of most areas is greater than of the typical soil, in a few places being steep and hilly, as the steep areas bordering Savannah River south of Memorial Bridge. Although some areas are comparatively smooth, most of the land is more rolling and broken than the typical soil.

MADISON SANDY LOAM

In forested areas, the 1 to 3 inch surface layer of Madison sandy loam is dark-gray or grayish-brown sandy loam in which the dark color is due to partly decomposed organic material. Small angular fragments of quartz gravel and small platy fragments of quartz mica schist are scattered over the surface, most of the fragments being less than 1 inch in diameter. The material in this layer grades into grayish-yellow sandy loam, containing small scales of mica and some coarse quartz particles, which extends to a depth ranging from

4 to 10 inches. Both of these layers contain noticeably more fine material than does the surface soil of Cecil sandy loam. The next lower layer consists of light reddish-yellow friable sandy clay which contains a noticeable amount of fine mica flakes as well as quartz grains. This layer, which is transitional between the surface soil and the subsoil, extends to a depth ranging from 8 to 16 inches below the surface. In cultivated fields the surface soil is yellowish-gray sandy loam, in most places showing some mica, together with scattered fragments of quartz mica schist, on the surface.

The subsoil is composed of two distinct layers, the upper one of which is firm and brittle red clay which breaks into irregular-sized and irregular-shaped lumps, slightly sticky when wet but readily pulverized when dry. This layer varies greatly in thickness, ranging from about 4 inches to 20 or more inches but in most places being between 10 and 14 inches thick. It grades into very friable and very micaceous light-red clay which has a greasy feel and is, in many places, penetrated by veins of soft parent rock. This layer varies from 5 to 20 inches in thickness before passing into purplish-red soft partly disintegrated quartz mica schist which is cut by the hard rock in many places.

The line of demarcation between Madison sandy loam and Cecil sandy loam areas is arbitrarily established in many places, as the soils grade almost imperceptibly into each other. Due to a change in soil classification Madison sandy loam in Elbert County is mapped adjoining Madison gravelly sandy loam in Madison County.

There are 10.3 square miles of Madison sandy loam in Elbert County. It occurs almost exclusively in the northwest part of the county in comparatively large unbroken areas, and a few small bodies are mapped throughout the northern end. The largest areas are around Bowman, north of Match, and near Stinchcomb Church. Areas of this soil are undulating and very gently sloping. They occur at high elevations, and the land is not subject to much surface erosion. Both surface and internal drainage are excellent.

Nearly all the land is cultivated, and this is considered one of the most productive soils in the county. Alfalfa does well on it, the county agent reporting one area of good alfalfa which has been seeded 12 years. This is considered one of the best cotton soils in the county and will average 1 bale of cotton to the acre if well tilled and fertilized. Wheat and oats are reported to do well, wheat averaging about 18 bushels to the acre and oats about 30 bushels over a period of years, but considerably higher yields of each are common.

The fertilizer recommended for cotton by the county agent is about 600 pounds to the acre of a 4–12–4 mixture, and corn, oats, and wheat are commonly fertilized with about 50 pounds of nitrate of soda to the acre.

In Table 4 are given the results of mechanical analyses of samples of the surface soil, subsurface soil, and subsoil of Madison sandy loam.

TABLE 4.—*Mechanical analyses of Madison sandy loam*[1]

No.	Description	Fine gravel	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt	Clay
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
258611	Surface soil, 0 to 2 inches	11.6	23.0	14.8	18.2	5.2	14.9	12.3
258612	Subsurface soil, 2 to 6 inches	11.8	16.9	12.1	16.5	4.9	17.9	19.9
258613	Subsoil, 6 to 10 inches	12.1	14.3	11.1	14.3	4.3	17.0	26.9
258614	Subsoil, 10 to 24 inches	3.4	9.2	7.1	9.7	3.4	11.4	55.7
258615	Subsoil, 24 to 34 inches	5.2	7.7	6.3	12.7	6.2	19.2	42.6
258616	Subsoil, 34+ inches	18.6	24.6	11.5	15.9	4.8	11.3	13.3

[1] After treatment with hydrogen peroxide.

MADISON GRAVELLY SANDY LOAM, MIXED PHASE

Madison gravelly sandy loam, mixed phase, differs from Madison sandy loam in the presence of a large quantity of gravel on the surface and through the soil, and also in the variability in the thickness of the sandy loam surface soil. The gravel consist of angular fragments of quartz and platy fragments of quartz mica schist. The size of the gravel and rock fragments ranges from about 1 inch to 4 inches in diameter. The quantity varies but is rarely sufficient to interfere with cultivation. This soil resembles the mixed phase of Cecil sandy loam.

The profile of this soil does not show uniform development. The upper subsoil layer of firm, brittle clay is lacking in many places, and the surface soil passes directly into friable, very micaceous clay. Here and there the micaceous parent material and hard quartz mica schist extend to the surface. In other places the uper part of the subsoil has been exposed at the surface due to erosion of the surface soil. A few areas of Madison clay loam are included with this mixed soil.

A few included rocky areas are indicated on the map by rock symbols. The rocky areas are adapted only to forest production and occur principally near Coldwater Creek, 1 mile southwest of Double Branch Church, near North Beaverdam Creek close to the Hart County line, and northeast of Pulliam Mill.

Madison gravelly sandy loam, mixed phase, in Elbert County adjoins Madison gravelly sandy clay loam in Madison County.

This gravelly soil is more extensive than Madison sandy loam. About 18 square miles of it occur through the western and northern parts of the county. Large areas are north of Harper, east of Match, east of Seymours Store, and north of the mouth of Deep Creek, and small areas occur throughout the north end of the county.

The areas are marked by greater relief than Madison sandy loam areas, ranging from rolling and moderately sloping to hilly and steep. Internal drainage is good but surface drainage is inclined to be too free, and much of the land requires terracing to check washing and gullying.

About 60 per cent of the land is under cultivation to the general crops of the county, and this soil is equal to Madison sandy loam in productivity wherever it is not too shallow or too rocky. The steep areas and the stony spots should remain in forest.

DAVIDSON CLAY LOAM

In virgin areas Davidson clay loam is characterized by a 1 to 4 inch surface layer of dark reddish-brown loam. This layer passes into reddish-brown heavy stiff clay loam which, when dry, readily breaks into small granules. It extends to a depth ranging from 4 to 12 inches below the surface. In cultivated fields the surface soil is reddish-brown or red heavy clay loam and is popularly known as push land, owing to its characteristic of adhering to the plowshare when plowed.

In the bottoms of many roadside ditches and small drainage ways there is an accumulation of heavy black sand which is sufficiently magnetic to affect a compass and which also shows a considerable manganese content.

