

# SOIL SURVEY OF ESCAMBIA COUNTY, FLORIDA.

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## DESCRIPTION OF THE AREA.

Escambia is the end county in that long arm which forms the western projection of Florida. It has an area of 680 square miles, or 435,200 acres, extending from the Alabama-Florida line on the north to the Gulf of Mexico on the south, a distance of nearly 50 miles. The Escambia River separates it from Santa Rosa County on the east, while the Perdido River forms the western boundary and separates the State from Baldwin County, Ala. For a distance of several miles from the lower end of the county the indenting waters of the Gulf

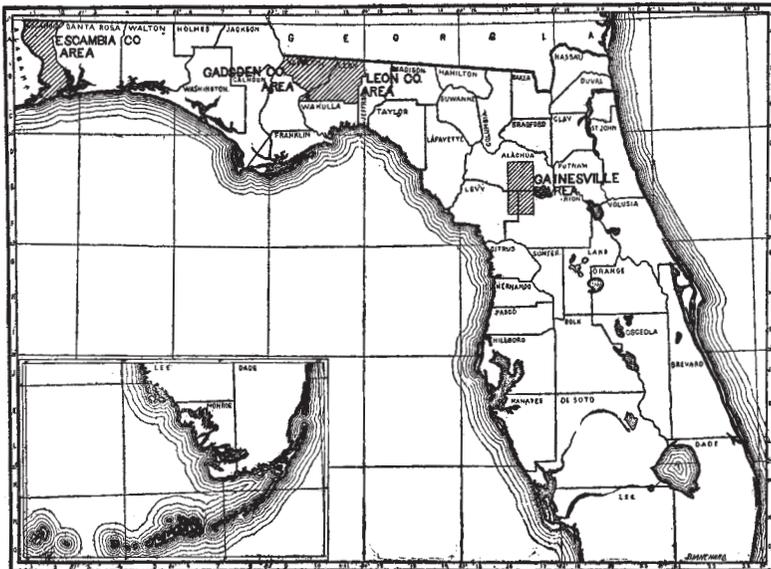


Fig. 10.—Sketch map showing location of the Escambia County area, Florida.

form natural boundaries on the east and west. The county is somewhat irregular in outline and varies in width from 25 miles along its northern boundary to about 8 miles across in its narrowest part.

There are two physiographic divisions in the county which, though not very sharply defined, still may be recognized. The smaller of these consists of the peninsula formed by the inclosing waters of the Gulf of Mexico, and Escambia, Pensacola, and Perdido bays. For the most part this section is nearly level, with immature stream valleys, and but few of them. The elevation varies from sea level

to something less than 100 feet. Sharp bluffs are present along the water front of Escambia Bay.

The remainder of the county forms the second division. Beginning about 20 miles from the Gulf the surface becomes undulating, gradually increasing in this respect toward the north and becoming quite rolling in the vicinity of the rivers and larger streams.

The rivers forming the county boundaries on the east and west constitute, with their tributaries, two drainage systems which cover areas of about equal extent in Escambia County. The divide between the two watersheds follows a line nearly midway between the streams. Well water is found at a depth of from 20 to 50 feet. Artesian wells have in some cases been secured at a depth of about 1,000 feet.

Pensacola and the surrounding territory came into possession of the United States in 1821 and at different times prior to that date had been held by Spain, France, and England. The population of the area surveyed, of which about 42 per cent is colored, is largely native born. At Cottagehill there is a settlement of people from the North Central States, and there are a few German communities in different parts of the county. With the exception of a strip along the railroad and in a few other scattered agricultural sections the area is very sparsely settled. The Twelfth Census gives the improved farms of the county as constituting about 2 per cent of the area. This has since been increased to about 4 per cent. There are several large tracts of land held by lumber companies, and there seems to be little inclination on their part to dispose of these in small tracts. Considerable timber remains, especially in the northwestern part of the county, and large saw and planing mills are located at Century, Pine Barrens, Muscogee, and Pensacola, besides many other smaller ones at different points. All crops have to be securely fenced to protect them from the stock which roams the county at will.

Pensacola, the only city or town of importance in the area, is situated near the southern end of the county on Pensacola Bay. It has a population of about 26,000 and is the metropolis of west Florida, besides possessing the finest deep-water harbor on the Gulf coast. It has some manufactures and is an important shipping point for lumber and naval stores, as well as for cotton and grain received from points farther north. At present, however, it lacks regular shipping facilities to American ports.

A branch of the Louisville and Nashville Railroad traverses the eastern edge of the county from north to south, connecting with the main line at Flomaton, Ala. A branch also leads eastward toward Jacksonville. A lumber road traverses the western side of the county and may eventually become a permanent transportation line. The northwestern corner of the county is not far from the main line of the Louisville and Nashville, which crosses Alabama just north of the Florida

line. There are large areas of country remote from any means of transportation. This lack of railroads through the county has done much to retard the growth of Pensacola and the surrounding territory. Excellent sand and clay roads can be easily constructed in nearly all parts of the county, but with few exceptions these have not been built, and even the main highways are often in deplorable condition. Oxen are used for logging and all heavy hauling. The Escambia River was formerly navigable for small craft, but at present is used only for floating lumber.

Pensacola is an excellent market for everything now grown in the area. In many instances the demand for fruits, vegetables, hay, butter, milk, etc., is not supplied by the local growers. All these products bring good prices and there is ample opportunity for increase in the quantity produced without fear of overstocking the local markets. The northern cities are comparatively easy of access over a route more direct than many other sections of the State enjoy.

#### CLIMATE.

The climate of Escambia County is typical of the region along the north Gulf coast and is what is known as "warm temperate." The records of the Weather Bureau station at Pensacola show that on an average there are nineteen days during the period from June to September upon which the temperature reaches 90° F. or higher. While the winter climate is not so even and salubrious as that on the east coast of Florida, even in the same latitude, it is usually mild. The average number of freezes during the winter is nine. The average date of the last killing frost in the spring is February 26 and of the first in the fall is December 10. This gives a growing season of nine months and makes possible two and sometimes three crops. Only once during the last fourteen years has the temperature fallen below 14° F. The normal temperature during the summer months is 81° F., and the average during the period December to February is 54° F. The rainfall is usually abundant, though occasionally a short drought is experienced during April or May. The heaviest rainfall occurs in July and August, the normal precipitation for these months being 6.73 and 8.36 inches, respectively.

