

SOIL SURVEY OF CHATHAM COUNTY, GEORGIA.

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DESCRIPTION OF THE AREA.

Chatham County is the most eastern county in Georgia. It is bounded on the northeast by the Savannah River (South Carolina State line), on the northwest by Effingham County, on the southeast by the Atlantic Ocean, and on the southwest by Bryan County. It is rectangular in shape, 28 miles in length, and averages about 18 miles in width, and has an area of 427 square miles or 273,280 acres. The surface configuration is generally level to gently rolling, with many low sand ridges crossing the county parallel to the coast, broken by drainage ways. In the western part of the county many large, flat, poorly drained areas are found, and the ridges of sand have a tendency to run parallel to the stream courses. The highest point in the county, Cherokee Hill, on the Augusta road, is 54 feet above mean low tide.

The regional drainage is performed by the Savannah and Ogeechee systems. The northern part of the area drains into the Savannah River through Augustine and Black Creeks and Pipe Makers Canal. On the west side of the county the drainage runs into the Ogeechee River, mainly through the Little Ogeechee River. The central part of the county is drained largely by canals into numerous salt creeks. The tide-water country is traversed by a network of tidal streams.

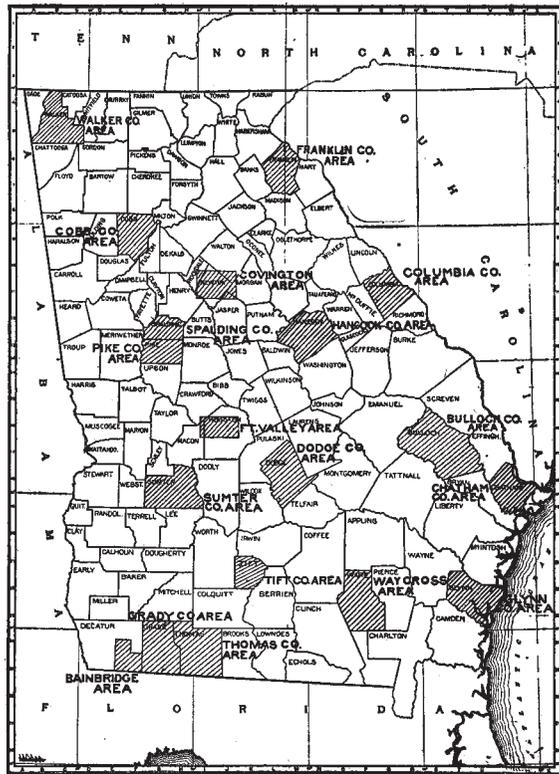


FIG. 12.—Sketch map showing areas surveyed in Georgia.

Savannah was settled in 1733 by a colony of English under James Oglethorp. They were soon joined by a few Germans, Jews, French, and Scotch Highlanders. Later immigration consisted mostly of English and Scotch-Irish. The present population of Chatham County, according to the Thirteenth Census, is 79,690.

Most of the white population is found in Savannah and the suburban districts, while the country districts are largely populated by negroes. Especially is this true of the country bordering the salt streams and tidal marshes. Savannah is the principal city of the county, with a population of 65,064, according to the Thirteenth Census. It is situated on a bluff 40 feet above the Savannah River and 18 miles from the ocean. It is the largest port on the South Atlantic coast, and exports large quantities of naval stores, lumber, cotton, and cotton products.

Pooler, a small town about 8 miles from Savannah, on the Central of Georgia Railway, is the center of a flourishing lumber and brick industry. Monteith, Meinhard, and Keller are stations on the Atlantic Coast Line, Seaboard Air Line, and Brinson Railways, respectively, and are situated in the northwest corner of the county in a prosperous trucking section.

The county is well supplied with transportation facilities. Both the Seaboard Air Line and the Atlantic Coast Line have trunk lines, giving direct connections with the northern markets. These roads also extend south to Jacksonville and other Florida points. Both the Central of Georgia and the Seaboard Air Line penetrate many States to the west, the first-named road connecting with the Illinois Central system. Two short roads, the Brinson Railway and the Tybee Division of the Central of Georgia, open up a small territory and furnish direct communication with Savannah. There is a considerable mileage of interurban street railway extending into the country. The county has over 100 miles of improved roads, consisting of shell and of sand-clay roads.

The coast country is supplied with many deep channels that are navigable even during low tide, and the Savannah and Ogeechee Rivers are navigable for small craft. Transportation facilities are excellent and rates favorable for truckers, who find a ready market in Savannah for their products the year round. New York, Philadelphia, Baltimore, and Boston are important markets for products shipped from Savannah.

CLIMATE.

Chatham County has unusually mild winters, the mean temperature being 52° F. for December, January, and February, and the absolute minimum being 8° F. With the Gulf Stream only 50 miles off the coast and the county bordered by water on three sides and

traversed by numerous inlets, the winter is greatly modified, but the high relative humidity renders the cold spells very disagreeable. The summers are hot, but not excessively so, as sea breezes keep the air constantly in motion and prevent sultriness.

The annual rainfall of about 50 inches is evenly distributed throughout the year, the heaviest precipitation occurring during June, July, and August.

The truck growers consider truck crops safe from killing frost after April 10. The date of the latest killing frost in Savannah is April 5. The average date is much earlier, February 26. The average date of the first killing frost of fall is November 1. The average growing period is thus 10 months, giving a season sufficiently long to enable the production of several crops upon the same land in a single year.

The temperature in the northwestern part of the county is usually about 2° lower than at Savannah, making the season slightly later and the danger from killing frost slightly greater.

The following table gives the normal monthly, seasonal, and annual temperature and precipitation at Savannah:

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

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.....	52	80	12	3.2	1.0	5.5
January.....	51	80	12	3.1	3.6	6.4
February.....	54	84	8	3.3	4.2	3.1
Winter.....	52			9.6	8.8	15.0
March.....	59	88	24	3.7	2.3	3.1
April.....	66	90	33	3.3	1.9	1.1
May.....	74	101	44	2.8	2.7	4.0
Spring.....	66			9.8	6.9	8.2
June.....	79	100	50	6.1	6.8	8.1
July.....	82	105	63	5.8	3.7	7.9
August.....	81	102	61	7.9	6.4	14.4
Summer.....	81			19.8	16.9	30.4
September.....	76	97	46	5.7	2.1	12.0
October.....	67	92	37	3.7	1.0	7.7
November.....	58	83	22	2.4	1.0	0.6
Fall.....	67			11.8	4.1	20.3
Year.....	66	105	8	51.0	36.7	73.9

Average date of last killing frost in spring Feb. 26, and of first in autumn Nov. 27. Date of latest killing frost in spring Apr. 5, and of earliest in fall Nov. 1.

AGRICULTURE.

The original intention of the trustees¹ of the early settlement at Savannah was to make it a silk, wine, and olive-oil producing country, as those commodities were commanding good prices in Europe and considered well adapted to the coastal region of Georgia. Grape vines and olive trees were imported and mulberry trees planted. Although high bounties were offered for growing silk, it was not found profitable and the industry was soon abandoned. The grape vines and olive trees died, and thus ended the first attempt at the agricultural development of the county. With the introduction of slavery rice growing commenced and soon became the most important industry of the county. The decline of the rice industry started with the emancipation of the slaves and was accelerated by the low price of rice, due to the introduction of rice culture into Texas, Arkansas, and Louisiana. In these latter States machinery is used in the cultivation and harvesting of the crop. Poor under-drainage of the land and the interference caused by ditches practically prohibit the use of machinery on the river-bottom lands around Savannah, and only a small acreage is now planted.

Savannah is the largest market for Sea Island cotton in the world. Very little of its output comes from Chatham County, however, as the local acreage in this cotton is very small. Short staple cotton has never been grown on a large scale either, and the acreage is still small when compared with the adjoining cotton-producing counties. The prevailing high price of cotton during the last few seasons has had a tendency to increase the acreage.

Tobacco is not grown to any extent at present, though a few old tobacco barns are seen and this crop was grown to some extent at one time.