The subsoil is dark-red or maroon clay which becomes slightly lighter in color on drying, and a cut surface appears yellowish red. The material is heavy, smooth, firm, and brittle, and breaks into irregular lumps which are readily crumbled into small granules which, when dry, are crushed with great difficulty. The surface of an exposed cut is covered with fine granules which give the soil a fluffy appearance, and in walking over an exposed surface it seems soft and velvety in sharp distinction from the hard bricklike surface of exposed cuts in the Cecil soils. The subsoil layer is from 40 to 96 inches thick, and it is underlain by friable soft reddish-brown clay having a yellow cast on cut surfaces. A few black specks are scattered through this layer which ranges from 8 to 20 inches in thickness and grades into mottled light-red and yellow soft friable disintegrated and partly decomposed diorite, gabbro, chlorite schist, and other quartz-free basic rocks.

The profile of this soil shows a more uniform development than any other soil in the county. The surface layer is absent in some places, due to erosion, and in an area 1½ miles northeast of Heardmont, near Savannah River, a noticeable quantity of rounded quartz gravel is scattered over the surface.

Less than 6 square miles of Davidson clay loam are mapped in Elbert County. This soil occurs principally in the southeast corner of the county in close association with the Iredell soils. The largest area is around Beulah School and comparatively large areas are west of Cade Chapel, northwest and east of Pearl, 1½ miles north of Heardmont, and 2¼ miles east of Flatwoods Chapel. Small areas are scattered throughout the southeast quarter of the county and two small but important areas are in the northern part 1½ miles southeast of Evergreen School and 1¼ miles southeast of the Elberton power plant, respectively.

The relief of Davidson clay loam areas is gently rolling or undulating. The soil occupies decidedly higher elevations than the closely associated Iredell soils. In many places a gently sloping hill of Davidson clay loam adjoins a flat area of Iredell soil. Surface drainage is good and internal drainage is adequate but perhaps slightly slower than on the Cecil soils.

Practically all the land had been cleared and farmed at some time but a large proportion is now idle, less than 50 per cent being cropped in 1927. The clay lands, regardless of their productivity, have been the first to be abandoned in favor of the loams and sandy loams in

the changes in soil utilization which has accompanied changing economic conditions. However, the high productivity of Davidson clay loam is being more appreciated and there is a tendency toward greater utilization of it. The difficulty of tilling this soil has been the deterring factor in the past, especially when compared with the ease of tilling the sandy loam and loam soils, but improved machinery is making possible adequate tillage of this soil, especially in the larger areas. If plowed deeper and well tilled under proper moisture conditions, it would be the most productive upland soil of the county.

Davidson clay loam is used in the production of cotton, corn, peaches, alfalfa, oats, and wheat. It is reported to be the best soil in the county for wheat and alfalfa. Wheat has been reported to yield as high as 40 bushels to the acre but averages about 18 bushels. Alfalfa yields about 4 tons to the acre from three to five cuttings a year.

The fertilizer recommended by the county agent for cotton on this soil is about 600 pounds to the acre of a 4–12–4 or 4–12–6 mixture. The structure of the soil would be improved and the nitrogen content increased by plowing under a green-manure crop or by using stable manure. This soil can be built up to a high state of productivity, and large yields of wheat, oats, and clover can be obtained.

MECKLENBURG LOAM

The surface soil of Mecklenburg loam in wooded areas consists of a 1 or 2 inch surface layer of dark-brown loam and partly decomposed organic matter underlain by brown loam which extends to a depth ranging from 4 to 10 inches. In most places on the surface and through these layers are a large number of small iron accretions ranging from one-sixteenth to one-eighth inch in diameter, a few being larger. In cultivated fields the surface soil is brown loam. The subsoil is brown or yellowish-brown slightly plastic heavy tough clay which on drying cracks into very hard irregular-shaped lumps. The larger lumps can be broken with moderate difficulty, but small fragments are pulverized with extreme difficulty. The cut surface has a somewhat yellow color. A few small accretions are scattered through the subsoil, which extends to a depth ranging from 15 to 30 inches below the surface. It is underlain by mottled brownish-yellow, reddish-brown, and light-gray clay containing faint red and green specks. The clay is heavy and plastic, and on drying it becomes very hard and vertical cracks appear. This layer extends to a depth ranging from 30 to 50 inches below the surface and grades into mottled disintegrated and partly decomposed basic rock such as diorite, gabbro, or chlorite schist.

An area south of Rose Hill includes several small spots of Wilkes sandy loam and in numerous places there are small outcrops of aplitic granite. Here the soil layers are all thinner than typical. In the larger areas small spots of Iredell loam are included and here and there a small spot of Davidson clay loam.

Mecklenburg loam occupies about 10 square miles in the county, occurring exclusively in the southeast quarter in the flatwoods section generally in close association with the Iredell soils. The

largest areas are in the vicinity of Beaverdam Mill, in the vicinity of Welcome Church, and around Cade Chapel. However, most of the soil occurs as small scattered areas.

The areas are gently sloping, and the relief is greater than that of Iredell loam. Many areas occupy gentle well-drained slopes to a stream channel, where Iredell loam occurs on the flat above. Mecklenburg loam is intermediate in relief as well as in location between areas of Davidson clay loam and Iredell loam. Surface drainage is good, but internal drainage is slow.

About 50 per cent of the land is cultivated. As it occurs in small areas, its utilization is incidental to that of the bordering soils, and it is used for the same crops. It produces good yields of all the general crops grown on Iredell loam, and some areas in which the surface soil is deep will probably produce good alfalfa. Fertilizer practices are similar to those for Iredell loam.

APPLING SANDY LOAM

In wooded areas Appling sandy loam has a 1 or 2 inch surface layer of dark-gray loamy sand which contains considerable coarse organic matter. It is underlain by grayish-yellow loamy sand which extends to a depth ranging from 3 to 10 inches. This layer is underlain by a layer of pale-yellow or faintly reddish-yellow heavy sandy loam a few inches thick. In cultivated fields the surface soil is gray or grayish-yellow light sandy loam, in most places containing a noticeable amount of coarse quartz grains on the surface. The subsoil is yellowish-brown, yellowish-red, or reddish-yellow friable, brittle, and firm clay which breaks into irregular-shaped lumps. On drying, the lumps are readily crumbled into granules which are pulverized with moderate pressure. A few quartz grains and mica flakes are noticeable. The subsoil varies greatly in thickness, ranging from 4 or 5 inches to as much as 18 inches. It grades into coarsely mottled and streaked yellowish-red, reddish-brown, gray, and yellow stiff but brittle clay which in most places ranges from 15 to 40 inches in thickness and grades into reddish-yellow and white soft friable disintegrated granite or gneiss carrying considerable mica.

