

# SOIL SURVEY OF COBB COUNTY, GEORGIA.

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## LOCATION AND BOUNDARIES OF THE AREA.

Cobb County lies in the northwestern portion of middle Georgia, between  $33^{\circ} 44'$  and  $34^{\circ} 6'$  west longitude, and  $84^{\circ} 8'$  and  $84^{\circ} 45'$  north latitude. It is bounded on the north by a portion of Bartow and Cherokee counties; on the east by a section of Milton County and the Chattahoochee River; on the south by the Chattahoochee River and

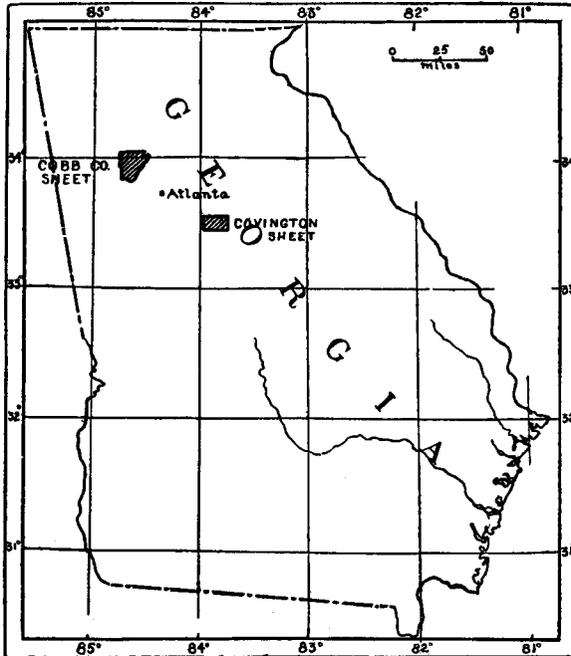


FIG. 9.—Sketch map showing areas surveyed in Georgia.

Douglas County; and on the west by Paulding County. Marietta, the county seat, is 18 miles northwest of Atlanta. (See fig. 9.)

## HISTORY.

Cobb County was formed from Cherokee County in 1832, while the area was still occupied by the Cherokee Indians.

This tribe held possession of all the northwestern portion of the State, and it was with great difficulty that they were induced to relin-

quish their claims. After many futile attempts to arrange a settlement a treaty was ratified by which the Government of the United States agreed to purchase the territory occupied by these Indians (the price being \$3,000,000) and to provide for their emigration to the West. In the year 1838 the transfer of the tribes to their Western reservation was accomplished, and the whites took possession of the land, which was distributed by lottery, as was usual in opening up new territory.

This marks the beginning of the agricultural industry of this portion of Georgia, though some little advance had been made by the semicivilized Indians and the whites living among them.

In 1850 the best lands along the Chattahoochee River were worth \$20 an acre, while the small creek bottoms brought about \$8, and lands in the uplands varied from \$1 to \$8. There has been practically no change in value since. At that time the county had a population of 11,568, exclusive of slaves, of whom there were over 2,000. The total valuation of real estate was \$1,881,269. In 1890 the total value of real estate and improvements was \$4,688,610, while the value of farm lands and improvements alone amounted to \$2,058,610. The Twelfth Census returns the population as 24,664.

CLIMATE.

The climate of Cobb County is shown by the following tables, compiled from records of the Weather Bureau, climate and crop service, Georgia section. The records given are from Atlanta, as the normals from that station are the most reliable obtainable.

The first table shows the normal monthly and annual temperature and precipitation, while the second gives the dates of killing frosts.

