

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS—MILTON WHITNEY, Chief.
IN COOPERATION WITH THE GEORGIA STATE COLLEGE OF AGRICULTURE,
ANDREW M. SOULE, PRESIDENT; DAVID D. LONG,
IN CHARGE SOIL SURVEY.

SOIL SURVEY OF RICHMOND COUNTY, GEORGIA.

BY

T. M. BUSHNELL, IN CHARGE, AND J. M. SNYDER.

W. EDWARD HEARN, INSPECTOR, SOUTHERN DIVISION.

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



WASHINGTON
GOVERNMENT PRINTING OFFICE
1917

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., April 24, 1917.

SIR: I have the honor to transmit herewith the manuscript report and map covering the survey of Richmond County, Georgia, and to request that they be published as advance sheets of Field Operations of the Bureau of Soils, 1916, as authorized by law.

The selection of this area was made after conference with the State officials cooperating with the bureau in the work of surveying and classifying the soils of Georgia.

Respectfully,

MILTON WHITNEY,
Chief of Bureau.

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

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MAP.

Soil map, Richmond County sheet, Georgia.

SOIL SURVEY OF RICHMOND COUNTY, GEORGIA.

By T. M. BUSHNELL, In Charge, and J. M. SNYDER.—Area Inspected by
W. EDWARD HEARN.

DESCRIPTION OF THE AREA.

Richmond County, Georgia, is situated on the eastern boundary of the State, at the head of navigation on the Savannah River and about 130 miles from the coast. It is bounded on the east by the State of South Carolina, on the south by Burke and Jefferson Counties, and on the west by McDuffie and Columbia Counties. It is separated from Jefferson County by Brier Creek, from the greater part of Burke County by McBean Creek, and from the State of South Carolina by the Savannah River. The county has an area of 316 square miles, or 202,240 acres.

Richmond County includes parts of two physiographic provinces, viz, the Coastal Plain and the Piedmont Plateau. The most extensive division is the Coastal Plain. The surface of this division has been reduced by stream erosion to a series of valleys and broad, level ridges with gentle to steep slopes and a general north-west-southeast trend.

The Piedmont Plateau, comprising the rolling and somewhat broken land in the northern corner of the county, is not typically developed. The drainage basins of Raes and Rocky Creeks may be grouped with this division, although Coastal Plain materials once covered the region and are still encountered in places.

The valleys, especially that of the Savannah River, include large areas of flat second bottoms or terraces. These occur at different levels and represent the remains of earlier flood plains of the streams. They now lie above normal overflow. From Augusta to Butler Creek the terraces are about 3 miles wide. Between this creek and Spirit Creek they are narrower, and below Tahoma they occur only in small, disconnected bodies. Terraces or flattish, terracelike areas occur also along the larger creeks.

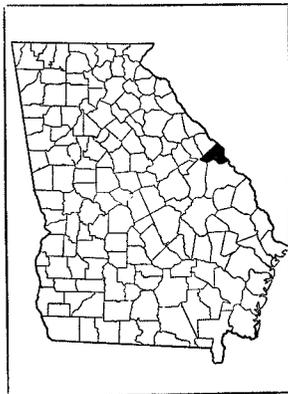


FIG. 1.—Sketch map showing location of the Richmond County area, Georgia.

Extensive first bottoms likewise occur in the county. The Savannah River has practically no first bottom above Augusta, but below that city bottoms 3 or 4 miles wide lie between the river and the higher terraces, except for a short distance just below the mouth of Butler Creek, where the older terraces extend to the river channel. Along all the smaller streams are strips of alluvial land a few feet to one-half mile wide, which occasionally are flooded after heavy rains.

The county presents a varied topography. The overflowed bottoms of the Savannah River are very flat and lie 8 to 15 feet above the normal water level. Their surface is broken by slight natural levees and abandoned stream channels. The second bottoms also are flat, though some slight elevations and depressions occur. The lowest second-bottom areas are usually separated from the flood plains by a sharp rise of 6 to 10 feet. Some of the higher terraces are somewhat eroded and are traversed by the channels of upland streams on their way to the river. Turpin Hill is a remnant of a high bench which has largely been washed away. The terraces often merge into the upland through a gentle colluvial slope or they may end at the foot of a steep bluff. The terracelike strips along Butler and Spirit Creeks are locally uneven and have a moderate slope toward the streams.

Parts of the upland still possess the generally level or gently undulating topography of the old Coastal Plain. The largest bodies of this kind occur near Blythe, Hoods Chapel, and Hephzibah, with others scattered from Augusta to McBean. Some small depressions occur in these large level areas.

As a rule the hill slopes are smooth enough for farming. They may be very gentle and extend over several miles, or may drop 200 feet or more in less than one-half mile. In some localities a striking feature of the landscape is the occurrence of narrow, intermittent strips of rough, dissected land along the upper slopes of valleys, where the ground breaks off sharply from the flat table-lands, forming conspicuous, bare red bluffs 10 to 50 feet high, interspersed with smoother slopes which lie between the forks of drainage courses. Just below these bluffs the slopes are steep and may be furrowed by heads of drainage ways.

A belt of hilly land known as the "sand hills" crosses the county in a southwesterly direction from Augusta. It is now divided into several areas by large creek valleys. Some of the roughest land in the county occurs in the northern corner, along the Savannah River, where erosion has been most active.

The elevation of the Savannah first bottoms at Augusta is about 130 feet above sea level. The terraces rise 10 to 40 feet above the

flood plains. The general level of the uplands is between 300 and 400 feet. The highest elevations occur along the western county line. The elevation at Hephzibah is 402 feet.

Richmond County is drained by the Savannah River and its tributaries. Where the Savannah Valley has been carved through the resistant Piedmont material the flanking bottoms are narrow, and the river pursues a fairly straight course from the northwestern corner of the county to Sand Bar Ferry. The fall is rather great and the current strong; the bottom is rocky, and shoals occur as far south as Augusta. Below this point the valley is cut through soft Coastal Plain materials, and the bottom and terraces are 2 to 6 miles wide on the Georgia side. Here the current becomes more sluggish and the river meanders in great oxbow loops cut through the soft alluvium. It has reached base level here and after heavy rains overflows the bordering bottoms.

Most of the local tributaries of the Savannah River head near the northwestern boundary line and flow in a general southeasterly direction, in parallel courses several miles apart, direct to the river. Sandy Run and Boggy Cut Creek rise in Columbia County and flow across Richmond County to Brier Creek. Rocky and Raes Creeks drain an area consisting largely of Piedmont soils. All the other small streams lie entirely in the Coastal Plain.

The currents of the small streams are swift. Numerous water-power dams have been built, and many small gristmills are in operation. One of the largest power dams in the South is located on the Savannah River a few miles above Richmond County. This furnishes light and power for the city of Augusta. Below it is a smaller dam which diverts water into a power canal for operating many factories in Augusta.

Drinking water in Augusta is obtained from the Savannah River and passed through a filtration plant. Some of the farms have driven wells, but most of them have dug wells ranging in depth from 20 to 100 feet or more. In a few cases hydraulic rams are used to force spring water to the houses. The water is of good quality.

The present boundaries of Richmond County were established in 1895, when the formerly included land west of Brier Creek was annexed to Jefferson County.

In 1880 the rural population of Richmond County was 12,774, and in 1910, 13,485. The urban population, all of which is now included in the city of Augusta, increased from 21,891 to 45,401 in the same period. Most of the rural population is concentrated in the small towns and settlements and along the main pikes. There are several large tracts of land in the sand-hill section and in parts of the Savannah bottoms which are practically uninhabited. Of the total population of 58,886 in 1910, 30,447 were white and 28,390 colored,

the remainder consisting mostly of Chinese and Japanese. The white population consists largely of descendants of the early colonists of Georgia and adjoining States, although some settlers have come in from the North.

Augusta, which had a population in 1910 of 41,040, is the county seat. This city is an important manufacturing and business center and one of the largest inland cotton markets in the world. On account of the attractive climate, it is a popular winter resort. Other towns of local importance are Hephzibah, Blythe, Gracewood, and McBean.

Augusta is an important railroad center, though it is not reached by any trunk line. It is the terminus of several branches of the Southern Railway, the Atlantic Coast Line Railroad, the Central of Georgia Railway, the Georgia & Florida Railway, and the Georgia Railroad, and is connected with Aiken, S. C., by a trolley line. The Savannah River is navigable as far north as Augusta.

Many good sand-clay roads radiate in all directions from Augusta, and there is a network of roads connecting farms and settlements.

Richmond County has an excellent public-school system. The hospital and medical school of the University of Georgia are situated at Augusta.

Rural mail-delivery routes reach almost every farm, and most of the small towns have telephone service.

Augusta is the principal market for the farm products of the county. The local mills consume far more cotton than is grown in the county, and about 300,000 bales are exported through this market each year.

CLIMATE.

The mean annual temperature for Richmond County is 63.6° F. The winter mean is 47.3° and the summer mean 79.2°. The lowest temperature of which there is any record is 3°, in February, and the highest 105°, in August and September. A temperature of 100° has been recorded in the months of May, June, and July. The summer is long and warm and the winter usually mild, periods of cold weather being of short duration.

The average annual rainfall amounts to 46.94 inches. This is well distributed throughout the year and is sufficient for all crops. The rainfall is lightest in October and November, and the weather at that time is usually favorable for cotton picking. The precipitation for the driest year on record was 19.13 inches and for the wettest year 57.19 inches. There is little snow.