Trucking has been carried on in the neighborhood of Savannah for many years to supply the local market and has kept pace with the growth of the city. It was not until after the completion of the transportation lines directly connecting this section with the North that the production of vegetables for shipment developed to any considerable extent. In the Monteith-Meinhard trucking section Irish potatoes, snap beans, and cantaloupes constitute the bulk of the shipments to northern markets. Sweet potatoes are grown to some extent for the Savannah market.

In the vicinity of Savannah some dairying is carried on, and the resulting manure is used for truck crops. Under this system oats are used for winter pasturage, and truck crops, such as sweet potatoes, tomatoes, and cantaloupes, are produced. Other truckers in the vicinity of the city use stable manure from the livery stables, appli-

¹ The holders of original grants.

cations of 30 to 40 loads to the acre being made. All of the vegetables common to the Middle and South Atlantic trucking section are grown, but strawberries, melons, and cabbages form the bulk of the shipments and receive special attention. The negroes cultivating small patches grow English peas, turnips, cabbages, cauliflower, spinach, okra, lettuce, etc., and peddle their wares through the streets of Savannah.

Cabbage is one of the best paying and most extensively grown crops of the Savannah district. It is planted late in the fall and marketed early in March. Irish potatoes are planted about February and harvested about May 1 to 15. English peas, planted in January, are shipped late in March or early in April. Tomato plants are set out April 1, and picking begins the last of May. Turnips planted in September are ready for market in January. The strawberry season is from April 1 to June 1.

Intensive trucking can be practiced very easily, but at present only two truck crops and, where practicable, one crop of crab-grass hay are secured. The value of the truck crops depends entirely upon the season and ruling prices at the time of marketing.

Climatic conditions are not settled enough for growing celery, as there is too much danger from winter frosts. It makes a very slow growth in winter, grows too rapidly in spring, and soon withers under the intense heat of summer.

In the western part of the county, farther removed from transportation facilities, general farm crops are grown, and stock is raised, mostly cattle and hogs. Stock raising has declined markedly within the past 20 years, since the passage of the "no-stock" law, which prohibits the use of the open range. Cotton is grown to a small extent, while corn, oats, crab-grass hay, ribbon cane, sweet potatoes, peanuts, and cowpeas constitute the principal crops. Cane, when grown upon the high, well-drained land back from the seacoast, produces a fine quality of sirup. Winter oats is a sure crop and should be planted and used as pasture. Vetch does well, but is grown only to a limited extent. The agricultural development in this part of the county has been very slow, as much of the land is in large holdings and is owned largely by lumber companies.

Although fruits in general are not found to do well in this section, there are several that give satisfactory results, and these should be more freely planted. Peaches may be profitably grown. Japanese plums make excellent growth and yield a fine quality of fruit. The same is true of figs. Pecans do well upon the Coxville and Norfolk soils.

In many cases the adaptation of certain crops to soil types is recognized, but in general little attention is given to this matter and all classes of crops are grown on all the soils. Many of the soils of this

area have a wide adaptation, and nearly all the crops grown in this section can be successfully produced upon them. But there are many crops that can be grown to the best advantage only upon certain types. Rice is grown upon the low land and tidal flats, lettuce and okra upon black low land, and potatoes upon sandy soils. Other crops are grown more or less indiscriminately.¹

The agricultural practices and methods used by the best truckers are well adapted to conditions and have been worked out by years of experience. The rotation used by the best truckers is (1) sweet potatoes, (2) tomatoes, and (3) cantaloupes, each crop being followed by a volunteer growth of crab grass, which is cut for hay. Near Savannah manure is used in heavy applications. In other sections fertilizers are applied freely. Ordinarily truckers use from 500 to 1,600 pounds of high-grade fertilizer, analyzing about 8-5-7. Nitrate of soda, 80 to 250 pounds, as a top dressing is often used to force a crop or when an increase of leaf is needed. Some make a practice of applying about one-fourth of the fertilizer after the crop has commenced to grow. Near Savannah several irrigation systems covering small acreages were found. They were of the overhead type and proved very successful in producing crops during dry seasons.

The truckers of the Monteith-Meinhard section are progressive. Machine planters, cultivators, potato diggers, and apparatus for spraying are fast coming into general use, and indeed improved labor-saving machinery, such as grain and fertilizer drills and disk plows, is beginning to be used in nearly all parts of the county.

Plowing is usually shallow, averaging about 6 inches, which is usually all that is necessary upon the lighter soils, where heavy applications of commercial fertilizers are used. When stable manure is used and cover crops turned under plowing should be deeper.

The labor upon the farm is nearly all negro and in many cases is unskilled. There is usually enough labor to tend truck crops. In parts of the county away from the coast labor is more plentiful. Wages range from 60 to 75 cents a day in all parts of the county, except in the immediate vicinity of Savannah, where 75 cents to \$1 a day is paid. Near the city the factories and fertilizer works have taken much efficient labor from the farms.

The average size of farms for Chatham County is 117.2 acres. Less land is rented in this county than in those adjoining. The small farms are usually operated by the owners, while the large holdings are not developed.

The farm lands, excluding nonagricultural soil types, are valued at from \$5 to \$100 an acre, the price varying with the soil type and

¹ The question of adaptation of the various soils to crops will be considered under the separate soil descriptions.

character of the improvements, location with reference to transportation, and general desirability. The census for 1900 gives the total value of farm lands, including improvements, in the county as \$1,469,390. The value of farm buildings was \$263,450, and of improvements and machinery \$48,770.

For improvement of agriculture in the county it is recommended that more leguminous crops be grown, especially vetch, that cover crops be turned under, and that where possible more manure be used. The incorporation of organic matter in the upland soils is very important, as they are usually deficient in this constituent. In the few cases where this has been done the results have been very gratifying.

SOILS.

Chatham County lies wholly within the Atlantic Coastal Plain. The soil-forming materials represent marine deposits of Pleistocene age and stream deposits of more recent age. The upland materials were deposited upon the bed of the ocean which formerly covered the entire region. Since its elevation above sea level the marine sediments have been modified to some extent by processes of weathering, erosion, and vegetation. The deposits that were made in shallow water close to the shore or in places affected by stream currents are coarse in texture, while those made under quiet, deep-water conditions are fine.

The recent deposits can be placed in three different classes, according to method of deposition and character of material. Those laid down upon the flood plain of the Savannah River consist of fine particles transported by the streams and dropped when the current was checked by the incoming tide. These deposits really represent fresh-water material subject to fresh-water tidal overflow and hold a position intermediate between the ordinary first-bottom soils and the tidal-marsh deposits nearer the ocean. The tidal marsh is being added to daily just as in case of the fresh-water deposits.

The coastal region is composed of a series of broken sand ridges running in a general parallel direction with the coast and separated by tidal marshes and salt streams. The sand ridges become higher and more continuous toward the interior and the tidal marsh disappears entirely, but the low places show evidence of having been tidal marsh within comparatively recent time. The lower spots have been altered by the addition of local wash and accumulations of organic matter.

The soils in these depressions are invariably black in color, owing to the accumulated organic matter. Over large areas of the upland where poor drainage conditions have existed for a long time the subsoils have become mottled in appearance and plastic in structure.

Where drainage has been good and the soils have been well aerated the clays or sandy clays have become more completely oxidized, in consequence of which their structure has become more friable and the mottled color has given way to uniform color.

Twenty-one types are developed in Chatham County, ranging from Tidal marsh, through heavy clays to loose, coarse sands incapable of retaining moisture in sufficient quantities to insure proper plant growth. These various soils have been grouped in a number of series, according to color, drainage, and origin of the soil material. The upland soils are included in the Norfolk, Coxville, Orangeburg, Portsmouth, Hyde, Bladen, Scranton, Plummer, and Leon series. The strips of sand along the ocean are mapped as Coastal beach. The overflow land is represented by the Georgetown series, Tidal marsh, and Swamp.