*Normal monthly and annual temperature and precipitation for Cobb County, Ga.*

Month.	Atlanta.		Month.	Atlanta.	
	Temperature.	Precipitation.		Temperature.	Precipitation.
	°F.	Inches.		°F.	Inches.
January .....	42.6	5.47	August .....	76.1	4.56
February .....	46.2	4.94	September.....	71.0	3.61
March .....	51.5	5.78	October.....	60.3	2.24
April .....	60.9	3.72	November.....	53.0	3.52
May.....	69.8	3.09	December.....	44.2	4.30
June.....	75.0	4.49	Normal annual.....	60.7	50.67
July.....	77.8	4.95			

*Dates of killing frosts.*

	Spring.		Fall.	
	Latest.	Average date.	Earliest.	Average date.
Atlanta .....	Apr. 24, 1893	Mar. 28	Oct. 16, 1893	Nov. 4
Marietta .....	.....do.....	Apr. 1	Oct. 19, 1896	Nov. 1

## PHYSIOGRAPHY AND GEOLOGY.

Cobb County lies entirely in the Piedmont Plateau, and its topography is of a rough, rolling character. The physical features present a hill and dale aspect, which is the result of powerful stream erosion.

The general elevation above sea level is about 1,000 feet, although there are four hills or mountains (Lost, Black Jack, Kenesaw, and Sweat mountains), which reach an elevation of from 1,500 to 1,700 feet.

The county has two separate drainage systems, one being northerly and the other southerly. The divide extends from northeast of Sandy Plains to Marietta, having a northeast-southwest trend. To the south the drainage is east and southeast into the Chattahoochee River—which upon entering Florida is known as the Apalachicola—and thence into Apalachicola Bay. To the north drainage is by way of Alatoona and Noonday creeks. The Alatoona, which flows north, empties into the Etowah River, which flows west to its junction with the Oostanaula River at Rome. Noonday Creek, which flows north, also empties into the Etowah River.

The area lies on the Piedmont Plateau, which is the relic of an ancient mountain range. This range is generally supposed to have been weathered to base level and then reelevated as a plateau. How many times such elevation and reduction has taken place is not known, but it is believed that it has occurred more than once. The rough features of the topography show the great erosive power of stream action since elevation. There are in the area four hills which have an altitude of from 500 to 700 feet above the general level of the plateau. They are known as monadnocks, being composed of varieties of rock more resistant to erosion than those usually occurring in the Piedmont Plateau, and thus having withstood weathering longer than other portions of the area.

## SOILS.

But three soil types, exclusive of the Meadow, were found in the area, the relative extents of which are shown in the following table:

*Areas of different soils.*

Soil.	Acres.	Per cent.
Cecil clay .....	166,130	74.9
Meadow .....	30,280	13.7
Cecil sandy loam .....	23,170	10.5
Herndon stony loam.....	2,020	.9
Total.....	221,600	.....

## CECIL CLAY.

The Cecil clay occupies three-fourths of the whole area of the county, and is characterized by rough, heavy, rolling topography.

It is locally known either as the "red" or "mulatto land." The soil to a depth of 10 inches is a heavy loam, underlain by stiff, tenacious red clay.

In this area there are two phases of this type. The principal phase is a stiff, tenacious red clay usually covered with a thin layer, 2 to 6 inches in depth, of gray sandy loam. The soil usually has more or less red quartzite scattered over the surface. This phase occurs throughout the whole area, usually occupying prominent ridges or hillsides. The other is a yellowish sandy loam, containing considerable mica and having a depth of about 5 inches, beneath which is a rather brilliant red micaceous subsoil of a heavy, tenacious character. This phase occurs along the Chattahoochee River and its branches east, southeast, and south of Marietta. This soil is derived from the weathering of mica schist, and the surface is commonly strewn with schist and quartz fragments.

In the more recent road cuts sections of the rocks from which these soils are derived are exposed. In many, or in fact most places, the rocks are thoroughly weathered, leaving only the massive red clay. Throughout this clay are frequently seen vertical outcrops of quartz of all widths. These outcrops mark veins or intrusions that existed in the rocks from which the clay is derived. When the rocks are exposed they give evidence of flow or former stratification, although they have been so greatly changed that such original characteristics are almost obliterated.