The average dates of the last killing frost in the spring and the first in the fall are March 24 and November 7, respectively, giving

a growing season of about seven and one-half months. Two crops, such as oats and cowpeas or oats and potatoes, may be grown successively on the same land in a single season. Beets, onions, collards, turnips, lettuce, radishes, and certain other vegetables can be grown during the winter.

The following table gives climatic data for the county as recorded at the Augusta station of the Weather Bureau :

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

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.
	° F.	° F.	° F.	Inches.	Inches.	Inches.
December.....	47.0	77	7	3.61	6.00	4.04
January.....	45.9	78	6	3.98	1.90	3.44
February.....	49.0	80	3	4.35	.62	7.22
Winter.....	47.3	80	3	11.94	8.52	14.70
March.....	55.9	85	14	4.73	.78	7.78
April.....	63.2	89	24	3.39	.05	6.23
May.....	72.2	100	40	3.04	1.07	3.88
Spring.....	63.8	100	14	11.16	1.90	17.89
June.....	78.1	100	46	4.44	1.20	3.29
July.....	80.5	100	57	4.83	.35	5.35
August.....	78.9	105	53	5.34	2.62	6.81
Summer.....	79.2	105	46	14.61	4.17	15.45
September.....	74.4	105	40	4.22	.53	5.85
October.....	63.6	97	32	2.28	3.51	1.09
November.....	53.9	89	22	2.73	.50	2.21
Fall.....	64.0	105	22	9.23	4.54	9.15
Year.....	63.6	105	3	46.94	19.13	57.19

AGRICULTURE.

The earliest type of agriculture in Richmond County included the production of cereals, hay, and other crops needed to make the region self-supporting. Later, with the invention of the cotton gin, cotton growing became the dominant industry, a position it has held continuously until the present time. Wheat, formerly grown to a considerable extent, is no longer important, but corn has always been extensively grown.

The census of 1880 reported 11,793 acres in corn, 7,871 acres in cotton, 4,209 acres in oats, 2,112 acres in hay crops, 1,549 acres in wheat, and 714 acres in sweet potatoes. These were the only crops grown to any important extent. At present the leading crops are cotton, corn, oats, hay, cowpeas, and vegetables, cotton being the principal cash crop. According to the census, there were 18,342 acres in cotton in 1909, with a production of 8,630 bales. Since then the area devoted to this crop has increased considerably. Corn was grown on 17,499 acres in 1909, with a production of 208,541 bushels; cowpeas on 4,714 acres, from which 8,757 bushels of seed were harvested; and oats on 2,917 acres, from which 55,970 bushels were obtained. Only 169 acres were devoted to wheat and 847 acres to tame or cultivated grasses. Grains were cut green from 4,500 acres, producing 4,126 tons of forage. All the corn, oats, and cowpeas produced, as well as the grains cut green, are consumed on the farms. The corn is used largely for feeding work stock and fattening hogs, but a part is used in the manufacture of meal. Sweet potatoes, Irish potatoes, and other vegetables, and strawberries, peaches, grapes, and nuts are grown both for home use and for sale in the local markets.

Cattle and hogs are not raised in sufficient numbers to supply the local requirements, and large quantities of meat and lard are imported each year. In 1909 there were sold or slaughtered 2,989 hogs, 606 calves, 711 other cattle, and 23 sheep or goats, with a total value of \$65,075. Dairy products, excluding those used at home, were valued at \$104,085, and poultry and eggs at \$46,881. Dairying has increased greatly in the last 20 years. It now consists largely in supplying the retail trade in Augusta with whole milk, though some butter is made. Interest is taken in fattening cattle, and boys' pig clubs have been formed to stimulate interest in hog raising. The county is tick free.

The importance of the adaptation of soils to crops is recognized by the farmers. Cotton is grown on all the well-drained soils, but the sandy loams give the best yields. The alluvial Congaree types and the dark-colored terrace soils, owing partly to moisture conditions, are considered best suited to corn, oats, and hay crops. Truck crops are grown chiefly on the terraces near Augusta, which is the principal market for such products.

The unit in most farming operations is the one-horse tenant farm, ranging in size from about 25 acres on the better land to 40 acres on the light sandy loam soils. Tenants usually devote about equal areas to cotton and corn. Oats are largely grown by landowners. The small farmers as a rule have comfortable houses and small barns or sheds for the stock and grain. One or two cows and a few hogs

usually are kept. One-horse plows and hand hoes are the common tools. The larger, more level farms are provided with binders for harvesting oats.

On sloping land the fields are terraced to prevent erosion. Cotton is nearly always planted on beds, which are heavily manured and well drained, and is given clean cultivation. Corn is often planted in the same way as cotton, but on deep, sandy soils it is planted in furrows to obtain better germination. The land is broken flat for oats, which are sown broadcast or seeded with drills. Oats are sown in the fall and harvested in May.

Definite crop rotations are not in general use. Often cotton or corn and cotton are grown for several years, after which the land may lie idle for a season. Some of the old fields have been allowed to revert to forest several times. Oats may be sown after corn, and cowpeas are frequently grown between the corn rows. On hay farms corn, oats, and grass is a common rotation. Oats are harvested early and usually are followed by cowpeas, potatoes, or some other crop.

The 1910 census reports an expenditure of \$101,585 for fertilizer, or an average of \$101.18 for each of the 1,004 farms reporting. In growing cotton the use of fertilizer is universal. About 200 pounds per acre is the ordinary application, but many farmers apply more, as much as 400 pounds per acre. Truck crops are much more heavily fertilized than corn or oats. Besides the commercial fertilizers, all available barnyard manure, as well as pine straw and other organic matter, is applied to the land.

An ample supply of farm laborers is available. Most of the work is done by negroes, who receive 75 cents a day, or about \$10 a month, with rations and a cabin. Cotton pickers receive about 50 cents per hundred pounds. There was a total expenditure of \$196,875 for labor in 1909, or \$272.68 for each of the 722 farms reporting outlay.

According to the 1910 census there are 1,344¹ farms in Richmond County, averaging 107.7 acres in size, of which 53.6 acres are improved. Some of the large plantations contain several thousand acres, and there is a general tendency toward large land holdings. In 1880 about 60 per cent of the farms were operated by owners and about 40 per cent by tenants, but at present the proportions are reversed. As a rule tenant farms are operated on the basis of an equal division of the crops. The cost of fertilizer also is often divided. Some one-horse farms are leased in consideration of a fixed rent so far as cotton is concerned, usually one bale, and half the corn crop.

The price of land in Richmond County ranges from \$5 to over \$200 an acre. Some of the rich bottom areas near Augusta are valued very highly. The level land south of Augusta sells for about \$25 to \$75 an acre, and land around Blythe for \$30 to \$50 an acre.

¹ Each tenancy is classed by the census as a "farm."

Much of the sandy upland can be bought for \$15 to \$25 an acre. Some of the sand-hill areas are of doubtful value. The more poorly drained Savannah River bottoms are valued chiefly for their timber, but if cleared and protected from overflow would be very productive.

SOILS.

Richmond County lies in the region of contact between the Piedmont Plateau and the Coastal Plain provinces, most of its area being in the Coastal Plain. The Piedmont section comprises the extreme northern corner. In addition to the upland soils of these two provinces, alluvial soils are extensively developed in the first and second bottoms of streams, the alluvial areas being 2 to 6 miles wide along the Savannah River and one-half mile wide or less along the creeks.

The Coastal Plain formations consist of unconsolidated materials carried from the Appalachian Mountains and Piedmont Plateau regions and deposited in an ancient sea. The sands and clays were assorted and distributed by the currents of streams and by the action of the tides and waves. The ocean floor was subsequently raised and subjected to erosion, which has produced the present surface relief.

With varying conditions of drainage and aeration and different contents of iron compounds from place to place, material has been oxidized to colors ranging from yellow through reddish yellow to deep red. In some poorly drained and poorly aerated materials light-gray and mottled colors have been produced, especially in the subsoils. Organic matter, accumulated under moist conditions, has given the soil a dark-gray color in places. The surface soils have lost the finest silt and clay particles through washing and leaching and now consist largely of sands or loamy sands, ranging from fine to coarse in texture and composed largely of waterworn quartz. Finely divided mica is abundant in places, and in others, usually in small areas, the material has been cemented by iron into soft red sandstone. Some clay beds have become indurated, forming ledges along hill-sides. The belt of sand hills is characterized by a growth of scrub oak and by bare patches of white sand soil.

The dominant soil series of the Coastal Plain in Richmond County is the Norfolk. The types in this series are characterized by light-gray surface soils and yellow, friable, sandy or sandy clay subsoils. Five types and two type phases are mapped in this series.

The Ruston series comprises types with prevailing gray surface soils and yellowish-red to reddish-yellow subsoils. In this series two types, the sand and sandy loam, are mapped in Richmond County.

The Orangeburg series includes types with grayish to brownish surface soils and red, friable subsoils. Only one type, the sandy loam, is mapped in Richmond County.

The Greenville series resembles the Orangeburg, but differs from it in having decidedly reddish or reddish-brown surface soils and

dark-red, friable subsoils. The Greenville loamy sand and sandy loam are mapped.

The Hoffman series includes types with light-gray surface soils and pinkish or light-reddish, compact but friable subsoils, more or less mottled with gray, yellow, and brown. The soils of this series have a raw, unweathered appearance. The surface is uneven and is characterized by galled and eroded spots. These soils are developed along the lower slopes of Coastal Plain streams which head near the Piedmont Plateau. Two types, the coarse sandy loam and sandy loam, are mapped in Richmond County.