The Norfolk series here includes only two types, the coarse sand and very fine sand, the former occurring exclusively in the north-western part of the county, while the latter occurs in all parts, though most extensive near the coast. The coarse sand is usually found in small strips along the stream courses, while the very fine sand is developed extensively along the coast. The Norfolk types have gray surface soils and pale yellow subsoils.

Only one type of the Orangeburg series—the fine sandy loam—is found in the area. This occupies well-drained elevations and seems to represent an advanced stage in the weathering of quiet water deposits (Coxville material). The soil is gray in color, with a red, friable subsoil. A few inadequately drained areas occur, in which the lower part of the subsoil is somewhat mottled like the Coxville subsoil.

The Coxville series is represented by the coarse sandy loam, very fine sandy loam, very fine sand, and clay. The soils are prevailingly dark gray in color, while the subsoils are mottled yellow, drab, and bright red. The surface of these soils is predominantly flat and the drainage has not been so well established as in case of the Orangeburg soils. The coarse members are developed in the northwestern part of the county and the finer types in the central section.

The Portsmouth soils occupy low-lying, poorly drained areas. They are characterized by black soils rich in organic matter and a water-logged, light-colored subsoil. Two members are represented, the coarse sand and fine sand. The coarse sand occurs in the north-western part of the county, while those of finer texture are developed in the south-central part.

The Plummer coarse sandy loam occupies irregular-shaped areas in the western part of the county. The topography is flat and the natural drainage poor.

The Scranton fine sand, the only type of this series found in the county, has a soil similar to the Portsmouth and subsoil like the Norfolk. It really represents a series intermediate between the Portsmouth and Norfolk soils.

Four members of the Hyde series occur in Chatham County, the very fine sandy loam, fine sand, loam, and clay. The determining characteristic of the series is the black color of the soil and subsoil. The Hyde soils occur in depressions, probably marking the location of former lagoons and salt-water creeks. They contain a high percentage of organic matter. The Hyde soils are very closely related to the Portsmouth soils, differing essentially in the dark color of the subsoils and higher average content of organic matter.

The Bladen clay in many respects resembles the Coxville clay. The type shows evidences of having recently existed as salt-water marsh. It is developed in the southwestern part of the area in the channels of the old salt-water creeks and on old tidal flats. It differs from the Coxville in having a yellow and gray mottled subsoil instead of yellow and red.

The Georgetown clay is a recent soil represented by the overflow land along the Savannah River, which receives the deposits laid down by the river when held in check by the tide. The surface of the type is below the level of high tide, but at low tide stands a considerable distance above the water.

Swamp, Tidal marsh, Leon sand, and Coastal beach are non-agricultural types, all but the Leon sand being Recent in origin.

The following table gives the actual and relative extent of the soil types mapped in the area:

Areas of different soils.

Soils.	Acres.	Per cent.	Soils.	Acres.	Per cent.
Tidal marsh.....	79,296	29.0	Coxville very fine sand.....	3,904	1.4
Norfolk very fine sand.....	37,120	13.6	Coxville clay.....	3,904	1.4
Swamp.....	25,472	9.3	Norfolk coarse sand.....	3,712	1.4
Coxville very fine sandy loam..	18,880	6.9	Bladen clay.....	3,648	1.3
Coxville coarse sandy loam....	15,552	5.7	Scranton fine sand.....	3,520	1.3
Hyde very fine sandy loam....	14,016	5.1	Leon sand.....	2,424	1.0
Georgetown clay.....	13,632	5.0	Hyde fine sand.....	2,496	.9
Portsmouth fine sand.....	12,160	4.4	Orangeburg fine sandy loam..	1,088	.4
Plummer coarse sandy loam..	10,816	4.0	Hyde loam.....	832	.3
Coastal beach.....	10,304	3.8			
Portsmouth coarse sand.....	5,376	2.0	Total.....	273,280	.....
Hyde clay.....	4,928	1.8			

NORFOLK VERY FINE SAND.

The soil of the Norfolk very fine sand is a light-gray to gray, loose and incoherent very fine sand, varying from 6 to 12 inches in depth, and passing abruptly into a subsoil of a pale yellow, slightly

compact fine sand that extends to a depth of 3 feet and more. The clay is usually found at 4 to 6 feet below the surface, but in many places lies at greater depth. The type has a tendency to pack slightly when wet and to become loose and fluffy when dry. The texture and structure admit of easy cultivation, and it can be plowed immediately after a rain without any injurious effects.

The topography is rolling and comparatively few level places are found, except along the tops of sand ridges. The elevation, texture, and structure of the soil and subsoil all tend to make the drainage excessive. Crops suffer during dry weather, and fertilizers leach out rapidly during rainy spells.

Little organic matter is found in the type. Virgin lands have a small content in the surface few inches, but when put under cultivation this almost entirely disappears within three years. Only where large quantities of manure and compost have been added by truckers is there found much organic matter in areas under cultivation.

The type appears to have been formed as an old beach line and represents the remains of old dunes modified by wind, rain, aeration, and vegetation. It is largely developed in the southern half of the county and is found in other parts only in small detached areas. The most extensive and typical occurrences are the sand ridges, which reach entirely across the county parallel with the seacoast. The most prominent of these runs from the city of Savannah along the Middle Ground Road almost to the Little Ogeechee River above Steadmans Island. Another extends from Lepageville, near the Savannah River, to Montgomery, on the Little Ogeechee River. The type is also found in large and typical areas upon the large islands—Wilmington, Skidaway, and Isle of Hope. In the coast country the type is strewn with shells, but these have been placed largely by human agencies.

The agriculture developed upon the type is confined largely to trucking, which is carried on within a comparatively short distance of the city of Savannah. Crops are produced to supply the local market. Nearly all the truckers use heavy applications of manure, which is secured from Savannah. High-grade commercial fertilizers are used liberally. An application of about 1,000 to 1,800 pounds per acre of 8-5-7 "trucker's fertilizer" is used by the best farmers. When manures are used the quantity of fertilizer is reduced to 500 to 800 pounds. Twenty to thirty wagonloads of manure per acre is not an unusual quantity upon this type.

The truck crops produced in greatest abundance are: Sweet potatoes, tomatoes, cantaloupes, cabbage, peas, and turnips, but nearly all the vegetables grown in the area are produced to some extent upon this type. Of the staple crops, corn, oats, and hay are generally grown. Vetch and peanuts make good crops, but are grown to only

a limited extent. Cowpeas are grown with corn and cut with crab grass, making splendid hay. Crab grass comes in after truck crops and makes 1 to 3 tons of hay per acre, depending upon the nature of the preceding crop and the quantity of fertilizer used. Sweet potatoes and cantaloupes are the best paying crops grown upon the type.

The type is naturally poor and unproductive, but furnishes a good medium for crop production if the proper fertilizer is added in sufficient quantities. Where unaided by fertilizers the yields are very low, but under good management very high yields have been secured. Corn yields from 10 to 30 bushels per acre, and sweet potatoes from 100 to 250 bushels. Ribbon cane makes a good growth and produces a fair quality of sirup.

Crops grown on the Norfolk very fine sand mature earlier than on any other of the soil types used in the area. It is considered one of the best light truck soils of the Atlantic Coastal Plain and should be used for trucking and not for general farming.

A large portion of this type is cleared and under cultivation, but much of it situated on the "Islands" is still in forest. The natural growth consists largely of live oak, scrub oak, pine, saw palmetto, and gallberry. The type varies in value from \$5 to \$100 an acre, according to improvements, transportation facilities, and other advantages.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Norfolk very fine sand:

Mechanical analyses of Norfolk very fine sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
251709.....	Soil.....	0.0	0.3	0.4	57.1	24.2	13.8	4.2
251710.....	Subsoil.....	.1	.2	.3	40.2	41.4	12.5	5.0

NORFOLK COARSE SAND.