There is much variation in Appling sandy loam as mapped in Elbert County, owing in part to the topographic position of the areas and in part to the character of the parent material. At the base of some slopes, the profile resembles that of a poorly drained soil especially where it joins areas of Worsham sandy loam, as northeast of Concord Church. Where large areas of the soil occupy high country with very little relief, the subsoil in places is yellow instead of red. Such spots are Durham sandy loam, and they occur north of Harmony Church and northeast of Concord Church. Another variation, about 2 miles south of Oglesby, is one in which rocky and shallow spots are included with the typical soil. In spots, loose incoherent sand extends to a depth of 20 inches and overlies a thin clay subsoil which, in turn, overlies rock. The rock outcrops in a few places. About 1 mile north of Bowman the surface soil is coarse sandy loam apparently caused by the washing out of the fine material by erosion. Here and there narrow strips of Cecil sandy loam or Cecil clay loam, occurring on the brink of short and

more abrupt slopes, are included with Appling sandy loam in mapping. Areas in the vicinity of Bowman occur intermixed with Madison sandy loam areas, and the lower part of the subsoil carries a high percentage of mica and the underlying rock is quartz mica schist.

There are few large areas of Appling sandy loam in the county but a large number of small areas. The largest areas are 2 miles east of Nickville, south of Goss, 2 miles southeast of Elberton, 2 miles southeast of Montevideo, and 1¾ miles southeast of Liberty Church. This soil does not occur in the southeast part of the county except in an isolated area 1¼ miles southeast of Woodlawn Church.

Appling sandy loam typically occupies high very gently sloping or gently rolling areas. It commonly occurs on slopes between higher Durham or Cecil sandy loam areas and a stream bottom or an area of Worsham sandy loam. Many areas occupy the well-drained but gentle slopes closest to the drainage ways which are heading into the level upland areas.

Surface drainage is good and internal drainage on typically developed areas is also good, but over much of the land drainage is excessive, especially where considerable coarse material is in the surface soil. Many areas of this soil are said to be leachy and to be slower in warming up in the spring than the Cecil soils. It is said that this soil is seriously affected by wet weather and that it will not stand droughts. Seventy-five per cent or more of the land is cultivated to the same crops as those grown on Cecil sandy loam. However, yields are in general not so high for most crops, and this soil is of lower agricultural value except for corn, sorghum, and similar crops. The productiveness of the soil is materially increased and the structure improved by turning under green-manure crops or stable manure. One of the greatest needs of the soil is organic matter and when this is supplied better results may be expected from the mineral fertilizers used.

DURHAM SANDY LOAM

In wooded areas Durham sandy loam has a 1 to 3 inch surface layer of dark-gray sandy loam which contains a small amount of organic matter. It is underlain by pale-yellow sandy loam to a depth ranging from 9 to 18 inches. In cultivated fields the surface soil is grayish-yellow sandy loam. The subsoil is deep yellow clay which is firm but friable. It breaks into irregular lumps which are readily broken into a granular mass. The broken surface and the cut surface are uniformly deep yellow, and the dry surface is slightly lighter in color. This layer in most places extends to a depth ranging from 28 to 50 inches and grades into yellow sandy clay, faintly mottled or streaked with light red. In the lower part of the subsoil, faint shades of gray are seen. This layer is very friable, and air-dry lumps are easily pulverized. At a depth ranging from 50 to 80 inches the material grades into the parent material consisting of partly decomposed granite or gneiss.

This is one of the most uniform soils in the county in its profile development, and few variations are included in it. Less than 1 square mile is mapped. The largest area is 1¼ miles south of Stinchcomb Church, and other areas are 1½ miles west of Winns

Mill, 1¼ miles south of Seymours Store, 1 mile and 2¾ miles southeast of Elberton, and east of Montevideo. A few small scattered spots are north of the Southern Railway in the northwest part of the county.

Durham sandy loam occupies high, nearly level areas with little relief and few drainage ways. Both surface and internal drainage are good, although this soil is reported to remain wet longer after rains than soils having red subsoils. This causes crops on Durham sandy loam to be more susceptible to injury during wet seasons.

Most of the land is cultivated to the general crops of the county, and good yields are obtained. The soil is adapted to the production of bright-leaf tobacco, should the growth of this crop ever be undertaken in this section of the State.

WILKES SANDY LOAM

A mature profile of Wilkes sandy loam in forested areas shows the following layers: (1) The surface soil, consisting of 1 or 2 inches of dark-gray sandy loam and containing a small amount of organic matter and in most places considerable coarse sand; and (2) grayish-yellow or pale-yellow sandy loam extending to a depth ranging from 4 to 16 inches. In cultivated fields the surface soil is yellowish-gray sandy loam, the subsoil is yellowish or reddish-yellow friable sandy clay ranging in thickness from 4 to 10 inches, and the underlying material is brownish-yellow heavy tough plastic impervious clay.

Areas of this soil vary greatly in texture and depth as well as in the structure of the subsoil. They represent a soil condition rather than a definite soil type. The soil is derived from gneiss and aplitic granite cut by dikes of diorite, diabase, chlorite schist, gabbro, or other basic rock. As the dikes are more or less vertical, the soil produced has a very spotted surface soil and little uniformity in profile development. Where Iredell areas approach Cecil areas a band of Wilkes sandy loam of varying width commonly occurs. Such an area is about 4½ miles southeast of Elberton. An area south of Heardmont contains a large amount of coarse sand and sharp angular fine gravel in the surface soil, thus making most of this area coarse sandy loam. An area 3 miles north of Elberton includes considerable Iredell loam with rock outcrops, gravel, and bowlders of chlorite schist. Included spots of Davidson clay loam, Cecil clay loam, Mecklenburg loam, and Iredell loam are scattered through areas of Wilkes sandy loam.

Wilkes sandy loam occurs in comparatively large areas in the southeast quarter of the county. Isolated areas are 1½ miles northeast, 1 mile southeast, and 1¼ miles south of Evergreen School in the north end of the county, and large areas are south of Heardmont, north of Petersburg School, north of Beulah School, east and west of Bethel Church, east of Middleton, and between Morrison Chapel and Springfield Church.

Most of this soil occupies rough, steep, and eroded hillsides intricately cut by deep drainage channels, but a few inextensive bodies occur in comparatively smooth rolling areas. Surface drainage ranges from good to excessive and internal drainage from good to slow. Much of the land would be subject to serious erosion if cleared.

About 10 per cent of this soil is cultivated, and efforts have been made to cultivate considerable more of it. In areas which have suit-

able relief and in which the soil is uniform, excellent yields of cotton, corn, and other general crops are obtained. But the agricultural value of most of this soil is extremely variable even within one field, owing to the variability in depth of the surface soil and in the character of the subsoil or underlying material.

The forests have been cut and the soil now supports a scattered growth of shortleaf and loblolly pines, together with a few hardwoods. The greater part of the land should be reforested.