The Piedmont Plateau province in its typical development is an elevated, rolling plain rising gradually from the upper margin of the Coastal Plain to the foot of the Appalachian Mountains. It extends about 1 mile across the extreme northern boundary of the county. It is exposed also in places along the valley slopes of Raes and Rocky Creeks, where the Coastal Plain material has been entirely removed by erosion. Similar areas are encountered as far east as Lake Olmstead and in a few places along the upper course of Butler Creek near Belair.

Geologically, the rocks of the Piedmont Plateau are much older than those of the Coastal Plain. They consist of igneous and metamorphic rocks, mainly granite, gneiss, and schist, containing many veins of quartz. The Piedmont soils are residual having been formed in place, through weathering, from the underlying rocks. The resulting soils usually are sandy at the surface, with stiff, brittle clay subsoils which rest on the bedrock at varying depths. Rock fragments, usually of quartz, are found on the surface and in the soil mass, while outcropping ledges sometimes occur on slopes. The soils are grouped in series according to the nature of the parent rock and the color of the subsoil, which usually depends upon the drainage conditions and the degree of oxidation.

In Richmond County the principal Piedmont series is the Appling, the types in which are characterized by grayish surface soils and a mottled yellow, gray, and red, heavy, brittle clay subsoil. The material is derived from granite and gneiss. One type, the sandy loam, is mapped.

The soils of the Cecil series are derived from material similar to that giving the Appling, but they have been more thoroughly oxidized, the subsoil having a deep-red color. This series is represented in Richmond County by the sandy loam and clay loam. The Cecil clay loam, or "red-clay land," is the dominant type of the Piedmont Plateau in Georgia.

The surface soils of the types included in the Iredell series are yellowish-brown or grayish-brown and the subsoils sticky, plastic, brownish-yellow clay, more or less mottled with brown, gray, and red. Only one type, the loam, is mapped in Richmond County.

In Richmond County there are a number of small areas of soil derived from very smooth, fine-grained mica, talcose, or chlorite schists. Soils derived from these rocks belong to the Louisa series, where the subsoil is red, and to the York series, where it is yellow. These areas are so inextensive and unimportant that they are mapped with the surrounding soils.

The River Flood Plains province in this county includes two main natural divisions, the overflowed first-bottom land and the higher lying nonoverflowed bottoms, or terraces. The soils in both these divisions consist of alluvium washed from upland areas by the various streams and deposited along their courses. The terraces, or higher bottoms, represent former flood plains now lying above overflow level by reason of the subsequent lowering of the stream channel. On the terraces the soils are more varied than in the flood plains, owing to differences in the original sediments and in the degree of oxidation and drainage. The Kalmia soils of the terraces correspond to the Norfolk soils of the uplands, having gray surface soils and yellow subsoils, which may become mottled with gray and brown in the lower part. The Kalmia sandy loam represents this series in Richmond County.

Some of the better drained terrace areas have grayish-brown surface soils and yellowish-red or red subsoils. The soil here is classed in the Cahaba series, of which only one type, the fine sandy loam, is recognized.

The Amite series is characterized by reddish-brown or red surface soils and red subsoils, and is represented by the loam type.

The Leaf series includes gray to dark-gray surface soils, with heavy, plastic, light-grayish or yellowish clay subsoils, mottled with red and yellow. In this series two types, the fine sandy loam and silt loam, are mapped.

The Myatt soils are poorly drained. The surface soils of this series are gray to dark gray, with light-gray, heavy sandy clay or clay subsoils, slightly mottled with brown and yellow. One type, the sandy loam, is mapped.

The Augusta series is developed along the larger creeks issuing from the sand-hill section and on parts of the Savannah terraces. The surface soil is usually gray, but may be light gray, yellowish, or pinkish in eroded areas, and dark gray in depressions. The subsoil is a yellow or pinkish silty clay, mottled with gray, brown, and red and resembles the subsoil of the Hoffman series of the upland. It has a very smooth, micaceous feel in places. Frequently, especially in eroded spots, the lower subsoil becomes loose and sandy, with a pinkish color, and contains a large percentage of mica. Sometimes the substratum contains layers of white kaolin. This series bears some resemblance to the Leaf series, into which the soil grades in

parts of the Savannah bottoms. Only one type of the Augusta series, the sandy loam, is mapped in Richmond County.

The Wickham series is developed on the second bottoms above Augusta, where the material is of Appalachian and Piedmont origin. The surface soil is red or reddish brown and the subsoil consists of a red, slightly sandy clay. Bedrock is encountered at depths ranging from 10 to 40 feet. The clay loam is the only type of this series mapped in Richmond County.

The first-bottom alluvium along the Savannah River consists of material brought from the Piedmont Plateau and Appalachian Mountain and Plateau provinces and is classed with the Congaree series. The surface soils and subsoils of this series are reddish or chocolate brown and contain considerable mica. Three types are mapped: The fine sandy loam, silt loam, and silty clay loam.

Most of the creeks of Richmond County are bordered by first-bottom soils consisting of wash from Coastal Plain material with a slight admixture of Piedmont material. This land is quite wet. It is extremely variable in color and texture and the surface material may be locally changed by each overflow. Such land is mapped as Meadow. Similar bottoms, but with more mucky soils, and differing also in being inundated much of the time, are mapped as Swamp. In the Savannah bottoms the Swamp is a silty clay soil bearing a heavy growth of cypress, tupelo gum, and other trees.

Steep, gullied slopes and bare cliffs that are unfit for agricultural use are mapped as Rough broken land.

In the following pages of this report the various soils of Richmond County are described in detail. The table below shows the actual and relative extent of each:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Norfolk sand.....	15,360	33.8	Norfolk fine sand.....	3,072	1.5
Sandhill phase.....	52,992		Congaree fine sandy loam.....	2,880	1.4
Norfolk sandy loam.....	12,352	7.0	Norfolk coarse sandy loam.....	2,560	1.3
Deep phase.....	1,728		Greenville sandy loam.....	2,240	1.1
Congaree silty clay loam.....	12,672	6.3	Leaf fine sandy loam.....	1,472	.7
Ruston sandy loam.....	12,608	6.2	Greenville loamy sand.....	1,280	.6
Meadow.....	10,304	5.1	Cahaba fine sandy loam.....	1,024	.5
Ruston sand.....	10,048	5.0	Cecil sandy loam.....	960	.5
Orangeburg sandy loam.....	9,920	4.9	Iredell loam.....	960	.5
Hoffman sandy loam.....	9,728	4.8	Lea silt loam.....	768	.4
Augusta sandy loam.....	5,952	2.9	Cecil clay loam.....	768	.4
Kalmia sandy loam.....	5,760	2.8	Rough broken land.....	704	.3
Congaree silt loam.....	5,120	2.5	Wickham c ay loam.....	448	.2
Swamp.....	4,288	2.1	Amite loam.....	448	.2
Appling sandy loam.....	3,712	1.8	Clay pits.....	64	.1
Hoffman coarse sandy loam...	3,392	1.7			
Norfolk coarse sand.....	3,328	1.7			
Myatt sandy loam.....	3,328	1.7			
			Total.....	202,240

NORFOLK COARSE SAND.

The Norfolk coarse sand consists of a gray to light yellowish gray coarse sand, grading at about 6 or 8 inches into a pale-yellow coarse sand which extends to a depth of 3 feet or more. A variation occurs in the northwestern corner of the county in which the surface soil contains a large quantity of very coarse sand and fine gravel.

The Norfolk coarse sand occurs in several small areas west of Augusta and in scattered areas in the western part of the county. A few small bodies are scattered throughout the other upland soils. The type occupies fairly level ridge tops, as well as steep lower slopes among the sandhills. Drainage is excessive.

The Norfolk coarse sand is an inextensive and unimportant soil type. Only a small proportion of it is cultivated. Corn, cowpeas, and cotton are the principal crops. Winter oats are grown to a small extent for hay and pasturage. A scanty growth of native wire grass and broom sedge affords some grazing for cattle. Corn yields only 5 to 8 bushels per acre, and 6 or 7 acres are required to produce 1 bale of cotton.

As this type is very droughty, it is usually plowed shallow and cultivated frequently to conserve moisture. Corn is planted in a deep water furrow. Ordinarily applications of 100 to 200 pounds of commercial fertilizer are given cotton and corn. Pine needles, stable manure, and other available organic matter are also used.

Land of this type, with the exception of a few areas near Augusta, is valued at about \$5 an acre.

The Norfolk coarse sand is deficient in organic matter and can be improved by plowing under cowpeas, rye, and other green-manure crops.

NORFOLK SAND.

The Norfolk sand consists of 4 to 6 inches of light-gray or gray medium sand, underlain by pale-yellow or bright-yellow sand, which extends to a depth of 3 feet or more. In places the subsoil is brownish, resembling the subsoil of the Ruston series. Sandy clay usually occurs at a depth of 6 to 15 feet. In the northwestern part of the county the Norfolk sand frequently approaches the coarse sand in texture, and some small areas of the latter types are included. South of Spirit Creek the texture of the material is generally finer, and there are included patches of fine sand.

The Norfolk sand is rather extensive, occurring throughout the Coastal Plain uplands. It occupies flat hilltops and gently rolling slopes. Drainage is good to excessive.