The soil of the Norfolk coarse sand is a gray to dark-gray coarse sand, from 6 to 8 inches deep, and of loose and incoherent structure. Small quantities of quartz gravel and iron concretions are found scattered over the surface and throughout the soil section. The subsoil is a pale-yellow to yellow coarse sand to 3 feet or more, loose and incoherent in the upper part and slightly compact in the lower part. Usually a sandy clay is encountered at about 4 feet, but in a few places a light coarse sandy loam is found at the lower limit of the profile. The soil is easily cultivated, requiring a comparatively light

draft, and can be plowed at almost any moisture content without injurious effects.

The topography is level to gently rolling. The drainage is well established, but the nearness of the sandy clay prevents extreme drainage and leaching. This clayey substratum is responsible for the higher producing power of this type when compared with the fine sand. The type is not extensive and is confined to a few irregular-shaped areas scattered over the northwestern part of the county.

The Norfolk coarse sand is used for general farming, as it is not well located for trucking. The principal crops grown are corn, cotton, oats, and potatoes. Corn produces from 10 to 40 bushels to the acre, potatoes 150 to 250 bushels, and cotton 1 bale, with applications of 1,000 pounds of 8-3-3 fertilizer.

Vetch makes a good growth, but very little is sowed. Peanuts and cowpeas both do well and are planted to some extent, the latter usually with corn. Sugar cane grows luxuriantly and produces a fine quality of sirup. Sweet potatoes and melons are grown more extensively than any other truck crop. Irish potatoes do well, but are planted to a very limited extent. Nearly all crops are produced with the aid of commercial fertilizers. Owing to the open nature of the soil, liberal incorporation of organic matter is necessary to improve its moisture-holding capacity. Heavy applications of high-grade fertilizers, especially those containing a high percentage of nitrogen and potash, are required to secure good yields.

A fair proportion of the type is cleared and under cultivation. The natural growth consists largely of pine, oak, and gallberry bushes. The price varies from \$10 to \$25 an acre, according to improvements.

ORANGEBURG FINE SANDY LOAM.

The surface soil of the Orangeburg fine sandy loam is a light-gray to gray light fine sandy loam from 6 to 15 inches deep. In places where the subsoil is close to the surface the soil has a slightly reddish tinge. This is largely due to exposing the subsoil when plowing. The soil grades into the subsoil through a yellow or reddish-yellow heavy fine sandy loam stratum about 4 inches thick. The subsoil proper consists of a red, heavy, though friable, fine sandy loam that becomes heavier and more compact in the lower part of the profile, which consists of a fine sandy clay. Below 30 inches the material is slightly plastic and somewhat mottled with gray or yellow. Pockets of fine sand are found in the subsoil.

The soil is easily cultivated but should only be plowed under proper moisture conditions. Plowing when the material is too wet results in the forming of a hardpan stratum, or plow sole.

The type as developed in the area probably represents an advanced stage in the weathering of Coxville material, as effected through good drainage and aeration. It is found only in small, scattered, irregular-shaped areas occurring along the higher bluffs of the streams west of Savannah.

The type is developed on slight elevations, ridges, or low hillocks, where the drainage is thorough but not excessive. The loamy texture enables the type to retain a sufficient supply of moisture to carry crops through very dry seasons.

The Orangeburg fine sandy loam is one of the strongest soil types in the area and is capable of producing heavy yields of cotton, corn, oats, and hay, but owing to its location it is used almost entirely for truck. Beans, cabbage, onions, peas, and Irish potatoes form the larger part of the truck produced. Beans do better on this type than on any other in the area. Lettuce, turnips, kale, radishes, carrots, spinach, parsley, and beets are produced in great abundance. Peanuts, vetch, sorghum, and ribbon cane do well, but are not grown to any appreciable extent. Sweet potatoes and tomatoes are planted to some extent and make good returns. Most of the corn planted is sweet corn.

Commercial fertilizers and stable manure are used on this type by all planters, but in smaller applications than upon some of the lighter types. Irish potatoes yield about 100 to 125 barrels to the acre with the use of about 1,200 pounds of 8-5-7 fertilizer. Irish potatoes and beans pay better upon this type than any other crops that are grown on a large scale.

All of the type is cleared and under intensive cultivation. Its value ranges from \$50 to \$100 an acre.

SCRANTON FINE SAND.

The soil of the Scranton fine sand is a dark-gray to black fine sand, from 10 to 12 inches deep, containing a relatively high percentage of organic matter. The subsoil is a yellow or pale-yellow, slightly compact fine sand.

The type is found closely associated with the Norfolk very fine sand and occupies the more level places throughout that soil. It is not very extensively developed, occurring only in a few small tracts over the south-central part of the area. The soil is from the same material as the Norfolk very fine sand. Its more level topography results in poorer drainage and consequent greater accumulation of organic matter.

After years of cultivation the soil assumes a light-gray color and more nearly resembles the Norfolk very fine sand. A large area of the Scranton fine sand is in forest. The natural growth is almost exclusively longleaf pine.

The important crops are corn, cotton, oats, hay, sugar cane, potatoes, peanuts, and cowpeas. Nearly all the truck crops grown in this section are produced to a limited extent on this type. The producing power of the type is slightly greater than that of the Norfolk very fine sand, owing to its supply of organic matter and also to its greater power to retain moisture.

Commercial fertilizers and manures are used upon this type for nearly all crops in about the same proportions as upon the Norfolk very fine sand. The soil is very easy to cultivate. While plowing can not be done as soon after a rain as upon the Norfolk very fine sand, it can be cultivated much sooner than most of the heavier types of the area. The price of land of this character varies from \$20 to \$60 an acre.

COXVILLE VERY FINE SAND.

The Coxville very fine sand consists of a very fine gray sand, having an average depth of about 24 inches, grading imperceptibly into a pale-yellow, slightly compact, friable very fine sandy loam stratum about 6 inches in thickness. Beneath this is found a compact yellow and red mottled fine sandy clay, having a tendency to become plastic in the lower portion of the profile.

The topography is gently undulating, giving good drainage. The heavy nature of the deep subsoil prevents excessive drainage, checking the downward movement of water. The type is easily plowed and no trouble is encountered in cultivating under moist conditions, as the clayey subsoil is too deep to be affected by the surface operations.

Areas of this soil are found largely in the southwestern part of the county. Two typical developments occur, one on each side of Savannah parallel to the sand ridge upon which the city is located.

Trucking is practiced upon favorably situated areas. Cabbage, sweet and Irish potatoes, tomatoes, beans, and cantaloupes constitute the chief truck crops. Cotton, corn, oats, peas, sugar cane, and sweet potatoes are grown on areas farther removed from Savannah. Of these crops corn, cane, and sweet potatoes are produced in greatest abundance. In productiveness the type stands about midway between the Coxville very fine sandy loam and the Norfolk very fine sand. It is more easily handled than the very fine sandy loam, but has better moisture retaining power than the Norfolk very fine sand. Strawberries will do well and are found to be a paying crop. Sweet potatoes probably make the best returns of any crop grown.

The type is in need of organic matter, which can be supplied by adding manure or compost, and by turning under cover crops. Most of the type is cleared of its original growth of pine and live oak and is under cultivation. The price varies from \$20 to \$100 an acre.

COXVILLE VERY FINE SANDY LOAM.

The soil of the Coxville very fine sandy loam is a dark-gray fine sandy loam, from 8 to 20 inches deep, with an average depth of about 12 inches. In many places the soil has a light-gray color below 6 inches, gradually grading into yellow or light orange near the subsoil. This variation is found in the better-drained areas. The soil contains only relatively small quantities of organic matter. The subsoil is a yellow, drab, and red mottled, heavy, and fairly compact fine sandy loam, grading into a very compact, stiff, plastic, and tenacious fine sandy clay at about 24 inches. The red mottling becomes more pronounced with depth.

The topography is level to gently undulating. On the higher, undulating portions the drainage is good, but only fairly well established over the rest of the type, the compact subsoil preventing free underground movement of water. The Coxville very fine sandy loam is developed in irregular-shaped areas over the central and northern part of the area and is typically developed around Monteith, Pooler, and Burroughs. In formation it is similar to most of the upland of the Coastal Plain. The fineness of the material indicates that the deposits were laid down in comparatively deep, quiet water.