There is of course considerable climatic difference between the extremes of the county, since they are nearly 50 miles apart. In the lower end, near the Gulf, crops are from one to two weeks earlier than in the northern part, and the former section possesses an immunity from the early and late frosts which often occur farther north. The summer climate along the coast is also tempered by an almost daily southwest breeze from the Gulf. The northern part of the county has a slightly higher average rainfall, there being a larger number of showers occurring in that region during the summer months. Its

average summer temperature is also slightly higher than that recorded in Pensacola.

The absence of large swampy areas and the purity of the water over the greater part of the area add not a little to its general healthfulness. The following table gives the normal monthly and annual temperature and precipitation recorded at Pensacola:

*Normal monthly and annual temperature and precipitation.*

Month.	Pensacola.		Month.	Pensacola.	
	Temperature.	Precipitation.		Temperature.	Precipitation.
	° F.	Inches.		° F.	Inches.
January.....	52.5	4.68	August.....	80.4	8.36
February.....	56.8	3.90	September.....	77.9	4.80
March.....	59.5	5.46	October.....	69.2	3.33
April.....	67.7	3.48	November.....	59.2	3.77
May.....	73.5	3.33	December.....	54.5	3.89
June.....	79.4	5.36			
July.....	80.8	6.73	Year.....	67.6	57.09

#### AGRICULTURE.

Agriculture has until recently been of minor importance in Escambia County. Hitherto lumbering or some industry closely associated with it has afforded ample employment for a majority of the people. Recently the county has begun to develop its agricultural resources, and the acreage devoted to crops is increasing steadily. There is a marked reluctance on the part of the native population to turn their attention to farming. This is partly due to prejudice against that occupation and partly to the fact that much of the soil is naturally unproductive and does not respond readily to the efforts of the unskilled farmer. There are, however, extensive tracts of land to be had at reasonable prices that can easily be brought under cultivation.

The cheapness of land and lumber, the mildness of the climate, and the comparatively low cost of living all make it easy to obtain a start in farming.

Scattered about the county are certain small agricultural communities living on farms which have been cultivated for many years past. Cattle, hogs, sugar cane, vegetables, and sweet potatoes have been the principal products, together with some peas, peaches, grapes, and pecans. A considerable number of pear orchards of the Le Conte and Kieffer varieties were set out some fifteen years ago, but the returns from these were unsatisfactory and most of the orchards have been allowed to run down. Blight has affected many of the trees, though the damage is not so severe as in some other parts of the South. Vegetables for market are grown to some extent in the vicinity of Pensacola, and a few shipments of early potatoes have been made from the upper part of the county. The acreage devoted to cotton and sugar

cane has been extended greatly during the last two years, and the increase will probably continue. A considerable number of cattle, sheep, and goats run wild upon the range throughout the year.

While the agriculture of the county is as yet in its infancy and has not resolved itself into any special types, there is a tendency toward the development of general farming upon the heavier soils, with cotton, corn, oats, hay, sugar cane, and sweet potatoes as the principal crops. Along the railroad and in the southern part of the county truck growing is being developed to a limited extent. Lumber and naval stores form the largest part of the county products at the present time. Live stock is of some importance, especially cattle. In 1900 only 127 bales of cotton were produced in the county, but the production in 1906 was several times as great. Sugar cane, corn, sweet potatoes, vegetables, and pecans are the principal products, with a minor acreage devoted to hay, oats, Irish potatoes, peas, peanuts, and peaches. The Scuppernon grape seems to thrive on all the principal soil types.

For the most part there has been little specialization of crops upon the various soil types, though certain broad lines of adaptation are recognized.

The value of crop rotation and the growing of leguminous crops is usually admitted by the farmer, but is not practiced as fully as most of the soils require. The most of the soils of the area are not naturally highly productive. Those with a heavy sandy loam or clay subsoil are capable of being brought to a fair state of productivity and if given proper attention can be maintained in that condition. The heavier soils will stand deeper plowing and cultivation than is at present given them.

The census of 1900 gives the average size of the farms in the area as 93 acres. This included unimproved as well as improved farms, of which the latter formed only about 20 per cent. The average number of acres under cultivation at present is not far from 40. Nearly 90 per cent of the farms are operated directly by the owners. Comparatively few fields are clear of stumps.

With such a small acreage there is little need in most cases for hired farm labor, and most of the work is performed by the owner and his family. It is almost impossible to secure farm help, so great is the demand for hands in the sawmills and lumber camps, where better wages can be secured than the farmer can afford to pay. From \$12.50 to \$15 a month with board is the usual rate paid for farm labor. The total expenditure for this item in 1900 was about equal to that for fertilizer.

The value of the improved farm lands varies according to location, soil, and class of buildings. Along the railroad the better farms are held at from \$10 to \$25 an acre. Away from the railroad the prices

range from \$6 to \$15 an acre. A majority of the farm buildings are rather poor, especially away from the railroad. An average valuation of all farm lands would not be far from \$10 an acre.

It has been demonstrated by actual tests that some crop can be grown successfully on nearly every soil type in the area. A majority of the people have always been lumbermen, however, and it is hard for them to realize that as the timber disappears they must turn their attention to farming. What the county needs most at present is an increased immigration of the industrious, skilled-farming class.

There is unlimited opportunity in the area for the successful growing of early and late truck crops for shipment to the North. At the present time the quantity grown does not even supply the Pensacola market. The soils, climate, and transportation facilities are fully equal if not superior to those of other sections along the Gulf coast where this industry has proved profitable. In addition to the early crops winter vegetables can be grown. The use of cold frames with cloth covers, or of glass-covered hotbeds, together with the adoption of methods used in the truck-growing regions, would enable the inhabitants of the county to realize a large income from this source.<sup>a</sup> There should be an organization of the growers for the purpose of systematizing shipments and securing suitable rates.

The burning over of the woodlands in the spring has been one cause of the great deficiency of organic matter in the soils of the county, and this practice should be stopped so far as possible. Leguminous crops should be grown in rotation with others at frequent intervals and occasionally plowed under. Cultivation should be thorough, both for the purpose of keeping the land in a good state of tilth and for the preservation of moisture during the summer months. A nearly level cultivation for cotton and corn will prove superior to the old ridge systems. Cowpeas, velvet beans, and oats for hay are especially recommended. Care should be taken to grow only the rust-proof varieties of oats, and as a rule they should be sown in November. The raising of stock, especially cattle and sheep, can be extended. One drawback to the sheep-raising industry, however, is the killing of many young lambs by the half-wild piney woods hogs.