Where the soils are derived from gabbro the surface is generally strewn with small, rounded fragments of a rusty-brown color, resembling slag from a furnace.

The following table shows the texture of soils and subsoils of this type:

*Mechanical analyses of Cecil clay.*

[Fine earth.]

No.	Locality.	Description.	Soluble salts, as determined in mechanical analysis.		Organic matter and combined water.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	P. ct.								
6223	½ mile S. of Lost Mountain.	Loam, 0 to 10 inches.	0.01	6.30	2.94	5.30	4.60	23.92	14.26	25.14	17.15	
6219	Vinings Station..	Loam, 0 to 5 inches.	.01	5.26	4.02	6.86	8.46	22.62	10.58	23.34	18.43	
6221	Mableton .....	Heavy red loam, 0 to 12 inches.	.01	11.40	1.86	2.90	2.00	11.64	10.00	34.64	25.41	
6222	Subsoil of 6221 .....	12 to 36 inches. ....	.....	10.48	1.48	1.24	1.16	5.44	9.02	28.54	42.82	
6220	Subsoil of 6219 .....	Tenacious red clay, 5 to 36 inches.	.01	8.86	3.08	6.14	5.80	13.08	3.86	15.60	43.91	
6224	Subsoil of 6223 .....	Tenacious red clay, 10 to 36 inches.	.01	9.70	1.54	2.08	1.56	10.50	6.94	23.18	44.69	

The Cecil clay is recognized as one of the best soils for general agricultural purposes, though upon this as upon the other soils of the area cotton is the crop chiefly grown. The yield of seed cotton is variable, depending largely upon the season and condition of the soil and ranging from 800 to 1,000 pounds to the acre. Corn yields from 8 to 20 bushels, and wheat averages 10 bushels to the acre. Where it receives proper cultivation and care this soil produces twice the above yields.

The Cecil clay is admirably adapted to dairy farming, which as yet is little developed in the area. The long season for pasturage and the ready production of forage crops are both favorable to the extension of the industry, the one opposing factor being the long summer drought, which tends to kill out the grasses. Bermuda grass, however, grows luxuriantly here and has great value as a pasture grass. It is nutritious and will withstand the tramping of stock. It responds readily to fertilization and yields as high as 3 tons of hay to the acre. This grass is usually started here by planting cuttings of old sod in shallow furrows in the early spring months, care being taken that the cuttings are not dry. It takes time to get a field into a good sod of this grass, but when once thoroughly entrenched it is practically permanent. Bermuda grass, however, is a summer variety, dying down at the approach of winter and springing up again the following season, and it is customary to plant orchard grass, which makes a splendid winter pasturage, in connection with it. It has been recommended in Farmers' Bulletin No. 20 as a preventive of the washing of hillsides.

The production of millet is an important item of the agriculture of this part of the South. The product is thought to be as good as, or even better than, corn for ensilage, while by some it is preferred to sorghum for that purpose. Sorghum is also grown for forage and for making sirup. The quality of the product of this type of soil is not so good as that made from the cane grown upon Cecil sandy loam or upon the sandy bottoms. The amount of cane produced to the acre depends upon the season and soil condition. The yield of sirup will vary from 50 to 200 gallons per acre. In 1901 the sirup sold for 50 cents a gallon.

The climate and soils of the county seem well adapted to peach culture, and the industry is rapidly growing. The Elberta is the variety chiefly grown, as it has been found generally to be the best adapted to the soils of the area. The fruit grows much larger, is a better shipper, and has a better quality on the Cecil clay than upon the sandy loam, though the yield is not so large as on the latter soil.

There is a large and profitable field for peach culture on this soil type, but in order to insure success planters must adopt and follow the advanced methods employed in other commercial areas.

The Cecil clay is subjected to very severe denudation from the excessive washing of the spring rains. The micaceous phase suffers

most from this cause, but whether this is due to the presence of mica in the soil or to the position of these soils is not at present known.