About 30 per cent of this type is cultivated, the remainder supporting a growth of scrub oak. Corn, cotton, oats, and cowpeas are

the principal crops. Ordinarily, corn yields about 8 bushels and cotton about one-sixth bale per acre. In favorable seasons, where the soil is well fertilized, much larger yields are obtained.

The type is easy to cultivate and keep free from weeds. Shallow plowing and frequent cultivation are practiced to conserve soil moisture. As a rule, moderate applications of commercial fertilizer and organic matter are made for cotton and corn. Fields are often allowed to stand idle after having been cultivated for two or three seasons, new land being cleared to take their place.

The price of land of this type ranges generally from \$3 to \$10 an acre. Some areas nearer Augusta are held at somewhat higher prices.

The greatest need of the Norfolk sand is organic matter. In addition, liberal applications of commercial fertilizers are required to maintain crop yields.

Norfolk sand, sandhill phase.—In color and texture the sandhill phase of the Norfolk sand is similar to the main type. It differs from the latter mainly in topography. Patches of bare white sand are more numerous over the phase than over the typical soil, and the surface soil and subsoil may be more incoherent.

This phase is by far the most extensive soil in the county, occurring throughout the uplands. It is developed principally in a line of dissected hills extending southwest from Augusta and on the steeper slopes of most of the small-stream valleys. There are also some relatively flat areas. Drainage is excessive.

Notwithstanding its great extent, this phase is less used for agriculture than any other soil in the county. Most of it is covered with a very scrubby growth of oak, with a few longleaf pines. Small patches of corn and cotton are grown on lower slopes which receive some moisture by seepage from the higher levels, and some stock is grazed on the scanty growth of grasses which the phase supports. Yields of corn and cotton are similar to those on the typical Norfolk sand.

The phase is handled like the typical soil. Terracing is practiced on the hillside fields which absorb rainfall readily and do not wash much.

Land of this phase may be bought for \$2 to \$10 an acre, except where it lies very near towns.

The Norfolk sand, sandhill phase, is very deficient in organic matter and very difficult to maintain in a productive state. It can hardly be made a profitable soil for general crops, but part of it might be profitably used for the production of melons and other truck crops. In parts of North Carolina this soil is used for the production of peaches, dewberries, rye, cotton, corn, pecans, grapes, and very early truck crops.

NORFOLK FINE SAND.

The Norfolk fine sand consists of 6 to 8 inches of gray or yellowish-gray fine sand underlain by yellow fine sand. The material is fairly uniform and free from coarse particles, but in most places it is somewhat coarser than the typical fine sand of southern Georgia and of Florida, especially the latter.

This type is confined mainly to the comparatively flat portions of the tops of sand hills in the southern half of the county. Drainage is good to excessive. The moisture-holding capacity of this type is better than that of the Norfolk sand, and it usually supports a more thrifty growth of vegetation.

The Norfolk fine sand is relatively inextensive. About 40 per cent of it is cleared for cultivation and the remainder supports a forest growth of scrub oak and scattered pine.

The type is used for the same crops as the Norfolk sand, the yields probably being a little better than on the latter type.

NORFOLK COARSE SANDY LOAM.

The surface soil of the Norfolk coarse sandy loam consists of a gray or light yellowish gray loamy coarse sand or light coarse sandy loam, changing at about 6 or 8 inches to a yellow, loamy coarse sand. The subsoil, consisting of yellow, coarse sandy clay, usually is encountered at a depth of 12 to 24 inches, but in places it lies nearly 3 feet below the surface.

This type is developed mainly in a few areas around the headwaters of Rocky Creek and along the junction of the terraces and uplands above Allens. A few smaller areas are scattered through the northern part of the county.

The topography is flat to gently sloping, rendering cultivation easy. Natural drainage is good. The soil is retentive of moisture and when well terraced it does not wash badly.

This type is relatively inextensive, but a large proportion of it is farmed. Corn and cotton are the principal crops, and cowpeas and oats are of secondary importance. Corn yields ordinarily about 8 bushels, cotton one-third bale, and oats 15 bushels to the acre. Under favorable conditions and with heavy fertilization much better yields, especially of cotton, may be obtained. The type is handled and fertilized much like the Norfolk sandy loam.

The price of this land generally ranges from \$8 to \$18 an acre, but in favorable locations higher prices are obtained.

The Norfolk coarse sandy loam can be greatly improved by plowing under green-manure crops. Somewhat heavier applications of commercial fertilizer also would give good results. Where favorably located this type could profitably be used for growing melons and truck crops.

NORFOLK SANDY LOAM.

The Norfolk sandy loam consists of a gray or light yellowish gray loamy sand or light sandy loam, changing at 6 to 8 inches to a bright-yellow light sandy loam, and this at about 12 to 18 inches to a yellow, friable sandy clay loam or sandy clay, which usually extends to a considerable depth. The lower subsoil may contain a few mottlings of brown or red in the better drained and of gray in the more poorly drained areas. In places in the southern part of the county the soil approaches a fine sandy loam in texture.

Included with this type are a few areas of Tifton sandy loam, having small iron concretions thickly strewn over the surface and disseminated throughout the soil section. These areas, being too small to map separately, are indicated on the map by gravel symbols.

The Norfolk sandy loam occurs in rather large bodies throughout the Coastal Plain uplands, but the largest and most typical areas are encountered around Edie and Blythe. The topography is flat to gently sloping and very favorable to farming operations. Drainage is good.

The Norfolk sandy loam is one of the most extensive of the better soils of the county, and most of it is cleared and cultivated. A more diversified system of farming is followed on this type than on many of the other soils of the county. Corn and cotton are about equally important. A considerable area is devoted to oats, and much of the wheat produced in the county is grown on this soil. Cowpeas are grown for hay and seed, as well as for improving the soil.

Corn yields ordinarily about 15 bushels and cotton one-half bale per acre, but these yields may be doubled on some fields in favorable seasons. Small patches are often heavily manured and made very productive.

Crops on this land receive the usual clean cultivation common in the cotton belt. All the available stable manure, pine needles, and other coarse material is plowed under. The principal crops usually receive acreage applications of 100 to 400 pounds of a fertilizer mixture analyzing 8 per cent phosphoric acid and 4 per cent potash.

The price of land of the Norfolk sandy loam type ranges from \$15 to \$60 an acre, depending on the improvements and the distance from towns.

The Norfolk sandy loam is usually well handled, but its productiveness could be increased by the incorporation of larger quantities of manures and plowing under leguminous crops. It is one of the best general-purpose soils of the county and is highly esteemed throughout the Coastal Plain region.

Norfolk sandy loam, deep phase.—The Norfolk sandy loam, deep phase, differs from the typical soil only in the depth of the surface

soil, which ranges from 18 inches to 3 feet. This phase grades into the typical Norfolk sandy loam on the one hand and into the Norfolk sand on the other. It also occupies an intermediate position in respect to yields. In topography, drainage, extent of use, and methods of handling it is little different from the typical soil.

RUSTON SAND.

The Ruston sand consists of a grayish-brown sand, passing at 6 to 12 inches into yellowish-red, reddish-yellow, or reddish-brown sand which extends to a depth of 3 feet or more.

This type occurs in many scattered areas. Near McBean it occupies the slopes of fairly steep hills resembling the sand hills, and in the vicinity of Phillips School it occurs in broad, shallow depressions surrounded by Norfolk sand. It is often encountered at the heads of intermittent drainage ways. Drainage is good and often excessive, as both the subsoil and substratum are loose and porous.

The Ruston sand is not extensive in Richmond County, but is more generally farmed than the other deep sands. It formerly supported a growth of small oak and pine.

Corn is the principal crop on this type and cotton ranks second. Oats and cowpeas are important crops on some farms. Corn yields ordinarily 10 bushels and cotton about one-third bale per acre. Under favorable conditions and with heavy fertilization better results are obtained.

The methods of cultivating and fertilizing this soil are similar to those used on the Norfolk sand. It is held at slightly higher prices than that type.

RUSTON SANDY LOAM.

The surface soil of the Ruston sandy loam consists of a grayish-brown loamy sand to light sandy loam, changing at 6 to 8 inches to a yellowish-brown to reddish-brown sandy loam. This is underlain, usually at a depth of 16 to 20 inches, by a yellowish-red to reddish-yellow, moderately friable sandy clay. In spots the depth to the subsoil ranges from 12 to 30 inches. In the southern half of the county some areas of Ruston fine sandy loam, too small to map, are included with this type, and some included areas south of Spirit Creek resemble the Hoffman sandy loam.

In the flat uplands in the vicinity of Blythe and Edie there are about 12 undrained depressions having a dark-gray or black sandy loam to silt loam surface soil, 10 inches deep, underlain by a light-gray impervious clay. These are really areas of Portsmouth soils, but owing to their small extent they were not separated from the Ruston on the map. Such areas are usually too wet for corn and

cotton, but are fairly well suited to oats. A few of the areas have been drained by ditching and it would be comparatively easy to drain the rest of them. At present most of this soil is used for pasture.

The Ruston sandy loam is most extensively developed in the southern half of the county, around Hephzibah. The surface is prevalently gently undulating to rolling, and lies well for farming. Surface drainage is effected by numerous draws leading to the creeks. The subsoil is fairly open and warm.

This type ranks among the better soils of the county and is largely under cultivation. Cotton and corn are the principal crops, followed by oats and cowpeas. Little attention is paid to the raising of live stock. Cotton yields ordinarily one-half bale and corn 15 bushels per acre. Much larger yields are obtained where the soil has been improved by the incorporation of large quantities of organic matter. Oats yield 15 to 30 bushels per acre, and cowpeas give a good yield of hay.