Pecan trees are profitable if given a certain degree of care, and there is a possibility that English walnuts can be grown successfully. Hardy oranges of the Satsuma variety can be grown in the southern part of the county, and, it is believed, these, together with figs, pomegranates, Japanese persimmons, quinces, and all kinds of berries, could be produced commercially.

There has been for the last few years an effort on the part of a few

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<sup>a</sup> Much information in regard to the methods employed by successful truck growers may be obtained from the Soil Survey reports of Long Island, New York; the Craven, N. C., and the New Hanover, N. C., areas.

peach growers to bring that industry farther south than the present well-established peach-growing districts and thus secure an earlier product for northern shipment. There are examples of marked success in adjoining counties in the same latitude in Alabama, but peach growing on a commercial scale was not undertaken in Escambia County until 1905, so the success of the experiment remains to be seen. The native population grow seedling trees for their own use and are prejudiced against the grafted varieties, contending that the trees are too short lived. However, the best varieties are now being tried, and the result of the experiment should be followed with interest, since the soils of the area are well suited to the growth of peach trees. Here, as elsewhere, a peach orchard can not succeed without the best of care and cultivation.

One advantage is that peaches from this region will reach the northern markets several days earlier than from any extensive peach-growing district so far established. The crop is by no means a certainty each year, as frosts frequently do considerable damage, but on the whole the outlook for commercial peach growing in the county is encouraging.

The growing of cotton, sugar cane for sirup, and upland rice can be profitably extended upon the heavier soils. Cassava has been successfully grown on the medium sandy soils and is an excellent root crop for feeding purposes. It has been found difficult to keep the seed, probably because of its late maturity. Some difficulty has also been experienced in keeping Irish potatoes for spring seed, but if a late fall crop is grown for this purpose little trouble should be experienced.

At the present time the milk supply for Pensacola is produced either within the city limits or a short distance outside. There are excellent opportunities for a combined truck and dairy farm along the line of the railroads north of the city, and such a combination should prove profitable. Several poultry farms are also needed to supply the Pensacola demand.

#### SOILS.

Escambia County is situated in that physiographic division of the United States known as the Coastal Plain. It extends north for 50 miles from the general shore line of the Gulf. No official geological data of this region are obtainable, but observations made during the course of the survey show that the surface formations are probably those known as the Lafayette and the Columbia. The former is an upraised shallow sea deposit, consisting of red and yellow sandy clays and loams. In general this occupies the more elevated areas of the county. The Columbia formation is a later deposit of nearly uniform clean-washed sand laid down on some parts of the Lafayette formation during a period of partial submersion of the country. Erosion

was active during the interim between the two deposits, and the greater part of the present rolling topography was developed at that time.

Although the surface geology of the county is very simple, 14 types of soil, including Meadow, were recognized in the area. These have the characteristics of soils found throughout the Coastal Plain, being for the most part light sands or sandy loams.

The Lafayette has been the source of all the heavier upland types. The variation in color found in different parts of this formation makes necessary the division of its derived soils into two series, the more extensive Norfolk having a yellow clay subsoil and the Orangeburg a red subsoil. Each of these soil series is represented by three types, two of which are a fine sandy loam and loam. The classification of any particular area has depended upon its original texture as well as upon the effect of weathering. The forces of weathering have been least active upon the areas of leveler topography, so that the heavier soils are usually found there.

The Columbia sands have given rise to the surface soils over 56 per cent of the entire area. The topographic position, with modifying agencies depending upon this, has largely determined the separation and classification of these sands into the several types. The upland well-drained Norfolk sand and the Sandhill, the low-lying swampy Portsmouth, and the water-washed and wind-blown Galveston soils are all of nearly similar texture and composition, differing principally in organic-matter content and relative moisture conditions.

Most of the soils occurring in the area are well-established types. They are extensively found in most of the Coastal Plain areas and especially in those close to the Atlantic seaboard and Gulf coast, with the exception of Louisiana. The Orangeburg loam has not been previously recognized, and although its extent is limited, it is a distinct soil and conforms to the requirements of a separate type. For the most part the soils are typical. There has been some question as to whether or not the soils of the Gulf coast should be correlated with the corresponding soils along the Atlantic coast. While there are some minor points of difference they are not important enough to warrant a separation.

The following table gives the name and area of the several types.

*Areas of different soils.*

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Norfolk sand.....	191,744	45.3	Galveston sand.....	5,696	1.3
Norfolk fine sandy loam.....	54,016	12.7	Myatt fine sandy loam.....	5,696	1.3
Meadow.....	45,632	10.8	Sandhill.....	4,352	1.0
Norfolk sandy loam.....	37,824	8.9	Norfolk fine sand.....	2,496	.6
Portsmouth sand.....	31,424	7.4	Orangeburg loam.....	1,280	.3
Norfolk loam.....	17,536	4.2	Marsh.....	448	.1
Orangeburg sandy loam.....	17,024	4.0			
Orangeburg sand.....	8,704	2.1	Total.....	423,872	.....

## NORFOLK LOAM.

The soil of the Norfolk loam is a loam from 6 to 10 inches deep. It is usually brown or grayish in color for the first 4 or 5 inches, but below this it changes to a light yellow. Over a small proportion of the type the surface consists of an unusually heavy and shallow fine sandy loam. There is more organic matter present in this soil than in most of the types of the area.

The subsoil to 36 inches has a lemon-yellow color and is usually a heavy loam or clay loam for a few inches, changing to a heavy clay loam and sometimes to a clay containing small quantities of fine and very fine sand. The subsoil as a rule is somewhat impervious, and the soil as a whole has a fine compact structure. At the same time the fine sand content of the soil is sufficient to permit of its being worked with comparative ease, except directly after a rain. As a rule it does not form a crust on drying, as is sometimes the case with soils of this texture.

A large part of this type is found in a continuous strip from 1 to 2 miles in width, extending southward from the Alabama State line for a distance of more than 12 miles and occupying the highest parts of the divide between Pine Barren and Brushy creeks. Some smaller areas occur to the east of this strip on the level highlands situated between Pine Barren and Canoe creeks.