WICKHAM SANDY LOAM

The surface soil of Wickham sandy loam is brown sandy loam to a depth ranging from 5 to 15 inches. The subsoil is reddish-brown sandy clay which is friable and crumbly, and the color changes very little on drying. Air-dry lumps are readily pulverized. This layer extends to a depth ranging from 20 to 60 inches below the surface and grades into lighter reddish-brown friable crumbly sandy loam containing a little fine mica.

This soil is of alluvial origin and is now above overflow. In parts of some areas the surface soil has been eroded, exposing the heavier-textured lighter-colored subsoil. Some variation in the texture of the surface soil exists, in places being fine sandy loam and in parts of the area east of Bells Bridge being heavy sandy loam. The surface soil varies considerably in thickness, in many places being thin toward the upland and deep toward the stream, especially in an area west of the mouth of Dove Creek. Rounded gravel occur scattered on the surface in some places.

The acreage of Wickham sandy loam in Elbert County is small. It occurs principally on islands and along the terraces of Savannah and Broad Rivers, and a few small spots are along lower Beaverdam Creek. The largest areas are at The Point, 4 miles west of The Point up Broad River, east of Bells Bridge, on Carter Island, south of Carter Island on the mainland, and between the mouth of Van Creek and McCalla Island.

This soil occurs in nearly level, smooth terrace areas adjoining first-bottom soils. The land is subject to overflow only during periods of extremely high water. Both surface and internal drainage are excellent.

Practically all the land has been cultivated at some time, and 80 per cent or more is still under cultivation. The island areas are cultivated less, owing to the handicap of inadequate transportation to and from them. This soil is used for all general crops and constitutes one of the most productive soils in the county, especially favored by its texture, structure, and relief for ideal cultivation. A deleterious compact layer, caused by continued plowing to the same depth, has developed in a few places. This can be remedied by plowing deeper and by including deep-rooted crops, preferably legumes, in a regular crop rotation. Cotton and corn are the main crops, and good yields are obtained.

ALTAVISTA FINE SANDY LOAM

Altavista fine sandy loam has a 5 to 8 inch surface soil consisting of brownish-gray or yellowish-gray fine sandy loam. The subsoil begins as pale-yellow fine sandy loam from 4 to 8 inches thick which

grades into pale-yellow friable fine sandy clay. This material continues to a depth ranging from 18 to 30 inches and grades into mottled gray and yellow friable sandy clay. The soil is of alluvial origin, occurring on terraces most of which are above normal overflow.

An area one-half mile north of Harper has a sandy loam surface soil, and a few rounded gravel are scattered over the surface. In an area 1¼ miles northwest of Harper the surface soil is silt loam in places.

This is an inextensive soil in Elbert County. It occurs exclusively in the northwest part, the largest areas being along South Beaverdam Creek, one-half mile north and 1¼ miles northwest of Harper. Smaller areas are one-half mile north of Hardcash and along Dove Creek, 1 mile south and one-half mile north of Oglesby.

All the soil is under cultivation to corn, melons, and to less extent, cotton. It is productive when fertilized. In a 5-acre corn contest reported by the county agent it produced 115 bushels to the acre.

CONGAREE FINE SANDY LOAM

The surface soil of Congaree fine sandy loam consists of grayish-brown fine sandy loam to a depth ranging from 8 to 16 inches. It is underlain by brown fine sandy loam which extends to a depth ranging from 40 to more than 80 inches. A large quantity of finely divided mica scales is in this layer.

Included with this soil are areas of fine sand and sand texture. Bordering the stream channels of Broad and Savannah Rivers, there is in most places a natural levee of loose incoherent sand ranging from 20 to more than 300 feet in width. Included with the soil occurring on the islands are loose incoherent fine sand areas of no agricultural value.

This is the most extensive first-bottom soil in the county. The largest area is about 2½ miles up Savannah River north of The Point, and comparatively large areas occur on Paris Island; on McCalla Island; along the shore of Savannah River at the mouth of Beaverdam Creek, north of the mouth of Van Creek, south of Kraft Island, and west of Hill Island; and along Broad River 4 miles west of The Point, above Anthony Shoals past Bells Bridge, 1½ miles southeast and 1 and 2 miles west of Mattox Bridge, west of the mouth of Dove Creek, one-half mile northwest of Steel Bridge, and one-half mile northwest of Lattice Bridge. Small areas lie along Dove Creek, Coody Creek, and South Beaverdam Creek north of Bowman.

This soil occurs in nearly level or slightly undulating areas on stream bottoms subject to periodic overflow. Drainage is good for a first-bottom soil. Overflow is not so frequent on areas along the rivers as on areas along the creeks, and crops are rarely lost by inundation.

About 50 per cent of the land is cultivated, most of the island areas and areas with a large proportion of loose sand not being utilized for crops. The typical areas of the soil constitute one of the most productive soils in the county, producing excellent crops of corn, oats, wheat, cotton, and melons. Cotton tends to produce a rank growth of stalk but matures a heavy crop of bolls during a favorable sea-

son. Melons do especially well but are not very extensively grown, owing to inadequate marketing facilities, but the acreage can undoubtedly be increased with the opening of bridges and improved highways to near-by Georgia and South Carolina markets.

Many of the very sandy areas support no vegetation. Virgin areas of the typical soil support a heavy growth of hardwoods, with a dense undergrowth of vines, canes, and bushes. The typical areas which are not in cultivation make very good pasture and are so used to a considerable extent. Corn is generally the best crop to grow on Congaree fine sandy loam.

CONGAREE SILT LOAM

The surface soil of Congaree silt loam consists of friable mellow brown silt loam. When the soil is air-dry the color varies from brown to light brown or grayish brown. Most of the soil carries considerable mica. Commonly, after areas have been flooded, especially cultivated areas, a crust is formed on the surface on drying. The source of this incrustation is probably sediment deposited by the flood waters. It is an important factor in the growth of crops, especially in the early stages of growth, to break up this thin crust as soon as possible after the soil becomes sufficiently dry. The subsoil consists of mellow and friable light-brown silt loam which in most places carries more mica than the surface soil. It extends to a depth ranging from 25 to 48 inches and passes into light-gray mottled with brownish yellow, heavy silt loam.

Between 4 and 5 square miles of Congaree silt loam are mapped in Elbert County. Only one area occurs on Savannah River, a comparatively large area 2½ miles north of The Point, but the soil is rather extensive along the lower part of Broad River. Areas occur along Beaverdam, Falling, Coody, Dove, Van, and Mill Shoal Creeks.

This soil occupies nearly level areas in stream bottoms and is subject to periodic overflow. Drainage is good for a first-bottom soil.

About 50 per cent of the land is cultivated. This is probably the most productive soil in the county and crops are rarely lost by inundation. The risk from this cause is somewhat less for areas along the rivers than for areas on the creeks. The soil is used mainly for corn, hay crops, and pasture, and yields of 100 bushels of corn to the acre have been reported by the county agent.