Ordinary cultivation is accomplished with ease. As the furrow slice is rarely deeper than 6 inches, the unwieldy clay subsoil is not penetrated. Plowing when the soil is in a soggy condition is likely to compact the upper subsoil, interfering with the proper movement of soil moisture and sometimes causing crops to suffer. Deeper plowing should be practiced, preferably in the fall, when the moisture condition is exactly right. Gradually the clayey upper subsoil material should be worked up and mixed with the surface soil so as to bring about a more loamy soil condition.

Cotton, corn, oats, cowpeas, sweet and Irish potatoes, sugar cane, and vegetables are successfully grown upon this type. Cotton is grown to only a limited extent, but it is planted more extensively upon this type than any other in the area. Crab grass makes a splendid growth and is usually cut for hay following some other crop. Vetch is grown to a small extent. Cowpeas are planted usually with corn, which covers by far the largest acreage of any crop. Sugar cane makes a heavy growth and gives a superior quality of sirup. Both Irish and sweet potatoes are grown with profit, giving the best returns of any of the crops planted in large acreages. Nearly all the truck crops are produced to advantage, but only beans, potatoes, and cabbage are grown to any considerable extent. The type is especially adapted to strawberries, but they are grown only in small patches. Cotton yields about 1 bale to the acre with the use of 500

pounds of 8-3-3 fertilizer, corn from 20 to 40 bushels, oats from 20 to 30 bushels, and hay 2 to 3 tons to the acre.

Commercial fertilizers are very generally used, heavy applications of the higher grades being made for truck crops. Manures are not so much used, as this type is not conveniently located to a source of supply.

A fair percentage of the type is cleared and under cultivation. The timber growth is largely pine. The price varies from \$10 to \$100 an acre, according to improvements and location with reference to transportation facilities.

COXVILLE COARSE SANDY LOAM.

The soil of the Coxville coarse sandy loam is a dark-gray to gray coarse sandy loam, loose and fairly open in structure, varying from 8 to 24 inches in depth, with an average of 12 inches. An intermediate grade of yellow coarse sandy loam, fairly compact and friable, of about 6 inches in thickness, is found between the soil and subsoil. A small percentage of quartz gravel is scattered on the surface and through the profile. In a few spots the percentage of gravel is high. These areas are small in extent and are indicated upon the map by gravel symbols. A few small concretions of iron are also found scattered on the surface. The subsoil is a heavy, plastic coarse sandy clay, mottled with yellow, drab, and red. It becomes more compact with depth, the red mottling becoming more pronounced and the yellow mottling disappearing altogether below 30 inches.

The soil is easy to plow, and there is little danger from puddling when plowed too wet. The topography is level to gently undulating, and the drainage, facilitated by the open structure of the soil, is especially good, except in depressions and very level areas. An iron cemented hardpan is found at times between the soil and the subsoil.

Irregular-shaped areas of this type occur over the western part of the county. The soil has been formed from marine deposits through processes of weathering since their elevation. The character of the deposits indicates that they were built up in shallow water and subjected to modification by tidal currents or wave action.

The agricultural development of the type varies with its situation in reference to transportation facilities. In the Meinhard trucking section it is used largely for Irish potatoes and snap beans. Nearly all of the truck crops grown in the county are produced to some extent. Crab-grass hay is an important product. Cotton, corn, oats, sugar cane, sweet potatoes, and peanuts represent the more important crops grown in parts of the county where truck markets can not be easily reached.

The type is admirably suited to cotton. Vetch and cowpeas do well, but only the latter is grown to any great extent. The heavy

truck crops, such as cabbage and Irish potatoes, make good yields with less fertilizer than is used on the lighter types. For heavy truck crops 800 to 1,000 pounds of 8-5-7 fertilizer is generally used. Strawberries are grown in small patches, but are injured to some extent by the coarse sand. Pecans make a good growth and are found to be profitable. Fruits, such as peaches and pears, do fairly well. They are grown to a small extent. Cotton yields about 1 bale per acre with the use of 500 pounds of 8-5-7 fertilizer. Irish potatoes yield 60 to 100 barrels to the acre, according to season and fertilization; sweet potatoes 150 to 250 bushels per acre; crab-grass hay 2 to 3 tons; cowpea hay about 3½ tons; and oats 20 to 30 bushels per acre. High-grade commercial fertilizers are used extensively, and manures and cover crops to a limited extent.

Deep plowing and the more general use of leguminous crops are recommended. Vegetable matter is especially needed, and it would be advisable to plow under some vegetable covering, as cowpeas or rye, occasionally.

The type is one of the strongest soils of the area, well suited to trucking or general farming. Owing to its remoteness from transportation, but little of it is cleared and under cultivation. The natural growth is largely pine. The price of this land ranges from \$20 to \$50 an acre.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Coxville coarse sandy loam:

Mechanical analyses of Coxville coarse sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
251725.....	Soil.....	6.3	28.5	17.5	26.2	9.7	9.1	2.5
251726.....	Subsoil.....	7.6	22.8	11.2	13.9	4.6	9.5	30.3

COXVILLE CLAY.

The soil of the Coxville clay is a dark-gray, medium heavy, friable fine sandy loam from 3 to 5 inches deep. The subsoil is a stiff, plastic, and tenacious heavy clay, mottled with yellow, drab, and red. The structure becomes more compact and the red mottling more pronounced with depth. When dry the subsoil cracks badly and becomes very hard.

The topography is generally level. For this reason and because of the impervious nature of the subsoil the drainage is poor.

The typical development of the Coxville clay occurs on the large, flat areas commonly known as "savannas." The soil material is evidently a quiet-water deposit and appears to have been laid down

along with the material that is found underlying nearly all of the area. Little or no sandy material has been laid down over the clay of this type. It occurs in irregular-shaped areas in the northwestern part of the county, particularly in the neighborhood of Pooler.

The type is hard to handle, owing to its flat surface, deficient drainage, and impervious subsoil. The latter so closely approaches the surface as to make plowing difficult, except with heavy draft. During dry seasons the surface bakes hard, causing crops to "fire" or suffer for lack of moisture. If the type is plowed too wet it puddles badly, and the injurious effects are noticeable for many years afterwards. By plowing into "lands" or wide beds, with water furrows 10 to 20 feet apart, or by a system of underdrainage, the general condition of the type could be greatly improved.

The addition of large quantities of organic matter and lime will go far toward improving the tilth. With such treatment the soil could be brought into condition for producing good heavy truck crops, beans, onions, and cabbage, and such staple crops as hay, cotton, corn, oats, and wheat. With the present area of well-drained, undeveloped land in the county there is not immediate need for reclaiming this type.

Much of the type is burned off each spring and used for pasture. It furnishes fair grazing until the heat of summer bakes the ground and kills the grass. Very little of the type is drained and cultivated. Crab grass yields from 3 to 4 tons per acre. It is the only paying crop that is grown to any extent. The natural forest growth consists of longleaf pine. The price of land of this type is about \$10 to \$15 an acre.

PORTSMOUTH FINE SAND.

The soil of the Portsmouth fine sand is a dark-gray to black, slightly compact fine sand, from 10 to 15 inches deep, containing a considerable percentage of organic matter. The subsoil is a dark-gray to gray fine sand, becoming lighter in color with depth. The subsoil contains little or no organic matter and is usually water logged. This condition makes ditching upon this type a very difficult operation. The type is easily cultivated and produces good crops when properly drained.

In topography the Portsmouth fine sand is usually level, with a few gently sloping places, where seepage water from higher ground keeps the soil in a moist condition. The largest areas of the type are located in the south-central part of the county, where it occurs as flat tracts or "swales" slightly below the associated types of Norfolk very fine sand and Scranton fine sand. It is identical with these soils in mode of formation, differing only in poorer drainage conditions.