The Ruston sandy loam usually responds well to careful cultivation and fertilization. On the slopes it must be carefully terraced to prevent washing. Acreage applications of 100 to 300 pounds of complete commercial fertilizer are usually made for cotton, and somewhat smaller ones for corn. Stable manure is used when available.

Land of this type sells for \$10 to \$40 or more an acre, according to location, topography, and improvements.

The Ruston sandy loam, like the other sandy Coastal Plain soils, is deficient in organic matter. Large applications of commercial fertilizers consisting of phosphoric acid and potash could profitably be made. Nitrogen should be incorporated by growing leguminous crops.

ORANGEBURG SANDY LOAM.

The Orangeburg sandy loam consists of a grayish-brown to brown loamy sand to light sandy loam, changing at about 5 to 8 inches into a lighter brown to yellowish-red sandy loam, which is underlain at about 12 to 16 inches by a bright-red, friable sandy clay.

This type is confined almost entirely to the section south of Spirit Creek. Large areas occur along the main roads leading east and southeast from Hephzibah. The topography ranges from gently undulating to rolling and is generally favorable to cultivation. The natural drainage is good.

The Orangeburg sandy loam is one of the more extensive soil types of the county, and most of it is used for farming. Only a few areas are uncleared, some of which support the original forest of pine and oak. There is some second-growth pine. This is one of the better cotton soils of the county, and a large area is devoted to the crop. Corn is also important, and oats and cowpeas are grown to some extent.

Cotton yields ordinarily three-fourths bale, corn 15 bushels, oats 20 bushels, and cowpeas 1 ton or more of hay per acre. In some cases, under the most favorable conditions, as much as 1½ bales of cotton is obtained.

This type has been farmed long and intensively. Usually its productiveness is well maintained, but some fields have been alternately cleared and allowed to revert to timber several times within the last 100 years. Cotton often is planted several years in succession on the same land. Acreage applications of 400 pounds of commercial fertilizer for cotton are common, and corn and oats usually receive moderate applications. All the available organic manure is applied to the cotton and corn fields.

The average price of land of this type is about \$35 an acre.

The Orangeburg sandy loam as a whole could be improved by a more general application of the methods followed by the better farmers, including the incorporation of green and barnyard manures, thorough preparation of the seed bed, and a systematic crop rotation, in which a leguminous crop follows a clean-cultivated one.

GREENVILLE LOAMY SAND.

The Greenville loamy sand consists of a brown, reddish-brown, or chocolate-brown, loamy medium sand, passing at about 8 inches into red or dark-red loamy sand. This material, which contains sufficient clay to cause it to be slightly sticky when wet, may extend to a depth of 10 feet or more. Included with this type are a few small areas of Orangeburg sand, in which the surface soil is gray instead of reddish.

The Greenville loamy sand is developed mainly around Hephzibah and southeast of that place. It occurs on slopes, where it lies below the Greenville and Orangeburg sandy loams. The surface is sloping to rolling and is seldom too rough for farming. Drainage is generally good and in places somewhat excessive. In places erosion has caused deep gullies.

Although inextensive, the Greenville loamy sand is highly valued, and most of it is used for the production of cotton and corn. Cotton yields ordinarily about one-half bale and corn about 12 bushels per acre. The methods employed in cultivating and fertilizing this type are similar to those used on the surrounding soils.

The average price of land of the Greenville loamy sand type is about \$25 an acre.

GREENVILLE SANDY LOAM.

The Greenville sandy loam consists of a reddish-brown sandy loam or loamy sand, passing at about 6 to 8 inches into a dark-red sandy

loam to sandy clay which becomes quite hard when dry. The type is derived from ferruginous sand which in places is cemented into hard red sandstone. In places the subsoil lies so near the surface that when plowed the material resembles a clay loam, and on some of the steeper slopes the sandy clay is exposed through erosion.

Except for a few small areas, this type is encountered only around Hephzibah and south of that town, along the county line. A few areas are comparatively level, but most of the type occurs at the heads or along the sides of draws and on valley slopes, and has an undulating to rolling topography, with good drainage.

Much of this type is under cultivation, the ordinary crops of the region being grown. Cotton yields an average of one-half to three-fourths bale, and corn about 15 bushels per acre, though where specially good methods are employed and in favorable seasons more than 1 bale of cotton and 25 or 30 bushels of corn may be obtained. Oats yield about 20 bushels of grain or a ton or more of forage per acre. Heavy applications of commercial fertilizer are made, with good results. Fertilizer apparently does not leach out of this soil quickly.

Land of the Greenville sandy loam type is held at prices ranging from \$30 to \$60 an acre.

This type can be improved by more careful terracing, the growing of winter oats and other winter cover crops, and the incorporation of organic matter, especially by plowing under leguminous crops.

HOFFMAN COARSE SANDY LOAM.

The Hoffman coarse sandy loam consists of 8 to 15 inches of loamy coarse sand overlying pinkish, yellowish, or reddish coarse sandy clay, mottled with gray, yellow, and brown. Variations similar to those described in the discussion of the Hoffman sandy loam occur.

This type is associated with the Hoffman sandy loam. Most of the areas lie near the heads of streams which rise in the northwestern part of the county, just below the Piedmont soils of Columbia County. The topography is slightly rougher than that of the Hoffman sandy loam. The areas are well drained.

The same crops are grown as on the sandy loam. Yields are probably somewhat lower, on account of included rough areas and small areas of Norfolk sand. The soil is handled and fertilized like the sandy loam.

Much of the Hoffman coarse sandy loam is remote from towns and main roads. The average price of the land is about \$15 an acre.

Where the surface soil is deep and the topography favorable this type can be built up by the incorporation of organic matter, which can be supplied by plowing under leguminous crops. Careful terracing is necessary to protect fields from destructive washing.

In the following table are given the results of mechanical analyses of samples of the soil and subsoil of the Hoffman coarse sandy loam :

Mechanical analyses of Hoffman coarse sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
254649.....	Soil.....	12.4	33.4	12.4	28.8	4.2	4.9	3.9
254650.....	Subsoil.....	8.2	19.0	14.4	21.0	1.9	11.4	23.9

HOFFMAN SANDY LOAM.

The Hoffman sandy loam consists of a grayish loamy sand to sandy loam, passing at 8 to 10 inches into a pinkish or reddish friable sandy clay, more or less mottled with gray, yellow, and brown. Both soil and subsoil carry a large percentage of mica, which gives the material a smooth feel. In many places the surface inch or two is darkened by organic matter. Sometimes there is a subsurface layer of light-gray or yellow loamy sand. Spots occur in which the surface is covered with fragments of red sandstone and the soil material is red and somewhat heavier in texture. In Spirit Creek Valley there are small areas in which the subsoil consists of a smooth silty clay and in which deposits of kaolin occur at some depth. Such areas resemble a soil mapped elsewhere in the Berzelia series, but they have not been separated in this county on account of their small size. There are also included small patches of Norfolk sand.

The Hoffman sandy loam is developed mainly along Rocky, Butler, and Spirit Creeks and their tributaries, especially in the sand-hill section. It occupies the slopes between the stream-bottom terraces on one side and the hills of Norfolk sand on the other. The slopes range from gentle to steep, with many little knolls and draws. Some fields are badly eroded and spots in which the clay subsoil is exposed occur throughout the type. Drainage is usually good.

While this soil is not very strong, it constitutes almost the only farming land in the sand-hill section and about 60 to 70 per cent of it is cleared and cultivated. Old fields and the included patches of Norfolk sand are forested, usually with a thrifty tree growth. The only turpentine grove and still in Richmond County are located on this type.

Corn and cotton are the principal crops. Winter oats and cow-peas are grown by some farmers. The yields depend largely on the quantity of fertilizer and manure applied. In fields which have a fairly deep surface soil and which have been properly farmed the yields often equal those obtained on the Norfolk sandy loam. Ordi-

narily cotton yields one-fourth to one-half bale and corn 10 to 15 bushels to the acre. This type usually requires careful terracing and heavy fertilization.

Land of the Hoffman sandy loam type sells for \$10 to \$50 an acre, according to improvements and location.

APPLING SANDY LOAM.

The surface soil of the Appling sandy loam consists of a gray, yellowish-gray, or brownish-gray sandy loam or loamy sand, passing at a depth of about 8 inches into pale-yellowish sandy loam. The subsoil is a mottled yellow, red, and gray tough sandy clay or friable clay. In places the soil section contains considerable coarse sand and angular rock fragments. Bedrock can be seen in road cuts and occasionally outcrops in the fields. In many places the subsoil is not mottled, but in patches several square rods in extent is more or less uniformly yellow, or in other similar patches red. There are also included a number of very small areas in which the soil is derived from fine-grained chlorite, talcose, and mica schists which would be mapped as a distinct type of soil if they were of sufficient extent.

The Appling sandy loam is confined mainly to the northwestern corner of the county. One small area lies near Belair. The topography ranges from gently sloping to steeply rolling. The type as a whole is well drained.

While this type is the most extensive of the Piedmont soils, it covers only a small percentage of the total area of the county. About 60 per cent of it is used for cultivated crops, the remainder supporting a forest growth consisting mainly of old-field pine. Corn, cotton, oats, and cowpeas are the principal crops.