Excellent crops of hay are grown, consisting mostly of natural grasses. Dallis grass and Bermuda grass are common hay grasses producing excellent yields. Two, three, and four cuttings a year are obtained, yielding about 1 ton at each cutting. The land makes excellent pasture throughout the year except during freshets.

CONGAREE SILTY CLAY LOAM

Congaree silty clay loam has a surface soil of grayish-brown silty clay loam from 8 to 14 inches thick. If allowed to dry undisturbed, the surface soil cracks with wide openings and becomes very hard. The subsoil is reddish-brown heavy silty clay becoming mottled with gray at a depth ranging from 20 to 40 inches unless strata of other textures are present as is the case in many places.

This soil covers about 1 square mile in the county, and most of it occurs in one large area along Broad River southwest of Cade Chapel. A smaller area is farther up the river, and a small area is along the lower end of Dove Creek.

Areas of this soil occupy flat first-bottom areas subject to periodic overflow. Along Broad River the soil occupies a slight depression between Congaree fine sandy loam and the upland, and along Dove Creek it occupies a wide flat area.

Surface drainage is slow or inadequate. Internal drainage is adequate where the surface has been artificially drained.

Only a small proportion of the land is farmed, owing to poor surface drainage. Areas that are farmed produce good crops of corn, hay, cotton, and wheat. An important factor in the successful utilization of this soil is tilling it when in the proper moisture condition. A crust forms on the surface after overflows as on Congaree silt loam, but it is of even greater importance to break this crust on the silty clay loam. A friable surface soil of good tilth is obtained when plowed at the proper moisture content. Good hay crops are grown, and the land makes good pasture if livestock are kept off while the land is wet. This is a good corn soil.

WORSHAM SANDY LOAM

Worsham sandy loam in virgin areas has a surface soil of gray sandy loam from 6 to 15 inches thick. The subsoil is light-gray or slightly bluish gray clay faintly mottled with yellow and rust brown. When dry the material is almost white. It is stiff, brittle, and slightly tough. Coarse quartz grains are scattered through the subsoil.

In places the surface soil is similar to that of the soil bordering it but the subsoil is typical of the Worsham soils. Such an area occurs near Beaverdam Creek north of Goss where the surface soil is typical Cecil clay loam and the subsoil is typical of the Worsham soils.

Worsham sandy loam occurs in very small though conspicuous areas in all parts of the county. This soil is associated with the Cecil and Appling soils in the northeast corner along the drainage ways and around the heads of small streams. Many areas occur across the north end of the county from Montevideo to the Madison County line and through the northwest part from Nickville and Stinchcomb Church westward.

Most areas of this soil occur at the bases of gentle slopes and in depressions. Surface drainage in most places is good, but internal drainage is poor.

Practically none of the land is cultivated except a few small areas which are in sugarcane and corn. The soil makes good pasture land, especially if seeded with Bermuda grass. Some of the areas are gullied and are adapted only to forest production.

MEADOW (CONGAREE MATERIAL)

Meadow (Congaree material) is a classification applied to a group of soils occupying the first bottoms of the creeks and smaller streams of the county, in which the material is so mixed that no separation

into soil types could be made. It includes areas of sand, sandy loam, silt loam, and silty clay loam, all of which may occur within short distances. On the larger creeks most of it consists of intermixed areas of Congaree silt loam and Congaree fine sandy loam, and on Van Creek northwest of Ruckersville it includes a considerable proportion of Congaree silty clay loam. Some of the areas mapped as meadow were originally good areas of Congaree silt loam or Congaree fine sandy loam over which a mixed covering of sandy material has been deposited following the clearing of adjacent hillsides. The bottom land of Mill Shoal Creek about a mile from the county line is typical of this condition. It was reported that all the bottom was cultivated and the soil was Congaree fine sandy loam 12 years ago. At present the bo tom land is a sandy wash with poor drainage and is covered with alders and willows.

Meadow occurs along nearly all the smaller streams of the county. Comparatively large areas are on Coldwater, Van, Beaverdam, Coody, Wahachee, Falling, Dove, and Mill Shoal Creeks.

Drainage conditions are variable. In most places the land is well drained for a first-bottom soil, but some of it is very poorly drained or even saturated the greater part of the year.

Some of the meadow is cultivated, and most of the uncultivated areas are pastured. Excellent crops of hay are obtained from the larger well-drained areas. Along Falling Creek where the soil is silt loam and sandy loam excellent crops of Dallis grass and Bermuda grass are obtained from 2, 3, and 4 cuttings a year yielding 1 ton or more to the acre at each cutting. An area mapped as meadow, consisting of Congaree silt loam and Congaree fine sandy loam, was reported by the county agent to have produced 100 bushels of corn to the acre for seven consecutive years.

SOILS AND THEIR INTERPRETATION

Elbert County is situated in the northeastern part of Georgia in the middle of the piedmont-plateau region, between the forks of Broad and Savannah Rivers. All the upland soils are well or excessively drained.

Previous to clearing for cultivation, the upland soils of the county supported a mixed growth of pine and hardwood trees, which is not conducive to the accumulation of a large amount of organic matter, as in grassland or prairie soils. The county lies in a region of high annual precipitation distributed throughout the year. Such high precipitation has tended to leach out of the soil what little organic matter would otherwise be accumulated and the warm temperatures prevailing in the region through the long summers have further acted toward complete oxidation of the organic materials. The result of all these conditions is that there is little organic matter in any of the virgin soils, and this occurs to a depth of only 1 or 2 inches. Consequently the mature soils of the county, which have been formed without any noticeable coloration from organic matter have light-colored soils of gray, brown, and red shades. The soils of Elbert County belong to the red soil group.

In this region of high temperatures oxidation is rapid, and where drainage and aeration are good it has reached to a considerable depth. In the normal comparatively mature soils the iron has been

oxidized to the ferric state, and the deep-red color in many areas extends to a depth beyond 10 feet. Soiltex acidity tests have shown slightly or strongly acid reaction on all the soils in the county at all depths of the profile.

Since the soils are frozen for only a short time, active leaching continues throughout the year. The high precipitation causes rapid leaching which has prevented the accumulation of lime carbonate in any horizon, and it has rapidly removed from the A horizon the soluble elements practically as fast as they have been formed by weathering processes. This leaching has removed most of the fine material from the A horizon carrying part of it away in water by lateral run-off and depositing part in the B horizon. The result is that the profiles of all the normal soils have light-textured A horizons, from which most of the fine material and soluble plant food has been removed; a B horizon in which fine material and soluble plant food from the A horizon have been deposited causing it to be the heaviest in texture and richest in plant food of any of the horizons; and the C horizon, which in most places is heavier than the A horizon but much lighter than the B horizon, is variable in color, and is in general very friable. The character of the C horizon depends in a large measure on the stage of weathering of the underlying rock formations.