Numerous small areas of the type are well drained and used successfully for trucking, garden peas, cabbage, lettuce, potatoes, and onions bringing the best returns. Corn, oats, and hay are the staple crops. Corn yields from 15 to 40 bushels, oats about 30 bushels, and hay from 2½ to 3 tons per acre. The type is not particularly adapted to the growing of leguminous crops, except, perhaps, soy and velvet beans. Strawberries do well and are found to be a very profitable crop.

The type is usually acid and needs heavy applications of lime. After cropping for a few years the organic matter begins to disappear and must be replaced either by the use of stable manure, compost, or green manure crops. The use of commercial fertilizers greatly increases the yields, but tends to hasten the depletion of the organic matter.

Only a small proportion of the type is cleared and under cultivation. The natural growth is largely pine, palmetto, and bay. The price of land of this type of soil varies from \$5 to \$40 an acre.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Portsmouth fine sand:

Mechanical analyses of Portsmouth fine sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
251721.....	Soil.....	0.0	0.3	0.4	74.1	9.8	7.7	7.3
251722.....	Subsoil.....	.0	.1	.3	68.1	22.9	5.1	3.7

PORTSMOUTH COARSE SAND.

The soil of the Portsmouth coarse sand, to a depth of 6 to 15 inches, is a black, moderately coarse sand, rich in organic matter. The subsoil is a grayish, coarse sand, slightly compact to about 20 inches, below which point it is usually water-soaked. A few quartz pebbles are scattered upon the surface and throughout the soil section.

Most of the type is situated in the western part of the county, where it occurs in comparatively large bodies. The topography is level, the drainage poor, the surface of some of the type being covered with water during a greater part of the year. This condition could easily be relieved by small drainage ditches. Little or none of the type is drained and under cultivation, the most of it supporting a heavy growth of pine, gum, cypress, and bay laurel.

The Portsmouth coarse sand is best adapted to corn, oats, hay, lettuce, cabbage, and onions. Most of it is not situated advantageously for trucking, and general farm crops must necessarily be grown. The type furnishes fair pasturage and a large area is burned over

each spring for that purpose. This soil is not naturally strong, but will produce good crops for a few years without the aid of manures or fertilizers. When the organic matter is used up by constant cropping it must be replenished if cultivation is to be successfully continued. In its present poorly drained condition fertilizers do not give the best results. Much depends upon the season in growing the crops adapted to this type. In wet seasons the crops suffer, but in dry seasons good yields should be obtained.

The loose, open structure admits of easy cultivation and the absence of clay removes all possibility of puddling when plowed too wet. With the large undeveloped area of well-drained, arable land in the county there is little necessity for the type being put under cultivation. It is held at prices ranging from about \$5 to \$10 an acre.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Portsmouth coarse sand:

Mechanical analyses of Portsmouth coarse sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
251729.....	Soil.....	11.9	23.3	9.7	29.7	13.6	9.5	1.8
251730.....	Subsoil.....	12.1	14.0	5.0	27.2	32.5	6.0	3.2

PLUMMER COARSE SANDY LOAM.

The Plummer coarse sandy loam is a gray or brownish-gray, moderately coarse sandy loam, from 4 to 6 inches deep, grading into a mottled yellowish to brownish, light, coarse sandy loam that extends to a depth of about 24 inches. The subsoil below 24 inches is a sticky, somewhat plastic coarse sandy clay, mottled with shades of brown, yellow, and white. It is very compact in structure and prevents the downward movement of waters. In places the material below 20 inches is waterlogged and frequently a hardpan is found between the soil and subsoil. Both soil and subsoil contain a small percentage of gravel, consisting mostly of small, waterworn fragments of quartz. A few small iron concretions are scattered upon the surface. The type is developed in irregular-shaped areas in the western part of the county. The topography is flat and the natural drainage poor.

A small acreage is cleared, drained, and under cultivation. Cotton, corn, oats, hay, cabbage, beans, cucumbers, and sugar cane constitute the principal crops. Strawberries do fairly well, but are grown only to a limited extent. When properly drained nearly all crops of the region can be successfully grown upon this type. Potatoes yield about 75 barrels, corn 20 to 40 bushels, and oats from 30 to 40 bushels per acre. The type is well adapted to cabbage and beans.

Fertilizers have been used only to a limited extent, except for truck crops. Heavy applications of lime would be beneficial where the type has been under cultivation for some time.

Values range from \$5 to \$30 an acre, according to improvements and location.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Plummer coarse sandy loam:

Mechanical analyses of Plummer coarse sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
251731.....	Soil.....	8.3	18.3	10.1	28.0	9.6	20.3	4.7
251732.....	Subsoil.....	8.4	14.9	8.0	15.8	9.9	17.3	25.1

HYDE VERY FINE SANDY LOAM.

The soil of the Hyde very fine sandy loam is a black very fine sandy loam, about 10 inches deep, fairly open and mellow in structure, and of high organic matter content. The subsoil is a drab to black, heavy, very fine sandy loam to very fine sandy clay, rather sticky, and sometimes mottles faintly in the upper portion with yellow.

The soil is easily worked into a good seed bed, although care must be taken not to plow when the ground is too wet. Puddling is not as common on this soil as on some of the heavier types, but there is some danger of forming a slight hardpan at plowing depth. Under-drainage is not rapid, the subsoil remaining wet long after the surface soil dries out. The topography is level and natural drainage poor, necessitating a thorough system of ditching before crops can be successfully grown.

The type is developed in large, irregular-shaped areas in the central part of the county. The soil was formed in old lagoons during the elevation of the region above sea level, and has since been subjected to poor drainage conditions.

A considerable proportion of the type is cleared, drained, and under cultivation. The staples, corn, oats, hay, and sugar cane, are the principal crops grown. Cabbage, onions, potatoes, lettuce, peas, beans, and tomatoes are the main truck crops. Corn yields from 20 to 40 bushels, oats about 30, hay (crab grass) 3 to 3½ tons per acre. When thoroughly drained the type will produce nearly all the crops grown in the area.

Fertilizers are not used to any great extent, but manures and compost are applied upon areas within hauling distance of Savannah. The type furnishes fair pasture and in many places is burned off in spring for that purpose. Lime should be used freely where there is

any indication of acidity in the soil. An application of 1 ton of burnt lime per acre following the ditching required to drain the type will help greatly to bring this soil into proper condition for cultivation. Leguminous plants as a rule do not thrive. The natural forest growth is largely pine and gum. The price of land of this type varies from \$10 to \$60 an acre.

HYDE FINE SAND.

The Hyde fine sand is a black fine sand, from 10 to 12 inches deep, slightly compact in structure, and containing a high percentage of organic matter. The subsoil is a black to brownish-black, slightly compact fine sand, containing somewhat less organic matter than the surface soil.

The type is found in the south-central part of the county and occurs in long, narrow strips parallel to the ridges of Norfolk very fine sand.

The topography is level and the drainage naturally poor. Artificial drainage is necessary before crops can be successfully grown, but this can be accomplished very easily, as the fall is sufficient to carry off the water when proper drainage ditches are supplied.

The Hyde fine sand is very easily tilled, owing to its light nature, although very little of it is under cultivation. The principal crops are corn, oats, hay, rice, cabbage, English peas, lettuce, and onions. The type is used very little for general farm crops, small truck patches representing the extent of the agricultural development. It is not particularly adapted to the growing of legumes, except, perhaps, velvet and soy beans, owing to the high moisture content of the subsoil. Crops that can grow under very moist conditions do best upon this type, such as corn, oats, rice, lettuce, and onions. Rice yields from 30 to 40 bushels per acre.

Very little manure is used upon the type, the organic content being sufficient. The type is productive and there has been so far little need for employing artificial fertilizers. The type is much stronger than the Portsmouth fine sand.

The natural growth is largely pine, bay bush, and palmetto. The price of farms of this type of soil ranges from \$10 to \$50 an acre.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Hyde fine sand:

Mechanical analyses of Hyde fine sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
251719.....	Soil.....	0.0	0.3	1.2	77.4	2.8	7.3	10.7
251720.....	Subsoil.....	.1	.3	1.2	78.3	6.6	4.5	8.8

HYDE LOAM.