This soil occupies some of the highest points in the county and is also more nearly level than any of the other types mapped in the northern half. A few areas have a somewhat undulating surface, but for the most part the type is flat and in many cases rather poorly drained. Small ponds and swamps are of frequent occurrence in the flat areas. Artificial drainage is necessary for the best development of this type. At least one-half of the type will be benefited by open ditches or, better still, by tile drainage. In many places the spring rains would prevent an early cultivation of the soil, unless artificial means for removing the excess of water were provided.

The origin of this soil is similar to that of the Norfolk fine sandy loam. While it is possible that the material forming the Norfolk loam was the heavier when deposited, it is likely that the present difference in texture between the two soils is due principally to the fact that the soil found on the level topography has been less subjected to change by weathering.

The timber growth on the Norfolk loam is a very heavy growth of longleaf pine, a good part of which is still standing. A good wire-grass sod is also found.

There is no doubt that this soil is one of the most valuable in the county for general farming purposes. Its close texture and compact structure enable it to retain moisture during the growing season and also make it responsive to fertilization and cultivation. It is naturally more productive than the lighter soils.

At the present time there are only a few fields in cultivation upon the type, and the greater part of it is owned by lumber companies. It is well suited to cotton, corn, sugar cane, early Irish potatoes, hay, oats, and cowpeas and should prove to be a strawberry soil of special merit. Deeper plowing and more thorough pulverizing than is at present practiced on the lighter soil types will be found necessary on the Norfolk loam. Cowpeas and velvet beans grown in rotation with other crops and occasionally plowed under will assist in retaining a high percentage of organic matter in the soil, and the roots will also assist in making the subsoil more open and porous.

The following table gives the average results of mechanical analyses of samples of this type:

*Mechanical analyses of Norfolk loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14628, 14630.....	Soil.....	0.6	4.5	4.4	19.7	17.4	28.5	23.8
14629, 14631.....	Subsoil.....	.7	4.2	4.3	19.3	16.5	25.7	29.1

NORFOLK SANDY LOAM.

The soil of the Norfolk sandy loam is usually a medium gray sandy loam or a loamy sand, changing to yellowish below 5 or 6 inches. At a depth varying from 15 to 24 inches the soil becomes heavier and grades into the yellow material constituting the subsoil.

The subsoil ranges in texture from a sandy loam to a sandy clay, the sand being of medium to fine grade. In about half of the type the subsoil is comparatively light, and a true sandy clay is not found at less than 4 feet from the surface. In other areas, however, the heavy subsoil occurs at a depth of 15 inches and is frequently quite stiff and more or less tenacious. The most loamy top soil is usually found overlying a subsoil of this character and contains considerable quantities of organic matter, which assists in holding moisture and makes the soil richer. The sandy soil makes this an easy type to work. Except on some of the lighter areas, crops do not suffer much from drought, since the rather loamy soil and comparatively heavy subsoil are well fitted to hold moisture and to supply it to growing crops. In this respect the type as a whole is far superior to the Norfolk sand, but does not equal the Norfolk fine sandy loam.

The Norfolk sandy loam has almost as wide a distribution throughout the county as the Norfolk sand, but does not approach that type in point of extent. Some small areas are found scattered throughout the larger bodies of Norfolk sand in the southern part of the county, and it forms a gradation type where the level part of the county, which embraces the large areas of Portsmouth sand and Norfolk sand, begins to break into the more undulating country to the north. Thence northward it continues to be found in comparatively small

areas, occurring to a greater extent in the eastern part of the county a short distance back from the Escambia River.

The topography of the type is as variable as the character of the soil. Adjacent to the extensive sand plain in the southern part of the county the type is nearly level, as are also many of the smaller areas mapped along the river. The greater proportion of the type occurs either on slopes or in rather rolling areas, some of which are quite rough and broken. If brought under cultivation in these rougher areas, the loose texture of the soil would render it liable to damage from washing.

With the exception of some areas where springs occur, the drainage of the type is ample. A few open ditches would make cultivation possible even on the areas where the drainage is poorest.

As is true in general of the other sandy loam types of the area, the original material from which this type is derived is a coastal sandy clay deposit. The removal of a large quantity of the clay particles from the surface by moving water, leaving the coarser sand as a top covering, gives the soil its sandy texture.

The native growth on this type was a forest of longleaf pine. While not so desirable a soil for farm crops as the Norfolk fine sandy loam and the Orangeburg sandy loam, the possibilities of the type for general farming have not been fully appreciated, especially on the areas which have the heavier clay subsoil. These areas are suitable for corn, cotton, and sweet and Irish potatoes, while hay and sugar cane thrive on the lower and more level areas. A variety of fruit crops also do well on the type as a whole. The more rolling areas are admirably adapted to the growing of peaches. The greater part of the type needs more humus, as well as commercial fertilizers, and, by the addition of both, the productiveness of the soil can be greatly increased. Barnyard manure and the frequent growing of velvet beans, cowpeas, etc., would prove highly beneficial to the soil.

With a fair application of commercial fertilizer, cotton yields from one-fourth to one-half of a bale, corn from 12 to 14 bushels, and Irish potatoes about 60 bushels per acre. Sweet potatoes do well, yielding from 90 to 120 bushels per acre if well cared for.

The value of this soil varies from \$4 to \$8 an acre, according to location. A considerable number of small farms and parts of farms are situated on this type.

The following table gives the average results of mechanical analyses of samples of this type.

*Mechanical analyses of Norfolk sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14443, 14632.....	Soil.....	0.7	9.9	13.9	39.5	13.7	13.8	8.2
14444, 14633.....	Subsoil.....	1.1	9.9	10.9	29.7	13.1	15.3	19.9

## NORFOLK FINE SANDY LOAM.

The soil of the Norfolk fine sandy loam consists of a fine sandy loam or a loamy fine sand from 8 to 18 inches deep. For the first 3 or 4 inches it is gray or nearly brown in color, but changes to yellowish below that depth. The soil usually passes into the yellow or lemon-yellow subsoil by a long gradation, frequently becoming first a heavy sandy loam and finally a sandy clay at a depth of 24 inches or more. In some places, however, the clay subsoil is encountered within 10 or 12 inches of the surface. Small reddish or brown iron concretions are very numerous over some of the areas. After several years of cultivation areas of this type of soil assume a much lighter color.