The principal rocks underlying and giving rise to the soils of Elbert County are granites, gneisses, quartz mica schists, and dark-colored basic igneous rocks such as diabase, gabbro, and chlorite schists. All the upland soils have been formed in situ through the disintegration and decomposition of these rocks, and direct relationship exists between the character of the B horizon and the rock from which it is derived. On the smooth-surfaced areas the B horizon ranges in depth from 2 to more than 10 feet. It is of uniform color, either red or yellow, and the consistence is constant. This heavy, uniformly oxidized and weathered layer indicates that the soil material is old. In many places, however, erosion has kept such close pace with disintegration and decomposition of the soil through weathering that only a very shallow solum has been allowed to accumulate.

The soils of Elbert County may be divided into two main groups according to their maturity and development of the soil profile. The first group includes those soils which have developed a mature or normal profile under conditions of good drainage on smooth or gently sloping relief. This group includes most of the soils of the Cecil, Madison, Durham, Appling, and Davidson series.

In these normally developed soils there is a wide range of color in the B horizons of some of the series. In the B horizon of the Cecil, Madison, and Davidson soils, a red or deep-red color prevails throughout. The red color is owing to an extreme stage of oxidation of the iron compounds present in the original rocks. The Cecil soils have bright-red or red stiff or brittle clay B_1 layers, which in general range from 2 to 4 feet in thickness and pass into friable B_2 layers. The B horizons of the Madison soils differ essentially from those of the Cecil soils in that the B_1 layers are usually from 6 to 12 inches thick and are not quite so heavy as the B_1 layers of the Cecil soils. The B_2 layers of the Madison soils are decidedly friable and micaceous, and this is one of the distinguishing features

between the Madison and the Cecil soils. The B horizon of the Davidson soil is smooth stiff or brittle clay which in places contains very small soft rounded accretions or black specks and does not contain the noticeable amount of coarse quartz grains and mica so characteristic of the B horizons of the Cecil and Madison soils. The A horizons of the sandy loams of the Madison and Cecil series are similar in color and structure to the A horizon of the Davidson soil, but the A horizon in the Davidson soil is dark red in color and heavy in texture.

The A horizons of the Durham and Appling soils are similar to each other in color, texture, and structure, being dominantly light gray or grayish yellow. The B horizon of the Durham soil is yellow stiff but brittle clay whereas that of the Appling soil is reddish yellow or yellowish brown in the B_1 layer and is streaked or mottled light red and yellow in the B_2 layer. The B horizon of the Appling soil is about intermediate in color and, in some places, in consistence between the yellow B horizon of the Durham soil and the red B horizons of the Cecil soils.

Cecil sandy loam may be considered the normally well developed or mature soil of the county. The detailed profile description of Cecil sandy loam, and also descriptions of several other soils, are given for the purpose of describing the soil profile, or solum, for those interested in a scientific study of the soils.

A profile of Cecil sandy loam, located 1¼ miles northwest of Evergreen School, shows the following layers: (1) From 0 to 2 inches, the A_1 horizon, dark-gray sandy loam, with a thin layer of leaves and pine needles on the surface. The dark color of the sandy loam is due to organic matter. (2) From 2 to 9 inches, the A_2 horizon, mellow friable grayish-yellow loam containing practically no organic matter. (3) From 9 to 12 inches, the A_3 horizon, reddish-yellow light sandy clay which constitutes the transitional zone between the A_2 and B_1 horizons. These three layers represent the A horizon. (4) From 12 to 38 inches, the B_1 horizon, stiff and brittle red clay which is light red when dry and dark red when wet. A cut surface is yellowish red or reddish yellow. The material breaks into large irregular lumps which are readily broken into small granules. When wet the clay is moderately sticky. Coarse quartz grains and a few small mica scales are scattered throughout this horizon. Exposed vertical cuts resist weathering and stand up with characteristic bricklike hardness. (5) From 38 to 54 inches, the B_2 horizon, light-red clay with streaks of yellow. The material is firm and brittle but more friable than in the B_1 horizon, and it contains a noticeable amount of fine mica flakes. Quartz grains and partly weathered minerals of the parent rock are scattered throughout this horizon. (6) From 54 inches downward, horizon C, mingled white, red, and yellow soft disintegrated and partly decomposed granite.

Other members of the Cecil series mapped in the county are the sandy loam, mixed phase, clay loam, and clay loam, steep phase. Cecil sandy loam, mixed phase, has been known as Cecil sandy clay loam in counties previously surveyed. The mixed phase represents eroded areas of Cecil sandy loam which have resulted in an intermixture of spots of Cecil sandy loam and Cecil clay loam, and erosion has removed part or all of the A horizon in spots. Cecil clay loam in

Elbert County is predominantly derived from Cecil sandy loam by erosion of the A horizon.

The profile of an area of Madison sandy loam 1¼ miles north of Harper shows the following layers: (1) From 0 to 2 inches, the A_1 horizon, dark-gray sandy loam in which the dark color is caused by organic matter. Quartz gravel and fragments of quartz mica schist are scattered over the surface. (2) From 2 to 6 inches, the A_2 horizon, grayish-yellow sandy loam containing a noticeable amount of small mica flakes and scattered coarse quartz particles. The A_1 and A_2 horizons contain a higher proportion of fine material than Cecil sandy loam. (3) From 6 to 10 inches, the A_3 horizon, light reddish-yellow friable sandy clay containing scattered particles of mica and quartz. (4) From 10 to 24 inches, the B_1 horizon, firm and brittle red clay which breaks into irregular lumps crumbling into a granular mass that is pulverized with moderate ease. The material is slightly sticky when wet, and the color changes little on drying. (5) From 24 to 34 inches, the B_2 horizon, very friable light-red clay which is very micaceous, having a greasy feel. (6) From 34 inches downward, the C horizon, purplish-red soft partly disintegrated quartz mica schist.

A profile of an area of Davidson clay loam, one-half mile west of Cade Chapel, shows the following layers: (1) From 0 to 2 inches, the A_1 horizon, dark reddish-brown loam containing a small amount of organic matter; (2) from 2 to 8 inches, the A_2 horizon, reddish-brown heavy clay loam; (3) from 8 to 60 inches, the B_1 horizon, dark-red or maroon clay in which the dry material is slightly lighter in color than the wet material and a cut surface is yellowish red. The clay is stiff and smooth and breaks into irregular lumps which readily break down into a coarse granular mass. An exposed cut has a distinctive and characteristic fluffy appearance, owing to the accumulation of fine granules, and in this respect it differs markedly from the material in exposed cuts of the Cecil or Madison soils, which appears hard and bricklike; (4) from 60 to 70 or more inches, the B_2 horizon, reddish-brown friable clay containing a few black specks. The cut surface has a yellow cast; (5) at a depth of 8 feet, horizon C, reddish-brown, yellow, and white very smooth, soft, and friable disintegrated and partly decomposed diorite containing black specks.