The soil of the Hyde loam is a friable heavy loam, about 10 inches deep, containing a high percentage of organic matter. The subsoil is a plastic and tenacious bluish-black clay, with occasional small iron stains, though in most of the type it is not mottled. A phase occurs in the cypress and black-gum ponds which is slightly lighter in texture and which contains a higher percentage of organic matter.

A long ridge that extends parallel to the coast just back of Thunderbolt forms the most typical area of this soil. Other small developments are found over the south-central part of the county. The surface is level, usually depressed, and the drainage is very poor, ditching being required to remove the surplus water before crops can be grown successfully.

The type was probably formed in a lagoon behind the old beach line, but in places it shows evidence of having recently been salt marsh.

The Hyde loam is not as difficult to handle as the Hyde clay, nor so easy to work as the Hyde fine sand. If plowed too wet it has a tendency to clod, but the clods are not nearly as intractable as in case of the clay. When plowed in proper moisture condition a mellow seed bed is readily secured.

The crops grown are corn, oats, hay, rice, okra, lettuce, cauliflower, onions, and cabbage. Nearly all the vegetables grown in the area are produced to a limited extent. Strawberries and celery, although grown to a very limited extent, do well upon the type. Rice yields about 40 bushels to the acre, corn from 25 to 40 bushels, and oats from 30 to 40 bushels. Lime should be liberally applied. The natural growth is largely pine, bay, palmetto, and willow. The price of this land, owing to its location, is high, ranging from \$30 to \$50 an acre.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Hyde loam:

Mechanical analyses of Hyde loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
251735.....	Soil.....	0.0	1.7	1.1	42.5	5.1	31.6	18.0
251736.....	Subsoil.....	.0	.3	.3	29.8	4.1	26.7	38.7

HYDE CLAY.

The surface soil of Hyde clay consists of 3 to 5 inches of a black heavy clay loam, which becomes slightly plastic when wet and cracks badly when dry. The soil contains a high percentage of finely

divided organic matter. The subsoil is a heavy, black, plastic clay, very compact to about 24 inches, below which point it is less dense, has a bluish-black color, and is waterlogged.

Areas of this type occur in low places between ridges of Norfolk very fine sand and represent old lagoons or salt creeks that have been filled in by deposits from backwater. They are located mostly in the central part of the county. The topography is very level and the drainage poor.

The Hyde clay is very difficult to handle. It puddles badly when plowed too wet, and, owing to its position and waterlogged condition, it remains wet for a long time after a rain. A heavy draft is required to plow it properly, and frequent harrowing is necessary to bring it into good condition for planting. Clod crushers are used to some extent.

A considerable area of the type is cleared, ditched, and under cultivation. Yields from the type are largely dependent upon seasonal conditions. In normal seasons they are unusually heavy. The principal crops are corn, oats, rice, and hay. Such vegetables as lettuce, onions, and okra are grown profitably. Corn and oats are the staple crops, the former yielding from 20 to 50 bushels, the latter about 30 bushels, and rice from 30 to 60 bushels per acre. Sugar cane makes a good growth, but gives a very poor quality of sirup.

Fertilizers are not used to any extent. The type is acid and in need of lime, both to counteract acidity and to improve the mechanical condition. About 1,000 pounds of lime are required to the acre. Leguminous crops do not thrive, as bacteria can not develop under the drainage conditions.

The type is best suited to onions, lettuce, cabbage, cauliflower, and celery, and other crops that can stand a considerable quantity of moisture. The natural growth consists of pine, gum, palmetto, bay bush, and willow. The undergrowth is usually very heavy and impenetrable. Land values range from \$10 to \$60 an acre.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Hyde clay:

Mechanical analyses of Hyde clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
251717.....	Soil.....	0.2	0.6	1.9	29.4	5.0	37.2	25.8
251718.....	Subsoil.....	.0	.2	.4	10.2	5.0	38.4	45.6

BLADEN CLAY.

The soil of the Bladen clay is a black heavy clay loam, 2 to 5 inches deep, that cracks slightly upon the surface when dry. The

subsoil is a plastic, heavy clay, mottled yellow and brown in the upper portion and blue and yellow in the lower portion. In places this superficial layer of black clay loam is lacking and mottled clay extends to the surface. Mounds built by crawfish are scattered over the areas.

The type is situated for the most part upon flat areas back from the tidal marshes, around the heads of salt-water creeks, and in old tidal channels that are at present above high-tide level. The soil shows strong evidences of having been a recent tidal marsh. It seems to hold a position intermediate in point of weathering between tidal marsh and the Coxville soils. Tree growth is sparse; the practice of burning off the surface each spring to improve the grazing has a tendency to keep down forest growth. Shortleaf yellow pine and black gum are the principal trees. The type furnishes good pasture and is largely used for that purpose.

With the level topography and the close structure of the subsoil drainage is very poor, even in well-ditched areas. The type was used extensively for rice at one time, but very little is planted now. It produced 30 to 40 bushels per acre. Most of the ditches in the old rice fields have filled up, and they are not now used for crops, and it is very doubtful if they could be in their present condition. Such crops as corn, oats, hay, sugar cane, and onions could be grown if the land were drained and properly handled. The soil contains very little organic matter, and as a result the type bakes hard when dry. To improve the conditions of this soil it should be thoroughly drained, lime should be applied liberally, about 2,000 pounds to the acre, stable manure and compost should be used, and green crops turned under to supply the organic matter.

Plowing is very difficult. Not only is the draft heavy and the effects of plowing when the soil is too wet injurious, but it is seldom that the soil is in proper condition for plowing. Land of this type is valued at from \$5 to \$40 an acre, according to improvements.

GEORGETOWN CLAY.

The soil of the Georgetown clay is a sticky, silty clay about 6 inches deep. It is mottled distinct brown, grayish-brown or reddish-brown, the latter color predominating in places, while in others the grayish-brown shades are more pronounced. The color is very similar to that of the Congaree soils. On drying out the soil cracks badly. The subsoil is a sticky, plastic, tenacious clay, mottled with rusty brown, blue, and gray. It is very compact to about 20 inches and below this level usually waterlogged. At this depth it is of a greenish-blue color and quite mushy.

The type lies below high water. The surface is level, and hence the drainage is poor, except where protected by dikes and thoroughly ditched. It occurs upon the islands and low overflow land of the Savannah River.

The type is formed of estuarine deposits brought from the Appalachian and Piedmont provinces by the Savannah River. It originally represented fresh-water tidal marsh, which was covered by a heavy growth of cypress and gum. Much of the type was at one time protected by dikes and was used extensively for rice culture.

The type really represents Congaree soil material, in which permanent poor drainage or daily overflow has brought about extensive mottling by preventing aeration and oxidation. The type is an intermediate soil between the Congaree on the one hand and the Tidal marsh on the other. Its overflow is fresh to brackish water, but it grades into the Tidal marsh, which is subject to daily inundation with salt water.

Practically none of the Georgetown clay is under cultivation. The dikes that held back the daily tidal overflow are going to pieces, and the fields are gradually reverting to the condition of fresh-water marsh.

Rice, no longer an important crop, yields from 30 to 60 bushels to the acre, with an average of about 40 bushels. Cotton, corn, peas, sugar cane, oats, sweet and Irish potatoes, spinach, late tomatoes, cabbage, cauliflower, and beans could be successfully grown when better drainage is secured.

With the building of better dikes and the installation of a thorough system of underdrainage, machinery could be used in the cultivation of rice upon the type, but it is doubtful if such expensive reclamation would pay at present, though in time these extremely fertile lands will probably be utilized for rice or some other crop. Underdrainage would necessitate pumping in order to lower the water table to any considerable level.

The forest growth upon the Georgetown clay is sparse. The price of this land varies from \$5 to \$50 an acre, depending upon the condition of the dikes and drainageways.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Georgetown clay:

Mechanical analyses of Georgetown clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
241733.....	Soil.....	0.1	0.4	0.4	1.5	0.6	48.5	48.3
241734.....	Subsoil.....	.0	.1	.2	1.2	1.2	44.4	53.1

LEON SAND.