The yields vary largely with the quantity of fertilizers used, the methods of cultivation, and the topography. From one-fifth to three-fourths bale of cotton and from 8 to 20 bushels of corn per acre represent the ordinary range in yield. This soil contains enough silt and clay to clod when plowed wet and to run together after rains, so that careful and frequent cultivations are needed to keep it in good tilth. On the steeper slopes it is difficult to maintain the terraces necessary to prevent the removal of the surface soil by washing.

An acreage application of 100 to 300 pounds of commercial fertilizer usually is made for cotton. Pine needles and barnyard manure are plowed under. Means should be used to increase the organic-matter content of the soil.

CECIL SANDY LOAM.

The Cecil sandy loam consists of a brownish-gray to reddish, medium sandy loam, about 8 inches deep, underlain by a brittle red

clay extending to a depth of 3 feet or more. Angular fragments of rocks, mainly quartz and granite, are scattered over the surface in many places. The sandy surface soil is in some places deeper than usual and contains rounded, waterworn gravel and stones, representing remnants of Coastal Plain deposits now largely removed by erosion. On hilltops these deposits sometimes have a depth of 3 feet or more and are thickly covered with rounded quartz fragments. Such areas are indicated on the map by gravel symbols.

This type occurs only in small areas in the northern corner of the county, just northwest of Augusta. It occupies moderately to steeply rolling hillsides and the crests of ridges, and is well drained.

Thirty to forty per cent of the area of this soil is in old-field pine and brush. All the smoother areas are cultivated, being devoted mainly to the production of cotton and corn. Oats are grown to a small extent. Part of the type is used for growing nursery stock.

Some fields have been improved to a point where they will produce over 1 bale of cotton per acre, but the average yield is between one-half and three-fourths bale. Corn yields ordinarily about 10 to 18 bushels, and oats about 15 bushels per acre.

The Cecil sandy loam is cultivated and fertilized in the same way as the other better soils of the county. Where the topography is not too rough the type can be built up to a good state of productivity by the use of manures and commercial fertilizer.

CECIL CLAY LOAM.

The Cecil clay loam consists of about 6 inches of red or chocolate-brown clay loam overlying tough, brittle red clay. In many places the surface soil consists of a heavy sandy loam, a few inches deep, underlain by sandy clay, but this heavier material is mixed with the surface sandy loam and forms a clay loam texture in plowed fields. Fragments of quartz are scattered over the surface in many places.

There are included with this type a few spots in which the soil is a smooth silt loam, derived from fine-grained mica and talcose schists. Such spots represent Louisa material too small to map separately.

The Cecil clay loam occurs principally on slopes in the vicinity of Raes Creek. The largest areas are found 3 or 4 miles northwest of Augusta. The topography is gently undulating to rolling, and the drainage complete.

This type, though inextensive, is naturally a strong soil, and all of it is under cultivation. Cotton and corn are the principal crops. Oats and alfalfa are grown to a small extent. Cotton yields ordinarily about three-fourths bale and corn about 15 bushels per acre. Alfalfa apparently does well.

The Cecil clay loam is hard to handle, except under the proper moisture conditions. Heavy applications of fertilizer are commonly made for cotton. The available manure is used, but there is seldom enough for all fields.

Owing to its convenient location and high productiveness, land of this type has a relatively high value. Prices range from \$20 to \$50 an acre.

The Cecil clay loam can be improved by growing and plowing under winter cover crops and other green manures, particularly the legumes. Like most of the other soils of the county, this type needs heavy fertilization in order to produce the best results. Heavy machinery and strong teams are required to till this soil satisfactorily.

IREDELL LOAM.

The Iredell loam consists of a yellowish-brown or grayish-brown, heavy loam, underlain at 6 to 15 inches by a sticky, plastic, brownish-yellow clay, more or less mottled with brown, gray, and red. In a few spots the surface soil has a sandy loam or clay loam texture. The subsoil directly overlies bedrock, which may in places be reached at a depth of 20 to 36 inches. This type is derived from various rocks, but mainly from diorite and hornblende. There are some included spots of York silt loam, a type derived from talcose and chlorite schists, consisting of a yellowish-gray silt loam, about 8 inches deep, underlain by yellow, slightly heavier silt loam to 10 or 15 inches, where it rests on a stiff, yellow silty clay.

The Iredell loam is confined to the drainage basin northwest of Augusta and occurs principally along the lower slopes bordering the valley of Raes Creek. The slopes range from gentle to steep and are more or less dissected by small streamways. Surface drainage is good, but the impervious clay subsoil, retarding underdrainage, makes the land rather wet and cold. Probably 50 per cent of this type supports a growth of oak, pine, and brush.

At present cotton, corn, oats, and cowpeas are practically the only crops grown on the Iredell loam. Cotton yields about one-third bale and corn 8 to 10 bushels per acre. Much of this type can be bought for \$10 to \$20 an acre.

In other parts of the Piedmont Plateau the Iredell loam is considered best suited to oats, wheat, and grasses, and it might be profitable to use it for these crops in Richmond County.

KALMIA SANDY LOAM.

The Kalmia sandy loam consists of a gray medium sandy loam, passing at about 8 inches into a yellow sandy loam, which extends to a depth of about 16 or 18 inches. The subsoil is a yellow friable sandy clay or clay loam. In places the surface soil consists of coarse

sandy loam. The subsoil also varies somewhat. Below 30 inches, as indicated by borings, the material in places shows faint mottlings of brown, gray, and red, and becomes more compact in structure.

This type is developed mainly in one large area extending from Augusta to Butler Creek. Smaller areas occur farther down the Savannah Valley and along some of the larger creeks. The type occupies the high terraces of the Savannah River. The topography is level, except for a few slight elevations and depressions. The type as a whole has fair drainage, though on many farms it has been found advantageous to dig ditches around small fields to carry off surplus water.

On account of its level topography, good subsoil structure, and proximity to Augusta, the Kalmia sandy loam is one of the more important soils of Richmond County. About 90 per cent of it is intensively cultivated. Part of the remainder supports a growth of shortleaf pine and brush and part is in pasture.

Cotton, corn, and oats are the principal crops. The largest fields of oats in the county are on this type. It also supports many of the truck farms which supply Augusta with vegetables. Cowpeas are grown to some extent. Crop yields depend more on the way the land has been handled than on its natural productiveness, which is rather low. The yields are generally good. Some fields have been so improved that more than 1 bale of cotton, 25 bushels of corn, or 30 bushels of oats to the acre are ordinarily obtained.

Liberal use is made of cotton seed, waste from cotton mills, stable manure, and other forms of organic matter, especially on the truck farms.

The price of land of this type ranges from less than \$50 to about \$100 an acre, depending upon location and improvements.

Much of the Kalmia sandy loam is already highly improved, but the average yields could be increased by a more general application of the methods used by the best farmers.

CAHABA FINE SANDY LOAM.

The Cahaba fine sandy loam consists of a gray to brown fine sandy loam, usually changing at about 8 inches to a brown, yellowish, or reddish-yellow fine sandy loam. This is underlain at a depth of about 12 to 16 inches by yellowish-red or reddish-yellow fine sandy clay or friable clay loam.

Practically all this type lies in the immediate vicinity of Augusta, the greater part within the city limits. It occupies the outer, well-drained margins of the successive terraces, and occurs in long, narrow strips. The topography is generally flat, but on one side there is usually a moderate slope terminating abruptly in areas of Myatt soils, and on the other a gradual slope leading into the Kalmia soils.

Cotton and corn are the principal crops on this type. Cotton yields nearly 1 bale per acre and corn proportionally well.

Farm land of the Cahaba fine sandy loam has about the same valuation as the Kalmia sandy loam.

AMITE LOAM.

The surface soil of the Amite loam is a reddish-brown loam, ranging in color from red on slight elevations to chocolate brown in shallow depressions. The subsoil, beginning at 6 to 8 inches, is a moderately friable to rather tough red sandy clay. In places the subsoil comes within 4 or 5 inches of the surface and the material plows up like a clay loam. The type occupies terraces and consists of material derived probably from both Coastal Plain and Piedmont upland soils. There seems to be a distinct deposit of this reddish material over the strata which form the Leaf and Augusta soils.

Only four areas of the Amite loam occur in Richmond County, one in Augusta and the others near the mouth of Butler Creek. The land lies quite flat, though low ridges and slight depressions occur in places. The drainage is good.

The Amite loam is best suited to the production of cotton, and is largely used for that crop. Corn is grown to some extent. Yields of 1 bale of cotton and 20 bushels of corn are not unusual.

The productiveness of this soil is maintained by the use of commercial fertilizer and by applying organic matter, including stable manure and "motes."¹

Farm land of this type is valued highly, and little, if any, of it is for sale at the present time.

LEAF FINE SANDY LOAM.

The Leaf fine sandy loam consists of a gray fine sandy loam or loamy fine sand, changing at about 8 inches to a light-gray fine sandy loam, which is underlain at a depth of 12 to 20 inches by a light-gray, heavy, plastic clay, mottled with red and yellow. On better drained knolls, as a rule, the surface soil is shallower than elsewhere, the dominant subsoil color is yellow rather than gray, and the mottlings occur at lower depths. There are some variations in the surface soil, which ranges from a very fine sandy loam to a sandy loam, and others in the subsoil, which in places resembles that of the Augusta sandy loam. Spots of Myatt soils, too small to map, are also included.

The Leaf fine sandy loam is developed only on the terraces of the Savannah River between Augusta and Tahoma. It usually occurs on

¹ Waste from cotton gins.

the lower levels, below the Kalmia, Cahaba, and Amite soils. The land lies very flat and the natural drainage is poor, although better than that of the Myatt soils. Surface ditches have been dug to help carry off the rainfall.