CECIL SANDY LOAM.

In Cobb County the Cecil sandy loam occupies the level upland areas, the crests of the largest ridges, and the summits of the higher hills.

The soil is usually a gray or yellowish sandy loam, having a depth of from 12 to 15 inches, underlain by stiff, tenacious red or yellow clay. The surface of the soil is usually free from stone, though oftentimes quartz fragments occur in the subsoil.

Cotton is the crop grown most extensively on this type, although the average yield is very low, being about one-third bale per acre. In exceptional seasons, however, and upon land in especially good culture a yield of 1,000 pounds of seed cotton to the acre has been obtained.

The cotton produced on this soil has a shorter staple than that grown on the Cecil clay, while, where the soil has been heavily manured, there is a tendency to run to weed. Farmers much prefer to work the Cecil sandy loam, as it is not so heavy as the Cecil clay, and with the same effort a larger area can be brought under cultivation.

The soil is well adapted to the production of sweet potatoes. There are instances where 100 bushels of potatoes have been raised to the acre, even when the land was in very poor condition, having suffered depletion through continuous cotton cultivation. The growing of sorghum for sirup is a prominent item in the agricultural industry of the section. The sirup produced on the Cecil sandy loam is of a superior quality to that grown on the other soils of the county, the percentage of sugar in the cane being much higher and the sirup being of finer color.

As yet there are very few peaches produced upon this soil, although the conditions seem to indicate that they would do remarkably well. Where they have been grown they do not have the brilliant color of the peach grown on the clay, although the yields are somewhat larger.

The Cecil sandy loam, owing to its usual situation upon the level uplands, is not so much damaged by washing as is the Cecil clay. The area, however, about 2 miles west of Acworth, suffers considerably. The advantage of terracing in that locality can not be overestimated.

Mechanical analyses of this soil and subsoil are given in the subjoined table:

*Mechanical analyses of Cecil sandy loam.*

No.	Locality.	Description.	Soluble salts, as determined in mechanical analysis.	Organic matter and combined water.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.
6227	Sandy plains .....	Sandy soil, 0 to 12 inches.	0.1	2.02	2.58	10.02	11.18	30.44	14.58	20.94	7.99
6225	2 miles W. of Upshaw.	Sandy soil, 0 to 15 inches.	.1	4.38	2.46	9.26	11.90	26.50	6.60	27.44	11.37
6228	Subsoil of 6227.....	Red clay, 12 to 36 inches.	.....	6.76	2.92	7.88	6.68	19.92	6.48	14.98	34.50
6226	Subsoil of 6225.....	Yellow clay, 15 to 30 inches.	.....	6.62	1.82	5.98	7.70	15.86	5.48	19.40	36.54

HERNDON STONY LOAM.

The Herndon stony loam has only limited representation in Cobb County, occurring in three phases, and in three isolated and comparatively small areas on the summits and slopes of Sweat, Kenesaw, and Black Jack mountains. These mountains rise from 1,500 to 1,700 feet above sea level, and from 500 to 700 feet above the mean elevation of the general plateau.

The soil of the Kenesaw loam phase is a reddish-brown sandy loam to a depth of 12 inches, underlain by a gritty red clay. It is of medium to sandy texture, and many of the smaller particles are cemented together with iron. This type is derived from a gabbro which outcrops in many parts of the mountain, particularly on the summits and northern slopes of Big and Little Kenesaw mountains. The mountain is generally forested, chiefly by chestnut, oak, and hickory.

The eastern slope has been terraced and set out to vineyards and peach orchards. The production of peaches here has not been large, but the fruit is said to be fine.

The phase on Sweat Mountain is a yellowish-green sandy loam of a medium to fine sandy texture, underlain by the same material. The soil contains considerable quantities of mica, which is of a yellowish color. The surface is strewn with fragments of a micaceous quartzite of all sizes and shapes.