The Leon sand type consists of white or gray, incoherent sand of medium to coarse texture, shading into pale yellow below a depth of 6 inches.

The relief of the type is typically that of the sand-hill region. Owing to this rolling topography and to the open structure of the soil material the drainage is excessive. Vegetation has a tendency to burn during dry seasons, and upon this account the undergrowth usual in this section is lacking upon Leon sand areas. The natural forest growth consists of blackjack oak and a few scattered pines.

The Leon sand is of little agricultural value, and attempts to grow crops upon it are made only in a few low places used for gardens. These spots have accumulated a small quantity of organic matter, and, owing to their location, usually have better moisture conditions. They are limited in extent and occurrence and are of little importance. With the addition of large quantities of organic matter to increase the moisture-holding power of the soil and heavy applications of manure and fertilizers crops may be grown with some degree of success. Early vegetables that mature during the wetter part of the year might be profitably produced, but at present the type is located too far from transportation facilities for the successful marketing of truck crops.

The Leon sand is found in the northwestern part of the county, where it occurs in a narrow strip along the Ogeechee River, forming the escarpment of the river swamp from the Old Ogeechee Canal to the Effingham County line. The maximum width of the strip is about 1 mile. The type is valued at from \$3 to \$5 an acre.

SWAMP.

The type mapped as Swamp in Chatham County comprises land that is covered by fresh water a greater part of the year. Most of the intermittently swampy areas were mapped as soil types and indicated with swamp symbols.

The Swamp areas can only be drained by canals, and some of the larger swamps are too deep and the soil surface too far below water level to be successfully drained except by diking and pumping. This would not be practicable, as the cost of equipment and maintenance would be greater than the returns from any crop that could be grown. Where the swamps can be drained by canals crops can be profitably grown.

The character of the soil of the Swamp areas varies considerably. In most of the large bodies it is unclassified material, varying from coarse sand to heavy clay. In the smaller bodies the texture is more uniform and is generally like the surrounding soil type. In all

cases the soil of the Swamp areas contains a high percentage of organic matter.

When properly drained Swamp should produce good crops of corn, oats, rice, and such vegetables as onions, lettuce, and cabbage. Crops that are easily drowned out are not safe upon drained Swamp areas unless very costly and thorough systems of drainage are installed. Late or fall truck crops would in all probability be the most profitable, as at this season of the year it is dry and there would be much less danger of loss from high water.

The largest areas of Swamp occur along the Ogeechee and Little Ogeechee Rivers above the Tidal marsh line. Smaller areas are found along such streams as Augustine and Black Creeks. Still smaller areas border the smaller streams scattered over the county.

TIDAL MARSH.

Tidal marsh represents areas of marshy soil covered by salt water at high tide. The material is predominantly black to bluish-gray heavy silt clay, containing large quantities of shells and decaying vegetable matter. The Tidal marsh areas are covered mainly by a thick growth of salt or "sword" grass and rushes.

The reclamation of these lands would require extensive diking and pumping. It is not likely that projects of this nature would prove profitable. Underdrainage would also be necessary to remove the salt. The type occurs in widely distributed areas along the salt streams.

Some of the Tidal marsh along the upper part of the Ogeechee swamp was at one time diked and used for rice, but the dikes have now broken down and the land has reverted to its original condition. The type in general is considered nonagricultural.

COASTAL BEACH.

The Coastal beach occurs here and there along the coast. It consists of tide-washed sand and dunes. The texture is fine and the structure incoherent, except where packed by the waves. The dunes rise 30 to 40 feet above mean low tide and are covered by a sparse growth of palmetto and live oak. They are unstable, shifting with every strong wind. The Coastal beach areas have an average width of about one-fourth mile. The maximum width is reached upon Ossabaw Island, where the type is about a mile wide.

Coastal beach is nonagricultural, but a few spots are found in the rear of the sand dunes that would make fairly good garden spots if large quantities of organic matter were incorporated with the soil. Peaches of excellent quality have been grown in these places.

SUMMARY.

Chatham County has a land surface of about 427 square miles, or 273,280 acres, and is situated in the eastern part of Georgia, bordering the Atlantic Ocean and the South Carolina State line. It lies wholly within the Coastal Plain Province. The topography is level to gently rolling. Most of the drainage is carried through small streams into the Savannah and Ogeechee Rivers.

The first settlement was made in the county at Savannah in 1733 by the English. Savannah, the largest town in the area, has a population of 65,064 (1910 census) and is the largest port on the South Atlantic coast.

The area is well supplied with transportation facilities, 6 trunk lines of railroad touching Savannah and 26 steamboat lines entering the port.

The climatic conditions are characteristic of the South Atlantic coast section. The winters are unusually mild and a sea breeze tempers the heat of summer.

Trucking is the principal industry of the area. The country immediately surrounding the city of Savannah produces vegetables for the local market, while other sections having good transportation facilities produce early truck for the northern markets. The agriculture of the outlying districts is largely general farming and stock raising on a small scale. Very little cotton or rice is grown and no tobacco. Corn, oats, sugar cane, and hay constitute the principal staple crops. Sweet potatoes, English peas, cabbages, turnips, melons, lettuce, onions, and carrots are the principal vegetables grown for local markets, while Irish potatoes, snap beans, cabbage, cucumbers, lettuce, and melons are the principal crops grown for northern markets.

The leading truck farmers follow up-to-date methods. They use heavy applications of high-grade fertilizers and labor-saving machinery. Crop rotations are not in general use.

The Upland soils of Chatham County, represented by the Norfolk, Orangeburg, Coxville, Portsmouth, Hyde, Plummer, Scranton, Bladen, and Leon series are derived from the Columbia formation, and the flood plain types, represented by the Georgetown series, Swamp, and Tidal marsh, are Recent in formation.

Next to Tidal marsh, the Norfolk very fine sand is the most extensive and most widely distributed soil. It is best adapted to early truck crops. Heavy applications of fertilizer or manure must be made to get satisfactory results.

The Norfolk coarse sand is not very well developed and is confined to the northern part of the county. It is adapted to both early truck growing and general farming.

The Orangeburg fine sandy loam occurs only in small areas, but is the best agricultural type of the area. It will grow successfully nearly all the crops of this section, though generally used for trucking.

The Coxville very fine sandy loam is well developed and has a wide distribution. It is well suited to general farming and heavy truck crops, requiring less fertilizer than most of the types of the area.

The Coxville very fine sand is very limited in extent. It is well adapted to early truck crops and general farming.

The Coxville coarse sandy loam is adapted to general farm crops, especially cotton and heavy truck crops.

The Coxville clay is typical, but not extensively developed and is little used for agricultural purposes.

The Plummer coarse sandy loam is cultivated to a limited extent and is used mostly for trucking purposes.

Only a small proportion of the Portsmouth fine sand is cleared and under cultivation. Numerous small, well-drained areas are used successfully for trucking. The type is usually acid and needs heavy applications of lime.

The Portsmouth coarse sand is little used for agricultural purposes. It is utilized to some extent for pasture.

The Hyde very fine sandy loam is fairly well developed and is a strong soil, producing good yields of general farm and truck crops when properly drained.

The Hyde fine sand and Hyde loam are very limited in extent and are used mostly for truck crops, such as sweet corn, lettuce, and onions.

The Hyde clay is more extensively developed than the soils last mentioned and is used for general farm crops, usually corn, oats, hay, and rice.

The Scranton fine sand occurs only in small areas and is not very widely distributed. Most of the type is covered with a growth of longleaf pine. The small areas that are cultivated are usually planted to general farm crops.

The cultivated portion of the Bladen clay is very small and is mostly used for rice. Large areas are used for pasture.

The Georgetown clay, found upon the tidal flats of the Savannah River, at one time was extensively used for the growing of rice, but at present very little of it is under cultivation.

The Leon sand, Coastal beach, Tidal marsh, and Swamp are non-agricultural types.

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