The fineness and somewhat compact nature of the soil, together with its fair organic-matter content and heavy subsoil, make this type well suited to maintain crop growth throughout the summer season. Occasionally there is a tendency to crust slightly after rains, but as a whole this soil is easily cultivated. Its nearly level topography and compactness of structure greatly enhance its value as compared with the Norfolk sand and Norfolk sandy loam. The zone of gradation between this type and the Norfolk sandy loam is sometimes broad, making any definite boundary hard to determine. As a rule the Norfolk sandy loam has a much coarser, deeper soil and lighter subsoil than the Norfolk fine sandy loam.

This type is encountered in areas of various size throughout the northern and central parts of the county. Large single areas of several square miles extent are located to the west of Molino and in the northwestern corner of the county. The type is confined principally to the more elevated sections of the county, especially the crests of ridges, the surface in such cases being moderately rolling. Frequently, however, these ridges expand, forming a broad, level plateau and giving to the type a nearly level surface. Small ponds and swampy places 3 to 4 acres in extent are of frequent occurrence over such areas. With the exception of limited areas on these flat surfaces the type is well drained.

The origin of the type is due to the weathering of the yellow sandy clay of the Lafayette formation. There probably has been little reworking of the material since it was deposited, the present soil conditions resulting from the washing out of a part of the clay particles near the surface. Organic matter has of course contributed materially to the composition of the soil. Often the yellow clay forming this soil is underlain within a few feet by a stratum of the red clay and small patches of the red soil are frequently found associated with the type. In several localities thin beds of coarse reddish-brown sandstone or conglomerate outcrop, thickly strewing the surface with fragments over areas of 2 or 3 acres.

The native forest growth upon this type is almost exclusively long-leaf pine and the second growth is also likely to be this variety. A

good wire-grass sod is usually found covering this soil in its virgin state.

With the exception of the Orangeburg sandy loam and the Orangeburg loam, both of which are of minor importance as regards extent, the Norfolk fine sandy loam is the most desirable general farming soil in the county. It is also a very desirable soil for heavy and late truck crops. These facts, together with its relatively large extent and general distribution, make it a very important factor in the agricultural development of the county. At the present time it is being quite generally selected for settlement, but probably not more than one-third of the type is under cultivation.

In view of the fact that Escambia County possesses similar climatic conditions and is in the same general region as those counties farther east in the State in which the growth of wrapper leaf tobacco has been established, the question has been raised as to the probable success of this crop in this area. The leading soil type used for tobacco in Gadsden County, Fla., and in Decatur County, Ga., is the Norfolk fine sandy loam. The type as found in those localities is very similar to that mapped in Escambia County. While nothing less than an actual trial by those who have had experience in the growing and fermenting of this tobacco will determine this question, the chances are in favor of success. As a rule the irrigation of the areas would be a matter of some difficulty.

Sugar cane, corn, peavine hay, a little oats, and some cotton are the crops now grown. The sirup produced from the cane is of a good color and quality, and the yield ranges from 300 to 450 gallons per acre. Corn yields about 20 bushels per acre, and with moderate fertilization and cultivation 35 bushels can be obtained. Hay yields about 1½ tons per acre, which represents at least two cuttings. The type has considerable merit as a cotton soil, though little has as yet been grown upon it. Cotton does better after the land has been worked in some other crop for a year or two after it is cleared. With fertilization it produces from one-fourth to three-fourths of a bale per acre. Sugar cane or sweet potatoes seem to be the best crop to grow on the new land. Of the truck crops radishes, beans, tomatoes, lettuce, spinach, and strawberries would probably be the most suitable. These would require heavy fertilization. The rolling areas of the type are well adapted to fruit growing, especially peaches, of which several thousand trees have recently been set out. Pecans do well on the more level areas.

The use of fertilizers is thought to be necessary for any degree of success; but the quantity of the commercial fertilizer which must be used can be reduced to a minimum by the growing of velvet beans and cowpeas once every two or three years. In addition to this more live stock should be kept and the manure saved and carefully applied to

the fields. The superior advantage of this soil for the production of forage crops is also favorable to stock raising.

The soil will stand a much deeper and more thorough cultivation than the more sandy types, and the use of 2-horse plows and harrows are essential if one would obtain the best results. Properly handled and judiciously fertilized the greater part of the type is capable of being brought to a very satisfactory state of productiveness.<sup>a</sup> The price of land of this type ranges from \$6 to \$12 an acre.

The following table gives the average results of mechanical analyses of samples of this type.

*Mechanical analyses of Norfolk fine sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14411, 14634.....	Soil.....	0.9	5.1	5.1	29.7	25.4	21.9	11.6
14412, 14635.....	Subsoil.....	.6	9.9	3.4	23.6	19.9	19.7	22.6

#### NORFOLK SAND.

The soil of the typical Norfolk sand is an incoherent light-gray or yellowish medium quartz sand with a depth of about 5 inches. In some cases it is dark gray in color and to a depth of from 2 to 4 inches is more or less loamy. The subsoil to a depth of 36 inches or more is a yellowish or cream-colored and sometimes reddish-brown sand of the same texture as the soil. It is loose, open, and incoherent, and contains very little clay and even less organic matter than the soil. While

<sup>a</sup> A study of the manurial requirements of this type of soil was undertaken in the Bureau laboratories, using three large samples obtained from different parts of the county. Two of these samples were from fields under a good state of cultivation, producing sweet potatoes, melons, corn, and cotton. A little rye and some cowpea hay have been grown on one of them, and sheep and other stock have been allowed to graze the other. Stable manure, and a complete fertilizer, composed chiefly of cotton-seed meal and acid phosphate, have been used upon both. The yield of corn is generally 15 to 20 bushels, cotton, one-fourth bale, sweet potatoes, 75 bushels, and hay, 1 ton per acre. The field from which the third sample was taken is uncultivated.

In the wire-basket tests lime alone gave a very marked increase, and its influence was seen in every instance where it was used in combination with other substances. With cowpeas, the increase was larger than in any other treatment and somewhat greater than that obtained when lime was used alone. When combined with a complete fertilizer but slight increase over that produced by the lime itself was noted, although both were greatly superior to the untreated soil.