None of this soil is under cultivation, the slopes being very steep and the rock outcropping so frequently as to make it of little or no agricultural value.

The Black Jack phase of the Herndon stony loam is a medium to coarse gray sandy soil, containing many sharp particles of rock, and having its surface strewn with fragments of gray quartzite. The subsoil is of the same material as the soil.

Along the steeper slopes of the mountain there are many outcroppings of red or yellow clay or sticky, sandy loam. The quartzite also outcrops in many places and forms one of the chief obstacles to cultivation of the soil. Little or none of the area is at present farmed, although it would seem to be well adapted to apple culture both by character and position.

The following table shows the texture of the fine earth of the Kenesaw phase of Herndon stony loam:

*Mechanical analyses of Herndon stony loam, Kenesaw phase.*

[Fine earth.]

No.	Locality.	Description.	Soluble salts, as determined in mechanical analysis.		Organic matter and combined water.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	P. ct.								
6229	Kenesaw Mountain.	Sandy soil, 0 to 7 inches.	0.01	10.64	10.50	11.44	7.94	16.76	8.06	23.14	12.01	
6230	Subsoil of 6229....	Clay, 7 to 40 inches	.01	9.70	10.12	11.54	8.68	18.22	5.98	19.44	16.71	

#### MEADOW.

Meadow is the term used to indicate low-lying, bottom lands, which are usually in a poorly drained condition or subject to occasional overflow of streams and rivers. In Cobb County the meadows border the larger streams and the Chattahoochee River.

The term Meadow is not restricted to any definite soil texture, for these bottom lands may be a sand or clay, or a composite of both. In this section the heavy rains of the spring and winter seasons carry considerable of the surface soil to the streams and valleys below, much of which material is redeposited by the streams during the annual overflow. Most of the bottom lands are quite flat.

When the season is favorable the Meadow is the most productive land of the area. For cotton, however, the bottoms are not suitable, being usually so moist that the plants have a tendency to run to weed. The crops most frequently grown are corn, sorghum, wheat, and grass.

The production of wheat is uncertain, but when a crop is made the yield varies from 10 to 30 bushels to the acre. Corn has been known

to produce 35 bushels to the acre. The production of sorghum is most successful, and enough cane has been produced on an acre of Meadow to make 120 gallons of sirup. The growing of cane for this purpose promises to become an important industry of this section. The great value of the cane itself as a feed for dairy and other cattle is well known.

The growing of grass upon these bottoms is very uncertain, although in favorable seasons they produce large yields of hay.

#### AGRICULTURAL CONDITIONS.

As before mentioned, the Cecil clay occupies a large proportion of the county. One of the most noticeable features of this type is the many outcrops of red clay, which are found on nearly every hill. These scalds or bare spots are gullied and furrowed by the excessive wash of the spring rains. The rough, rolling features of the land surface and the impervious nature of the clay afford every facility for transportation of soil material, which is carried to the valleys and meadows below, where it is known as the "made lands."

Little thought is given to the great length of time necessary for this soil coating to form. It is careless and extravagant in the extreme to allow it to be so preyed upon by the destructive rains of early spring.

Soil washing is one of the most important problems to be met in the agriculture of the area. As a hindrance to the productivity of the country it affects the vital interests of the community. Sidehill cultivation and terracing has only been practiced in this section for about five years, but it has already resulted in improved conditions, and much further good will follow in the future. Greater care should be exercised in the surface drainage of these slopes. At present many of the terraces and sidehill ditches are nothing more than dams for surface water. As a consequence the water often overflows or breaks through these dams and causes more damage than if the hillsides were unprotected. Some method of draining the surplus water from each terrace is necessary. Tile drains are rather expensive, but shallow drainage ditches, sodded with grass, are both inexpensive and effective. The sod should remain from year to year and not be subjected to cultivation. These drainage ways could run down the slopes, where the incline is not too steep, but the preferable way would be to run the drains around the hills with just enough fall to carry off the water. In many places where terracing has been attempted the terraces and ditches do not occur at as frequent intervals as they should.