On the east side of Montevideo, a profile of Durham sandy loam showed the following layers: (1) from 0 to 1 inch, the A_1 horizon, gray sandy loam consisting of leaf mold and a small amount of organic matter; (2) from 1 to 12 inches, the A_2 horizon, mellow and friable pale-yellow sandy loam; (3) from 12 to 34 inches, the B_1 horizon, friable deep-yellow clay of uniform color on broken and cut surfaces. The material breaks into irregular lumps which are readily pulverized; (4) from 34 to 44 inches, the B_2 horizon, yellow, faintly mottled with light red, friable sandy clay which is characterized by faint shades of gray in the lower part. The material is more friable than the material in the B_1 horizon. This soil is derived from granite and gneiss, into which it grades at a considerable depth.

A profile of Appling sandy loam located one-half mile northwest of Harmony Church shows the following layers: (1) From 0 to 1 inch, the A_1 horizon, dark-gray loamy sand containing consider-

able leaf mold; (2) from 1 to 7 inches, the A_2 horizon, grayish-yellow mellow and friable loamy sand; (3) from 7 to 11 inches, the A_3 horizon, pale-yellow heavy friable sandy loam; (4) from 11 to 22 inches, the B_1 horizon, light reddish-yellow stiff but friable clay or sandy clay containing small mica particles; (5) from 22 to 42 inches, the B_2 horizon, mottled and streaked yellowish-red, reddish-brown, grayish-yellow, and yellow friable clay, with quartz sand and a little mica scattered throughout the layer; and (6) from 42 inches downward, horizon C, reddish-yellow and white soft disintegrated partly decomposed granite or gneiss. The material in this layer is friable and brittle and contains much mica.

The second group of soils includes the members of the Mecklenburg, Iredell, Wilkes, and Worsham series. These soils, because of poor drainage or severe erosion, have not developed a normal soil profile. They are young and immature soils, and the B horizon is not uniform in color or consistence except in the Iredell soils, and these are comparatively young. The Mecklenburg, Iredell, Wilkes, and Worsham soils are all upland soils derived from the various rock formations.

A profile description of Iredell loam is given because of its uniform development over an extensive area in the southeastern part of the county, 1¼ miles northeast of Cade Chapel, and it shows the following horizons: (1) From 0 to 2 inches, the A_1 horizon, brownish-gray loam containing many small iron accretions from one-sixteenth to one-eighth inch in diameter, both on the surface and throughout the layer. (2) From 2 to 7 inches, the A_2 horizon, light-gray loam containing many small rounded iron accretions. (3) From 7 to 32 inches, horizon B, brownish-yellow heavy plastic impervious clay which in exposed cuts turns a rust-brown color and when air-dry is very hard. In exposed cuts the material cracks deeply into irregular angular lumps which cling to the wall. The color along the cleavage lines is slightly darker. (4) From 32 inches downward, horizon C, mottled green or greenish-yellow, white, and brown disintegrated and partly decomposed diorite. This friable, crumbly rotten rock is only a few inches thick and is underlain by the hard rock.

The numerous phases of soils mapped in Elbert County represent soil conditions rather than soils having a normal development. This has been brought about through the effects of erosion as in Cecil sandy loam, mixed phase; probably all of this soil was at one time Cecil sandy loam, but a large part of the sandy surface soil has been removed, exposing the red clay. Cecil clay loam, steep phase, is also a product of destructive erosion. Madison gravelly sandy loam, mixed phase, represents a soil condition where some of the original surface soil has been removed and where there is a large accumulation of quartz gravel and quartz mica schist fragments.

Mecklenburg loam is intermediate in color, textural, and structural characteristics between the Iredell soil and the Davidson soil, especially in the B horizon, as this layer is of a reddish-yellow or yellowish-brown color and is less plastic than the B horizon of the Iredell soil and not smooth and brittle like the B horizon of the Davidson soil. Wilkes sandy loam has a somewhat young soil profile development only in spots. The greater part of this soil represents a soil

condition rather than a definite soil in that it is badly eroded and gullied and also because of the fact that it is derived from aplitic granite and gneiss which are cut by numerous dikes of diorite. Worsham sandy loam has not developed a normal soil profile because of poor drainage conditions, particularly in the B horizon, and in many areas there is no sharp line of demarcation between the surface soil and subsoil.

The alluvial soils of the county, which include the Wickham, Altavista, and Congaree soils, together with meadow (Congaree material), owe their origin to the deposition of material brought down from the uplands and deposited at times of overflow. The Wickham and Altavista soils are developed on second bottoms or terraces which lie well above ordinary overflow. Some of the material giving rise to these soils occupies a sufficiently high position and has remained undisturbed in a well-drained condition long enough to develop an almost normal soil profile in places. This is particularly true of spots of Wickham sandy loam. Either the material giving rise to this soil has weathered and oxidized more thoroughly than that giving rise to the Altavista, or the Altavista has been more thoroughly leached.

The Congaree soils occupy first-bottom positions along the rivers and larger creeks. The materials here are young and have not developed a normal soil profile, owing to the fact that new material is constantly being deposited and also to the fact that they are in many places poorly drained.

Meadow (Congaree material) represents material so variable in color, texture, and structure that no type distinction can be given it.

RECOMMENDATIONS FOR THE UTILIZATION AND IMPROVEMENT OF ELBERT COUNTY SOILS

One of the greatest needs for all the clay loam soils of the county is deeper plowing. Where deep plowing has not been practiced, better results are usually obtained by gradually increasing the depth of plowing year by year, rather than by turning a large quantity of clay subsoil at one time. Fall plowing of the clay loam soils produces a surface soil with better tilth, as sufficient freezing and thawing occurs during the winter to greatly improve the structure of the clay lumps turned in plowing, causing a mellow surface soil to be more readily obtained in the spring. It is essential not to plow the clay loam soils when too wet. By frequently working the surface soil to a slight depth on all the cultivated soils as long as possible during dry weather, soil moisture will be conserved and less damage will be suffered from droughts.

To successfully till the clay loam soils, heavy tillage implements and strong work animals are necessary. Disk plows are reported to give excellent results and tandem disk harrows are most satisfactory to work the soil after plowing.

A crop rotation should be adopted for every area of tilled land in the county, and soil improvement crops should be grown more extensively. A four or five year rotation should be adopted for the principal soils and should include a legume, a green-manure crop, and, on areas subject to erosion, winter cover crops. The

county agent can render valuable assistance in selecting crops for such a rotation which will be profitable and will improve the soil.

A legume can sometimes be grown for hay and the last cutting be plowed under as a green-manure crop. It is important that green-manure crops be plowed under when there is adequate moisture in the ground. The soils of the county can be greatly improved by soil-improvement crops such as alfalfa, Pitt's clover, vetch, cowpeas, and other crops demonstrated by the county agent. On most of the clay loam soils and on the mixed phase of the sandy loam soils, winter cover crops are essential to prevent surface erosion. These crops are of paramount importance, as such a large proportion of the county is subject to serious erosion and erosion has been such a prevailing cause for the abandonment of much land.