The various combinations of nitrate of soda, sulphate of potash, and acid phosphate also gave increases over the untreated soil, as did the use of stable manure. The effects of acid phosphate and sulphate of potash, both singly and combined, were less marked, though slightly beneficial. The results of these tests, while strictly applicable only to the fields from which the samples were taken, will doubtless apply to this type of soil throughout the area, and confirm the observations of farmers as to the beneficial effect usually following the liming of newly cleared pine lands.

there are certain slight variations in the texture of the sand in different parts of the area, the greater part of the type is uniform in this respect. An unimportant exception is found in the northern part of the county, where the areas of this type contain varying quantities of white quartz.

The open, porous structure of the soil as a whole and its usual deficiency of organic matter make it especially susceptible to drought. Because of its leachy character the soil does not show the effect of commercial fertilizer for any length of time. Although the entire type is poor, its agricultural value differs widely. The broad, level plain stretching north from Pensacola is in many parts above the average in productivity for this soil. There are other similar areas which are fairly productive. On the other hand, there are many areas which approach the Sandhill in structure and are so loose and incoherent as to be nearly worthless. The burrows of salamanders are a prominent characteristic of this type.

The Norfolk sand is by far the most extensive type found in the area and its distribution is general. It covers 45.3 per cent of the county or approximately 300 square miles. The largest and most typical, as well as the most uniform area of the type, occurs in the southern part of the county. Here its surface is usually nearly level, or at the most slightly undulating. The very porous nature of the soil is sufficient, however, to afford ample drainage even in extremely wet seasons. Farther north the surface becomes more uneven and rolling and is in some cases steep and gullied. The type occurs either along the slopes of the smaller streams or in more extensive continuous areas on the sides of the ridges between the larger creeks.

By its topography and close proximity to the Gulf and surrounding bays, that portion of the type of low elevation lying in the southern end of the county gives evidence of being a very recent sandy marine deposit of later origin than the heavier soils farther north. It has also been less affected by erosion and other modifying agencies and retains more nearly the characteristics it possessed before it was elevated to its present position. The mantle of sand covering this section is from 5 to 20 feet or more in thickness. The type as found bordering the streams in the northern part of the county is a deposit of similar character. Its formation, however, was influenced by previous topography and it is also likely that the finer sediments of earlier deposits mingled with it to some extent. Because of its rolling topography and the steep slopes along the streams erosion has undoubtedly been active in modifying the surface soil to a considerable degree. The rolling areas of the type are often too well drained and when cleared and cultivated have a tendency to wash.

The native forest upon this type is a fairly heavy growth of long-leaf pine, together with a few scrub oaks and some dogwood. As soon as the pine is cut away the oaks spring up in large numbers and

a second growth of pine is unusual. As a rule the grass is so sparse that no firm sod is found and the bleached surface often presents a barren appearance. There are some areas, however, which afford fair pasture for several months of the year.

The Norfolk sand, because of its loose structure and low productivity, is not well suited to the heavier crops, such as cotton, corn, cane, etc. Its texture and general character fit it for the lighter, quicker growing crops, such as asparagus, beans, beets, turnips, lettuce, Irish potatoes, peas, spinach, berries, etc., and such other crops, like melons, cantaloupes, sweet potatoes, cowpeas, and peanuts, as thrive best on a light sandy soil. The large percentage of sand in this soil and its efficient drainage causes it to warm up early in the spring, and it can also be used for growing hardy vegetables during the winter.

The yield of farm crops upon this type is very light. No cotton is grown upon it. With fertilization an acre of corn yields from 8 to 12 bushels, and of sugar cane from 150 to 250 gallons of sirup of excellent quality. Without fertilization the yields are very low. Cowpeas and velvet beans usually make a fair stand. The hot, scalding effect of the sun after the summer showers is often especially severe upon the crops on this type.

At the present time there is comparatively little of this soil in cultivation. It is farmed in a desultory manner, with little recognition of special methods or systems, aside from that practiced on the other types. There are a few successful truck farms in the vicinity of Pensacola, but little effort has been made to grow these products for shipment.

The Norfolk sand needs close attention and special methods to obtain the best results. One of the chief difficulties to be overcome is its tendency to droughtiness. This can be somewhat corrected by the addition of humus through the plowing under of green crops, such as cowpeas, velvet beans, etc., with a slight application of lime to prevent acidity and hasten decay.<sup>a</sup> The application of stable or barnyard manure is also of great importance. These, with shallow and level cultivation, will enable the loose surface soil to retain a much greater moisture supply and insure a more satisfactory and quicker

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<sup>a</sup> The manurial requirements of this type of soil were investigated, using three large samples obtained from fields located near Pensacola, Molino, and Muscogee. The first two have been under cultivation for some years, and have received applications of commercial fertilizer, mainly cotton-seed meal, acid phosphate, and muriate of potash, as well as some barnyard manure, usually applied when corn is grown, but no regular rotation of crops has been followed, nor has there been any system in the application of either manure or fertilizer. The average yield is about 15 to 20 bushels of corn and 65 to 70 bushels of potatoes to the acre. Oats are also grown but usually pastured, and the natural grasses cut for hay. The remaining field is not cultivated at present. Tests were made by the wire-basket method, using nitrate of soda, acid

growth of all crops. Some pear and peach orchards are found on this soil, but as a rule the heavier soils are better for these fruits. Pecan trees do fairly well. Large areas of the Norfolk sand remain unsettled. Its price ranges from \$1.25 to \$5 an acre, according to location, with a somewhat higher valuation in the vicinity of Pensacola.

The following table gives the average results of mechanical analyses of samples of this type:

*Mechanical analyses of Norfolk sand.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14203, 14640.....	Soil.....	2.1	20.9	25.5	32.5	6.7	7.8	4.4
14204, 14641.....	Subsoil.....	1.9	17.7	22.6	35.9	8.5	8.4	4.7

NORFOLK FINE SAND.

The surface 6 inches of the Norfolk fine sand is a gray fine sand, usually somewhat firm and compact. This grades into a gray or yellow fine sand which continues to a depth of 36 inches. In some of the smaller areas the subsoil becomes appreciably heavier at about 30 inches and is a fine sandy loam below that depth, grading finally into a sandy clay at from 3½ to 4 feet below the surface.

This type is neither extensively nor very typically developed in Escambia County. It is found principally in a few scattered areas along the Perdido River. As a rule these areas consist of small ridges between streams or stream heads and possess a well-rounded contour, thus insuring good but not excessive drainage. A few comparatively flat areas of this soil were also mapped in the form of second bottom lands along one or two of the larger streams.