The consequence of this excessive wash is gradual abandonment of the soils most subjected to it, and many such gullied and abandoned fields can be seen in the area. These are usually occupied by a scattered growth of scrub pine, which is the only vegetation that seems to show an affinity for the washed areas.

The Cecil sandy loam does not suffer to any appreciable extent from washing, although there are places where sidehill cultivation would be most beneficial.

The deficiency of organic matter in the soils of this area does not receive the attention it deserves. In the growing of general farm crops a deficiency so marked would be indeed serious, but since cotton is the staple crop, it is not quite so important a factor. In fact, it is the clean and shallow culture which this crop requires that is responsible for the existing condition of the soil with respect to humus, and, moreover, an increased amount of organic matter in the soil is even prejudicial to the production of lint. Therefore so long as cotton remains the staple there seems little likelihood of much general improvement in the soils. However, with the incorporation of organic matter, the soil would be in better condition to withstand the wash of the rains.

The meadows or bottom lands contain much more organic matter than the soils of the uplands, as the vegetation which accumulates along the stream courses is distributed on the bottoms and incorporated with the sediments from floods and the wash from the upland valleys.

There is little general agriculture practiced in the county, and the principal methods of cultivation resolve themselves into cotton culture. The cotton is sometimes followed in the fall by wheat. The old cotton stalks are broken down by many rough devices, although sometimes a stalk cutter is used. The land is usually plowed by a one-horse turn plow, followed sometimes by a cutaway disk harrow. Sometimes, however, a scooter plow is used to open up the old cotton ridges, after which the winter wheat is sown. The soil is plowed to a depth of about 5 inches and furrows are thrown up on each side. This gives a good seed bed, but it is doubtful if the crop resists drought as well as it does where level culture with deep plowing is followed.

The time of planting cotton is not usually later than the 10th of April. It takes about ten days for the seed to germinate, while in about two weeks more the plants show in the row. When the soil is free from weeds and grass a cultivator or harrow is used between the rows, but where much vegetation occurs a scooter plow with sweep or wing attachment is used.

The shallow and frequent cultivation which cotton receives is doing much to make the soils deteriorate. Especially for general farm purposes the soils should be gradually deepened each year, not more than an inch of the subsoil being exposed during the season, as the bringing up of much more than this would temporarily impair the productiveness of the soils. Considerable time would have to elapse before the subsoil would weather enough to provide sufficient nutrition for crop production.

In the description of the Cecil clay reference was made to its sandy and micaceous phases. These differences, although so apparent now, with deeper plowing and proper cultivation would largely disappear, and the soil would then approximate closely the Cecil clay, so well typified in the red lands near Kenesaw and Lost mountains. There would be slight difference in composition, but the physical characteristics would be about the same.

The annual expenditure in Cobb County for commercial fertilizer is estimated at about \$50,000. The cost per acre is about \$2, and the quantity applied per acre about 200 pounds. Only about 50 per cent of the land of the area is under cultivation. The labor of this section is considered unreliable and unsatisfactory. Wages are very low, however, and this possibly has considerable to do with the kind and character of labor available. Laborers can earn better wages in the neighboring cities, and the better class is attracted thither.

The growers are somewhat at the mercy of the cotton buyers, as they make no combined effort to control the amount of cotton produced or to regulate the marketing of the product. As soon as the cotton is baled it is marketed. With associations the planters would keep in close touch with the market and be able to an appreciable extent to control the price of their own products. Most of the cotton produced by the tenants is sold to defray the expense of making the crop, and the net returns are so small as to keep this class poor.

The markets for cotton are the railroad stations of the area. The county is traversed by several railroads, presenting fair facilities for transportation.

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