Part of this type lies within the city of Augusta. Probably 85 per cent of the remainder is in cultivated fields. Cotton, corn, and oats are the principal crops. Some trucking is carried on near Augusta. Estimated yields, with the use of fertilizer, are about one-half bale of cotton, 15 bushels of corn, and 20 bushels of oats to the acre.

Complete commercial fertilizers are usually applied to cotton and corn, at the rate of 200 to 300 pounds per acre. Cotton seed and cotton-mill waste are used on some farms.

Land of this type lying near Augusta is held at high prices. The price of land several miles from town ranges from \$20 to \$40 an acre.

Next to drainage, the greatest need of this type is the addition of organic matter.

LEAF SILT LOAM.

The Leaf silt loam consists of a light-gray, smooth silt loam, 8 to 12 inches deep, underlain by light-gray, plastic, impervious clay, mottled with red and yellow. The soil often contains a relatively large proportion of very fine sand.

This type occurs in several areas along the New Savannah Road south of Augusta. It occupies the lower terraces and is very flat. The natural surface drainage is imperfect. Most fields are drained by surface ditches, but the impervious clay subsoil retards under-drainage and makes the type cold, wet, and late.

The Leaf silt loam is inextensive, but most of it is cleared for cultivation. Cotton and corn are the principal crops. Oats are grown on an apparently increasing acreage.

Where the clay subsoil lies close to the surface and in the wetter spots the cotton plants are small and the yield is correspondingly light, but where the surface soil is deep and the land has received careful cultivation and heavy fertilization a yield of one-half bale or more per acre may be obtained. The same conditions influence the yields of corn and oats. This soil clods badly and is hard to pulverize and keep in good tilth.

Owing to its location near Augusta and on well-improved roads, the price of land of this type is higher than its agricultural value would seem to warrant.

In addition to artificial drainage, the Leaf silt loam is badly in need of organic matter. It is probably better adapted to small grains and grasses than to intertilled crops, owing to the difficulty of cultivation.

MYATT SANDY LOAM.

The Myatt sandy loam consists of a gray to dark-gray, heavy sandy loam, passing at 8 to 12 inches into a light-gray sandy loam, which merges into a light-gray sandy clay loam or clay, mottled in places with brown or yellow. In a few places the surface soil is more silty than usual and the subsoil is somewhat plastic, resembling the subsoil of the Leaf series. Some very small areas of black sandy loam or loam soil are included with this type as mapped.

The Myatt sandy loam is developed mainly on the terraces of the Savannah River. It occurs also along the smaller creeks, but the areas here are mainly too small to map. The type usually lies at the foot of the uplands, where the terraces are lower than they are nearer the first bottoms. It is kept moist by springs and draws, which bring in rain water, and the drainage outlets are poor. Some ditches have been dug and stream channels straightened so that the type can be cultivated in ordinary seasons.

Much of this land has not been cleared of the original forest growth, consisting mainly of shortleaf pine, sweet gum, and water oak. About 40 per cent of it is now under cultivation. Corn and cotton are the principal crops. Oats have recently been grown to some extent. Under favorable moisture conditions cotton yields about one-fourth to one-half bale and corn about 15 bushels per acre. Oats sometimes yield 30 bushels or more per acre. The included patches of black soil produce from 30 to 50 bushels of corn per acre without fertilizer.

The Myatt sandy loam is a late soil, and it can not be plowed until well dried out. However, it stands dry seasons better than most of the other soils of the county, and farm land of this type is held at \$15 an acre.

More thorough drainage and the use of commercial fertilizer are the greatest needs of this type. In the lighter colored patches the incorporation of organic matter would also be beneficial.

AUGUSTA SANDY LOAM.

The Augusta sandy loam consists of a gray to yellowish-gray sandy loam or loamy sand, underlain by a salmon-colored, pinkish, or yellowish, smooth, silty to sandy clay, which may be mottled with red, gray, yellow, and brown.

A number of variations occur. There are numerous eroded spots, in which the subsoil is exposed at the surface. In such spots a friable, micaceous sandy loam is usually encountered below 30 inches. In places the surface soil is darker colored and deeper than usual. In a number of areas about the headwaters of Butler and Spirit Creeks the material approaches a coarse sandy loam in texture.

The type occupies terraces along streams. In some places these do not seem to be composed entirely of alluvium, and in a few instances beds of residual talcose and chlorite schists are found in the substratum. The principal areas of the type occur along Butler and Spirit Creeks and on some of the lower terraces of the Savannah River valley.

The surface in general is level, but is varied in places by knolls, sinks, draws, and gentle slopes toward the streams. Most areas have good natural surface drainage, but the subsoil is slightly impervious, and springs at the foot of hills keep some of the flat areas moist.

The Augusta sandy loam is an important type, especially in the sand-hill section. About 80 per cent of it is cleared for cultivation. Corn and cotton are the staple crops. An increasing area is devoted to oats. Cotton yields ordinarily one-half bale, corn 15 bushels, and oats 15 to 30 bushels per acre.

Many fields of this type have been improved by digging small surface ditches. The liberal use of "motes" and manures, and acreage applications of 200 to 300 pounds of fertilizer have been found profitable on cotton land.

On some of the narrower and more irregular terraces remote from towns land of this type is valued at about \$10 to \$15 an acre. In broad areas on the Savannah River terraces south of Augusta it is held at about \$50 an acre.

The Augusta sandy loam can be improved by artificial drainage and by the addition of organic matter and commercial fertilizer.

WICKHAM CLAY LOAM.

The Wickham clay loam consists of a red or chocolate-brown clay, underlain by a moderately stiff, red sandy clay or clay. In places there is a surface mantle, several inches deep, of heavy sandy loam. The substratum consists of layers of clay and sand and rests on bed-rock at a depth of 10 to 40 feet.

This type occurs in a strip of areas lying along the Savannah River above the mouth of Raes Creek. In general the topography is rather level, but in places there are undulations and ridges a few feet high. The type is naturally well drained except in a few small depressions.

Practically all of this type is farmed. It is naturally a strong soil. Cotton and corn are the principal crops. The former yields ordinarily about 1 bale and the latter 15 to 20 bushels per acre.

This type resembles the Cecil clay loam in appearance, and it is handled and fertilized in the same way. On account of its proximity to Augusta, this land is probably valued more highly than crop yields warrant.

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

Mechanical analyses of Wickham clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
254637.....	Soil.....	4.2	18.8	10.4	27.0	10.3	13.2	15.9
254638.....	Subsoil.....	4.0	15.0	8.0	19.4	7.8	11.4	34.4

CONGAREE FINE SANDY LOAM.

The Congaree fine sandy loam consists of a mellow, friable, reddish-brown fine sandy loam, about 10 inches deep, underlain by a friable clay loam of the same color. Near the Savannah River the surface soil is often 3 feet deep and coarser in texture than elsewhere, back from the river the soil merging gradually into the Congaree silt loam.

This type is developed mainly along the Savannah River in a more or less continuous strip from Raes Creek to Butler Creek. The greatest width of this strip is attained at the east boundary of Augusta, where it is nearly one-half mile wide. Farther down the river it becomes too narrow to show on the map. The type also occurs in a few isolated patches, such as Whites Mound, which were deposited when the river followed another course.

The type occupies the low natural levee formed by the deposition of the coarser sediments at times of overflow. It ranges in elevation from 25 feet above water level at Augusta to 10 or 15 feet farther south. The surface is level, though slightly furrowed by overflow channels.

This type is naturally well drained. At Augusta overflows have occurred about once in 20 years, but a levee now protects the city and part of the farming land for some distance south. The fine sandy loam has the highest level among the Congaree soils.

All of this type not included in the city of Augusta is farmed. The principal field crops are corn, oats, hay, and cotton. Truck crops are grown near Augusta. The soil is considered almost ideal for corn, producing ordinarily more than 40 bushels and occasionally more than 80 bushels per acre. Oats yield from 40 to 50 bushels per acre. Grass land generally yields several cuttings of about 1 ton of hay each. The first cuttings consist largely of vetch, while the subsequent ones are composed mainly of Johnson grass. This hay brings about \$15 a ton at Augusta. Cotton makes a better growth on this type than on other Congaree soils and ordinarily yields more than three-fourths bale per acre.

Practically no fertilizer is used on this soil as it is enriched from time to time by fresh sediments from the river.

The price of land of this type ranges from \$40 to more than \$150 an acre, the higher prices prevailing near Augusta.

CONGAREE SILT LOAM.

The Congaree silt loam consists of a friable, reddish or chocolate-brown silt loam, passing gradually into a friable to moderately plastic silty clay loam or silty clay. The color changes little with depth. In places where this type adjoins the sandy Congaree soil it approaches a very fine sandy loam in texture. In other places it merges gradually into the silty clay loam.

This type is developed around or near most of the bends of the Savannah River from Augusta to Tahoma. The largest area lies in and immediately south of Augusta. There are only a few areas below Tahoma and in the interior of the Savannah swamps.

The surface is very flat, except for slight furrows and channels cut by overflow waters. There is a gentle slope from the river. Except where overflowed by the Savannah River, the type has good natural drainage.

The Congaree silt loam is the most important of the alluvial soils, although not so extensive as the Congaree silty clay loam. Probably 80 per cent of the type is now under cultivation, only the lower lying and heavier land being in forest.