In addition to winter cover crops, more terracing is needed as a primary defense against erosion, many areas being inadequately terraced at present. Although most of the steep areas are wooded, a few attempts have been made to clear slopes so steep that the surface soil and in some places the subsoil have been rapidly removed by erosion, and here and there areas are seen in which erosion has continued so actively that vegetation could not obtain a start. Near the heads of small erosion channels, rock walls built or brush thrown across the drainage ways behind which the soil washed from above may accumulate are successful in checking gullying.

Fertilizers differ for the different crops, but cotton receives most of the fertilizer purchased, and the county agent has made definite recommendations for cotton fertilizers for the principal soils. On the Cecil and Madison soils, 600 pounds to the acre of a 4–12–4 mixture are recommended. Davidson clay loam should receive a fertilizer carrying more potash, such as a 4–12–6 mixture, at the same rate of application. Cotton on Iredell loam should receive an acre application of 600 pounds of a fertilizer mixed as follows: 1,000 pounds of acid phosphate, 1,000 pounds of cottonseed meal, and 1,000 pounds of kainit.

SUMMARY

Elbert County is in the northeastern part of Georgia. It comprises 364 square miles in about the middle of the piedmont plateau between the forks of Savannah and Broad Rivers. Remnants of a high plateau occur in the northern part of the county which is dissected by small streams with their attendant erosion. Near the rivers and along their lower courses, erosion has altered more of the surface configuration. A lower plain occurs in the southern end of the county and is popularly called "the flatwoods." The soils in this part of the county differ from those in other parts.

Surface drainage ranges from good to excessive throughout the county. Checking erosion is a paramount problem which needs greater facilities for year-round control.

The county has an average annual rainfall of 50.18 inches. The summers are long and moderately hot, and the winters are comparatively short with freezing weather of short duration. The average frost-free season is 211 days.

Elberton, the county seat, furnishes a market for some local produce, and the near-by manufacturing cities of South Carolina are

excellent markets to which produce may be hauled. However, most of the farm products to be sold are shipped to northern markets or to larger cities in Georgia. Excellent marketing facilities are available both by railroads and highways to northeastern cities as well as to near-by Georgia and South Carolina cities.

Cotton occupied the largest acreage of any crop in 1924, with corn second. Smaller acreages were devoted to oats, wheat, peaches, alfalfa, sweetpotatoes, and sorgo. Milk production has received an impetus from a recently established creamery in Elberton, and poultry raising is becoming of greater importance.

The soils of Elbert County are typical of those of the southern piedmont plateau. There are large areas having light-gray or yellowish-gray sandy loam surface soils which are underlain by red, yellow, or reddish-yellow clay subsoils. These soils are very mellow and friable and are extremely easy to cultivate. On them crops mature earlier than on the heavier soils of the county, and they are well suited to the production of cotton, peanuts, bright tobacco, and garden vegetables, also to corn if a sufficient amount of organic matter is available. In the southeastern part of the county is an extensive area of so-called flatwoods, and here the surface soil is loam and the subsoil is plastic impervious clay. This soil, when properly handled, is fairly productive. Throughout the county are areas of dark-red and light-red clay loams underlain by dark-red and red clay subsoils. These are the heavy soils of the county and are well suited to the production of alfalfa, clovers, and small grains. Small areas of second-bottom terrace land and extensive strips of first-bottom soils are developed along the rivers and larger creeks. These are excellent soils for the production of corn and hay crops.

Good opportunities are offered settlers, especially on some of the clay loam soils. These soils are very productive if properly tilled, but are not favored by local farmers owing to the difficulty of plowing and working as compared with the sandy loam soils. However, care should be exercised in purchasing land in this county for settlement not to acquire land too steep or too gullied for cultivation but to select clay loam areas of favorable relief. The price of farming land depends on the character of the soil, its location, and the improvements thereon. Much good land can be purchased at very low prices.

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[PUBLIC RESOLUTION—No. 9]

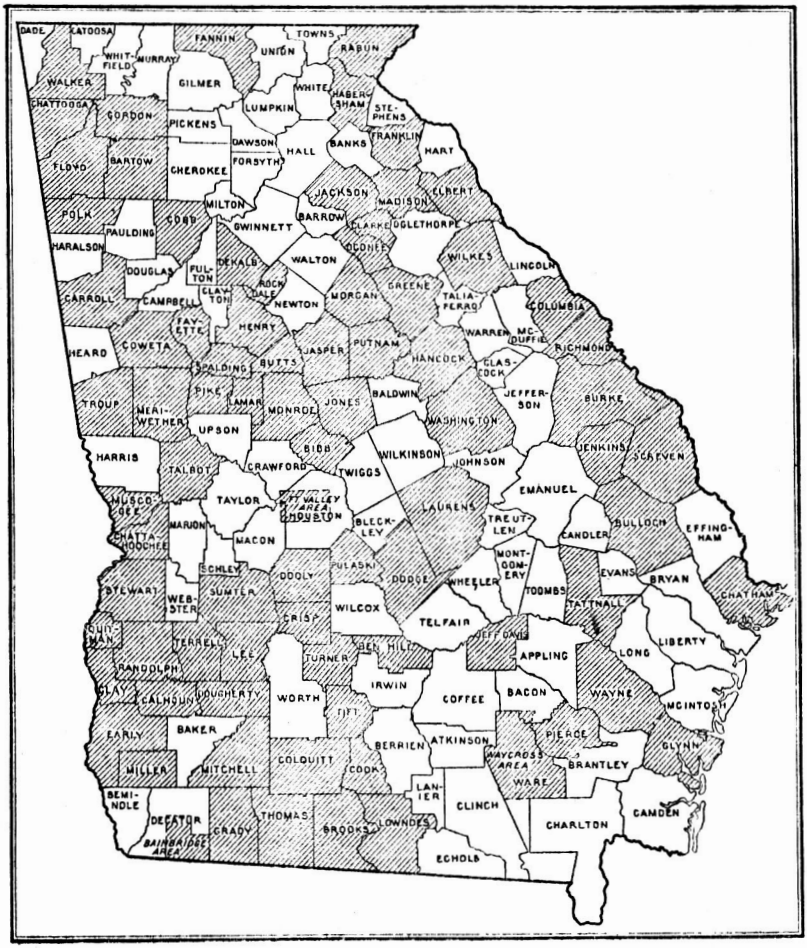
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

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

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

Approved March 14, 1904.

[On July 1, 1901, the Division of Soils was reorganized as the Bureau of Soils, and on July 1, 1927, the Bureau of Soils became a unit of the Bureau of Chemistry and Soils.]



Areas surveyed in Georgia, shown by shading

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