The occurrence of these fine sand areas in connection with the streams indicate that they are comparatively recent in formation and were laid down under quiet conditions of water favorable to the deposition of fine material, probably in small bays.

phosphate, sulphate of potash, and lime, singly and in combinations, stable manure, and cowpea vines applied as green manure with and without lime.

Cowpea vines to which lime was added gave the greatest increase and stable manure the next, the difference, however, not being very great and both being greatly in excess of the increase derived from the use of a complete fertilizer, either with or without the addition of lime. Increases were obtained from the use of nitrate of soda, sulphate of potash, and acid phosphate, used singly and in combinations of two. Lime alone was beneficial and increased the efficiency of the complete fertilizer when in combination with it. The tests substantiate the benefits to be derived from the use of stable manure and systematic green manuring on soils of such loose and incoherent texture. The results of these experiments, while strictly applicable only to the fields from which the tested samples were drawn, are no doubt indicative of the best treatment for this type throughout the area.

The type is covered with a heavy growth of longleaf pine and some dogwood. As a rule it also supports a thick sod of native grasses which afford good pasturage.

Most of the type is still in its wild state, and no estimate of yields is available. Because of its compact nature, as well as the relatively shallow depth to the water table, it should be a fairly good general farming soil, suitable for corn, peavine hay, and sugar cane. It is also an ideal truck soil.

The following table gives the results of mechanical analyses of samples of this type:

*Mechanical analyses of Norfolk fine sand.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14638.....	Soil.....	0.8	5.5	4.9	43.7	31.2	8.8	5.2
14639.....	Subsoil.....	.6	3.5	4.5	42.3	31.0	10.5	6.9

PORTSMOUTH SAND.

The soil of the Portsmouth sand consists of a medium black sand from 6 to 12 inches deep. It is underlain by a sand subsoil of similar texture and of a gray, yellowish, or dirty white color. The dark color of the soil is due to the organic matter which in some cases is present in sufficient quantities to make the soil quite loamy. In some cases this dark-colored soil was found to extend to a depth of 3 feet. Occasionally a brown peaty layer a few inches in thickness is found in the subsoil, though this feature is not prominent. In some areas in other States where this soil has been mapped a hardpan is frequently found, but this condition exists in only a few places in Escambia County. Small swampy depressions also occur throughout this type, in addition to the larger ones shown on the map.

The Portsmouth sand occupies a considerable area in the southwestern section of the county, and is the principal soil type surrounding Perdido Bay, where it occurs in comparatively broad areas, broken only by small areas of swamp and ridges of Norfolk sand. It also extends for some distance up the streams emptying into the bay from the northeast.

The type is characterized by its occurrence in flat, poorly drained areas, which for the most part are never more than 15 or 20 feet above sea level. The main area is traversed by a number of very swampy "slashes," which follow a course parallel to the coast line. The area to the west of Eleven-mile Creek is somewhat lower than the balance of the type, and much of it is wet and of a swampy character and is not suited to cultivation.

In comparatively recent geological times the waters of Perdido Bay extended over this broad, flat area, and upon their recession left a

sandy bottom composed of the materials derived by wash from the adjacent territory to the north. The organic matter, now such a conspicuous feature of the soil, is derived from vegetation which thrived shortly after its elevation. The small Norfolk sand areas found mingled with the Portsmouth sand were either heaped by former wave action or occur as the result of superior drainage conditions which surround them.

At the present time the areas are covered principally with longleaf pine, with an occasional cypress. The wetter areas support a thick growth of gallberry and some gum, in addition to the cypress and pine. A wire-grass sod is found in some places, but the most of the native grasses are of a moisture-loving character. They furnish good pasture from the latter part of March to December.

Up to the present time little has been done in the way of cultivating this type, and the section is sparsely settled. Examples of successful cultivation are not lacking, and there is little doubt that much of this soil can be made to yield profitable returns. One of the first steps in making it suitable for cultivation is the securing of sufficient drainage. In some parts of the area this would be a matter of considerable difficulty and would require the investment of large capital. In the main Portsmouth sand area, however, as will be noted from the map, there are several long natural drainage channels with areas of slightly elevated soil between them, so that fall for sufficient drainage is assured. The expense of cutting short cross ditches would not be great. In some of the deeper ditches the sandy nature of the soil might cause the walls to cave, but it is not thought that this would be a serious difficulty in a majority of cases. Being a low soil, it withstands drought better than many others and is thus fitted to some of the longer growing crops. While it would need fertilizer, it already contains a good supply of organic matter.<sup>a</sup> With good drainage it is

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<sup>a</sup> The manurial requirements of the Portsmouth sand were investigated by the wire-basket method, using for the purpose a large sample obtained near Warrington. This field has been under cultivation about four years and has been planted to sweet potatoes, pumpkins, watermelons, and beans, the yields unknown. A small quantity of manure and a little commercial fertilizer, chiefly cotton-seed meal, has been used. The field is drained by a system of open ditches.

A good increase in plant growth was obtained through the use of lime at the rate of 2 tons per acre, the increase thus obtained being equal to that resulting from the use of barnyard manure or a complete fertilizer to which lime at the same rate was added. An increase was also observed when cowpeas and lime was used. In fact, whenever lime was applied its influence was plainly seen.

Applications of nitrate of soda, sulphate of potash, and acid phosphate, singly and in combination, gave slight increases over the untreated soil, the combination of all three giving the largest increase, while sulphate of potash and acid phosphate, singly or combined with each other, were of too little benefit to warrant their use.

The results of this test are held to be strictly applicable to the field from which the sample was taken, but they agree well with the experience of farmers upon recently cleared pine lands of this type throughout this section.

thought that it would prove a very valuable truck soil, especially if in addition means for irrigation be provided. It would be suited to onions, lettuce, strawberries, cabbage, asparagus, cauliflower, radishes, etc., and possibly to winter celery. Of the heavier crops, sugar cane, corn, and either sweet or Irish potatoes would be the best. The location of this soil in the southern end of the county and its proximity to the Gulf also makes it earlier than some of the types farther north.

The following table gives the average results of mechanical analyses of samples of this type:

*Mechanical analyses of Portsmouth sand.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14213, 14651.....	Soil.....	Tr.	10.0	33.2	44.1	0.9	6.9	2.7
14214, 14652.....	Subsoil.....	0.1	8.8	38.6	41.4	1.0	5.9	3.5

MYATT FINE SANDY LOAM.