The principal crops are corn, hay, and oats. Cotton is seldom planted, as it makes a rank growth of stalk at the expense of bolls. The soil is particularly well suited to the production of corn, and the yields of this crop, as well as of hay and oats, equal or surpass those on the Congaree fine sandy loam. Fertilizers are little used.

Where not protected by levees, crops are liable to injury by floods, especially in the autumn, so that it is often necessary to gather the corn before all of it has matured. Farm land of this type is valued at \$50 to \$100 an acre.

CONGAREE SILTY CLAY LOAM.

The Congaree silty clay loam consists of a reddish or chocolate-brown silty clay loam, passing at a depth of about 10 to 16 inches into a bright chocolate brown silty clay. There is in many places a remarkable uniformity in both color and texture throughout the soil section. In lower situations where this type grades into Swamp the subsoil becomes more or less mottled with grayish brown or gray. The structure is semiplastic.

This type occupies the greater part of the first bottoms of the Savannah River. It occurs in a broad, continuous area from Au-

gusta to a point south of the county line, but gives way largely to lighter types in the immediate vicinity of Augusta. It includes the lowest bottoms, which are generally flat, but locally cut up by old stream channels. The type has poor drainage outlets and is overflowed by backwater from the river when the lighter Congaree soils are still unflooded. High-water marks can be seen at a height of 6 or 8 feet on the trees. Most of the type is in forest, but there are evidences that part of the forested area was cultivated prior to the Civil War. Near McBean Creek the trees consist mainly of water oak and gum, with cypress and tupelo in the sloughs. There is usually a heavy undergrowth of cane, vines, and palmetto. Part of the type near Augusta is farmed, and additional land will be cultivable when the levee is completed. Practically none of the type is farmed below the Tobacco Road, and the bottoms near McBean Creek are uninhabited.

Corn, hay, and oats are the only crops grown. When not injured by high water, corn yields 40 to 80 bushels per acre and oats almost as much. Hay land is mowed several times in a season, and yields a total of 3 to 5 tons per acre. The hay is usually baled and stored in barns out of reach of overflow. Cattle and hogs are pastured in the woods. No fertilizer is used on this type.

Farm land of the Congaree silty clay loam is worth as much as that of the silt loam, but the remote, uncleared areas have little value other than for timber. If diked, drained, and reclaimed, this type would be especially well suited to the production of corn or for use as pasture land. It is naturally a grass soil.

MEADOW.

Along most of the small streams of the county there are areas of rather dark colored alluvial soil, which is not differentiated into types. This material is mapped as Meadow. It includes soil of all textures, derived largely from Coastal Plain uplands. Along Raes and Rocky Creeks there is some admixture of Piedmont material. A few of the areas are mucky. The Meadow is subject to overflows, especially in winter, but may become comparatively dry in summer.

It is said that some of this land was cultivated prior to the Civil War, but none of it is farmed at present. In places it supports a valuable growth of swamp pine, gum, and poplar. If cleared, this land would afford excellent pasturage for cattle during the summer months.

SWAMP.

As mapped along the smaller streams of the county the material classed as Swamp is almost identical with Meadow, but differs in being inundated or in a wet condition most of the time.

In the Savannah bottoms the soil is a gray or drab, heavy silty clay. There is usually a heavy growth of cypress and tupelo. The land is inundated most of the year and when floods occur is covered with water to a depth of 10 to 15 feet. It also receives run-off from the adjacent Congaree soils and from various upland areas.

ROUGH BROKEN LAND.

Areas too rough for agricultural use are mapped as Rough broken land. These are very inextensive in Richmond County. Some of the areas are bare, perpendicular cliffs, while others consist of steep, gullied slopes, which may be sparsely forested with pine and scrub oak.

SUMMARY.

Richmond County is situated in the northeastern part of Georgia. It comprises an area of 316 square miles, or 202,240 acres. Most of the county lies in the Coastal Plain province, but the northern corner is in the Piedmont Plateau. Alluvial flood plains and terraces are extensively developed along the Savannah River, which borders the county on the east.

The Coastal Plain and Piedmont Plateau sections are well dissected by streams and draws, but areas of table-land occur near Blythe and Edie. The bottom lands are flat but fairly well drained, except for the flood plains of the small streams and the Swamp areas along the Savannah River. There are few areas in the county too rough for cultivation. Elevations range from about 100 feet above sea level near the mouth of McBean Creek to nearly 400 feet on the hills northwest of Augusta.

Augusta, with a population in 1910 of 41,040, is the county seat and the only large town in the county. Summerville, which in 1910 had a population of 4,361, is now incorporated in Augusta. Augusta is an important cotton market and manufacturing, trading, and railroad center. The population classed as rural numbered 13,485.

Richmond County has a mild winter climate, which permits truck growing in that season and attracts large numbers of northern tourists to Augusta. The mean annual temperature is 63.6° F. The winter mean is 47.3° and the summer mean 79.2° F. The average annual rainfall of 46.94 inches is well distributed.

Cotton and corn are the principal crops. Other important crops are oats, cowpeas, and vegetables. Very little attention is paid to stock raising.

In 1910 there were 1,344 farms in Richmond County, averaging 107.7 acres in size, of which 53.6 acres were improved.

There was an expenditure of \$101,585 for fertilizer in 1910, or an average of \$101.18 for each of the 1,004 farms reporting its use.

The price of land ranges from a nominal sum for the sand-hill and Swamp areas to over \$200 an acre for the rich alluvial lands near Augusta.

The soils of Richmond County are grouped in three soil provinces—the Coastal Plain, the Piedmont Plateau, and the River Flood Plains, the last including overflowed and nonoverflowed alluvial soils along streams. In all, 16 series of soils, including 27 types and 2 phases of types, in addition to Meadow, Swamp, and Rough broken land, are mapped in Richmond County.

The soils of the Coastal Plain are included in the Norfolk, Orangeburg, Ruston, Greenville, and Hoffman series; those of the Piedmont Plateau in the Appling, Cecil, and Iredell series; and those of the River Flood Plains in the Congaree, Kalmia, Cahaba, Amite, Leaf, Myatt, Augusta, and Wickham series. Areas subject to frequent overflows, occurring along most of the small streams, are mapped as Meadow. Swamp is almost identical with Meadow, except that it remains inundated or wet most of the time. Rough broken land represents areas too rough for agricultural use.

The Norfolk coarse sand, sand, and fine sand are droughty and rather thin soils. The sandhill phase of the Norfolk sand is the most extensive, but the least used, soil in the county. The Norfolk coarse sandy loam is relatively inextensive, but a large proportion of it is farmed. The Norfolk sandy loam is one of the most extensive of the better soils of the county, and most of it is cleared and cultivated.

The Ruston sand is not extensive, but it is more generally farmed than the other deep sands. The Ruston sandy loam, though not extensive, ranks among the better soils of the county and is largely used for farming.

The Orangeburg sandy loam is one of the more extensive soil types, and most of it is under cultivation. It is one of the better cotton soils in the county.

The Greenville loamy sand and sandy loam, though inextensive, are largely under cultivation, and are used for the production of cotton and corn.

The Hoffman coarse sandy loam and sandy loam are poorer soils than the Norfolk sandy loam, but they are largely cultivated.

The Cecil sandy loam occurs in small areas in the northern corner of the county. All the smoother areas are cultivated. The Cecil clay loam is the strong so-called "red-clay" land of the Piedmont section. It occurs principally on the slopes in the vicinity of Raes Creek. All of it is under cultivation.

The Appling sandy loam is confined mainly to the northwestern corner of the county. It is the most extensive of the Piedmont soils.

The soil is naturally well drained, and about 60 per cent of it is cultivated.

The Iredell loam is developed mainly along the lower slopes of Raes Creek valley. It is a rather cold soil, and about half of it is in forest. At present cotton, corn, oats, and cowpeas are practically the only crops grown on this soil.

The Wickham clay loam is a strong, well-drained, second-bottom soil. It produces good yields of cotton and corn.

The Kalmia sandy loam is developed mainly in one large area extending south from Augusta to Butler Creek. It is one of the most important soils of Richmond County, and about 90 per cent of it is cultivated. Cotton, corn, and oats are the principal crops. Many of the truck farms which supply Augusta with vegetables are located on this type.

The Amite loam is a terrace soil occurring in only four areas. It is largely used for the production of cotton.

The Myatt sandy loam is developed mainly on the terraces of the Savannah River valley. It is naturally poorly drained, and only about 40 per cent of it is under cultivation.

The Augusta sandy loam is most extensively developed along the creeks of the sand-hill section and on the Savannah River terraces. It lies well for farming and produces good yields of corn, cotton, and oats when well fertilized.

The Leaf fine sandy loam and silt loam are characterized by an impervious, plastic clay subsoil. Where drained and fertilized they give fair yields of corn and cotton. The silt loam is difficult to cultivate.

The Cahaba fine sandy loam is a well-drained terrace soil occurring in the vicinity of Augusta, most of it within the city limits. Good yields of cotton and corn are obtained on this soil.

The Congaree fine sandy loam is developed mainly along the Savannah River from Raes Creek to Butler Creek. It is naturally well drained and is considered an ideal corn soil. The Congaree silt loam is the most important of the alluvial soils, though not so extensive as the silty clay loam. Where not protected by levees, crops are liable to injury by floods. The Congaree silty clay loam occupies the greater part of the first bottoms of the Savannah River. It is poorly drained and is subject to overflow. Most of the type is in forest.

[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.]

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