The soil of the Myatt fine sandy loam to a depth of from 9 to 12 inches is usually a light-gray fine sandy loam. The subsoil to a depth of 36 inches is very similar to the soil in appearance and texture, though usually a little lighter in color and sometimes slightly heavier in texture, in some cases becoming a heavy mottled sandy loam at 30 inches. In a few places the soil is dark colored or nearly black from the presence of relatively large quantities of humus, but as a rule there is comparatively little organic matter present. The frequent changes of the surface soil from a fine sandy loam to a fine sand make the type rather irregular, so that it can not be considered a typical development.

The type exists only to a limited extent in Escambia County, and is found principally in the western part along the small streams tributary to the Perdido River. It occurs in oval or amphitheater-shaped areas about the stream heads, or as a bottom land along their lower courses. A few areas are also found near the river, and are locally known as savannas. All the areas are crawfishy and wet during several months of the year. They are covered with a sparse growth of pine, with a scattering of cypress. The native grass is of semi-swampy nature, and the growth is luxuriant.

The formation of these areas is due to the deposition of fine sand in still water some time after the uplifting of the mainland areas. To a certain extent they have also received the wash of fine sediments from surrounding higher lands. The gray color and soggy nature are due to deficient drainage. Little if any of this soil has been cultivated, and the most of it, for the present at least, should be left in pasture.

The following table gives the results of mechanical analyses of samples of this type:

*Mechanical analyses of Myatt fine sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14441.....	Soil.....	1.0	9.9	6.8	24.4	27.8	20.8	9.6
14442.....	Subsoil.....	.6	9.2	9.0	21.7	25.7	19.4	14.2

ORANGEBURG SANDY LOAM.

The Orangeburg sandy loam constitutes one of the best cotton and general farming soils of the Gulf and Atlantic coastal plains, and while it is not extensively found in Escambia County, it covers sufficient area to be of considerable importance. The surface soil from 0 to 15 inches consists of a light-brown or reddish-brown sandy loam of medium to fine texture. For the first 8 inches the soil usually contains a relatively high content of humus as compared with many of the soils with which it is found associated. While it has a fine texture and is more or less compact, the loaminess of the soil and the quantity of sand which it contains is sufficient to make it easy to plow and cultivate, with little if any tendency to form a crust after rains. The sand content is sufficient to cause it to warm up early in the spring, while it is retentive and the effects of fertilizers are lasting.

The subsoil likewise has some very desirable features. While as a whole it consists of a red sandy clay extending from 15 to 36 inches, the upper portion, from 15 to 25 inches, is usually slightly more sandy and hence somewhat friable, while below this it becomes quite compact and has more nearly the characteristics of a true clay, though containing considerable quantities of fine sand. It does not hold a large quantity of water for any great length of time in close proximity to the root zone of the growing crop, yet retains within easy reach sufficient moisture for vigorous growth. With fair cultivation crops suffer very little from drought, and on the other hand the leaching effects of heavy rains are not so severe as on some other types.

The most extensive occurrence of this type is in the northern part of the county. It is found in smaller and less typical areas to the southward, disappearing almost entirely a little below the middle of the county. There are no regular lines of elevation or special topography to which it is confined. It is usually found, however, on broad, rather flat undulating divides or ridges and associated with the Norfolk fine sandy loam. It also occupies slight slopes, usually near the heads of draws or small streams. In this position the surface is occasionally somewhat denuded of its soil covering. On the whole the

slight unevenness of the surface, together with the usual good elevation and frequency of small streams and shallow draws, affords ample drainage.

The origin of this soil and process of formation is that common to most soils of the Coastal Plain. It is usually considered as being derived from one of the older shallow sea deposits, but where it occurs in close relationship with the Norfolk series of similar texture this difference in time of deposition is not so evident, although in general it is true. Since its deposition and later elevation the material has been slightly changed by erosion and other weathering agencies, as well as by the accumulation of organic matter on the surface.

The native vegetation is quite generally a strong and vigorous growth of longleaf pine. After the larger trees are cut off young ones spring up from the seed in thick groves and small clusters. A sparing growth of oak is occasionally found on some of the lighter phases of the type.

This soil is well adapted to the growing of cotton. It is likewise an excellent corn soil, producing yields above the average for the Southern States. Cowpeas, velvet beans, crimson clover, and other legumes grow well and produce large quantities of forage and good yields of seed. The soil is not quite so well adapted to the production of sugar cane as the Norfolk fine sandy loam, since the sirup is of a darker color. As it yields more per acre, however, there is little difference in the profit on the two types.

Cotton yields from one-fourth to three-fourths of a bale per acre with only fair cultivation and fertilization. There is little doubt that with better culture the yield could be brought up to 1 bale or even more than that per acre. Corn yields from 15 to 30 bushels, but this could be increased. Oats do exceptionally well for this section.

It is the practice to use but little fertilizer on this soil, since as a whole it is fairly productive in its natural state, and as yet has been under cultivation for so short a time that no marked decline in the yields has taken place. The application of manures, together with the use of crop rotations, in which legumes, such as velvet beans, cowpeas, and crimson clover are included, should be practiced. If this is attended to properly, the farmers who possess this type of soil need not fear the impoverishment of their fields so common in older agricultural sections of the South and hardly to be avoided on some of the lighter, sandy types.

A general appearance of prosperity is noticed where this type forms the principal farming land. It is also noticeable that this soil is most sought after in buying cut-over lands from the large mill and timber companies, and is the first to be cleared and put under cultivation. The price of farms is considerably higher where a large proportion of the land is Orangeburg sandy loam.

The following table gives the average results of mechanical analyses of samples of this type:

*Mechanical analyses of Orangeburg sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14647, 14649.....	Soil.....	2.3	13.6	11.5	27.9	17.0	17.7	9.3
14648, 14650.....	Subsoil.....	1.5	10.1	9.7	23.1	12.1	16.1	27.4

ORANGEBURG SAND.

The Orangeburg sand consists of medium to coarse gray sand, quickly changing to a yellowish or reddish-brown color and extending to a depth of 8 to 24 inches. The lighter colored areas have a tendency to be loose and incoherent, while the reddish-brown areas are heavier, more compact, and often quite loamy. Beneath this surface soil occurs a somewhat coherent brick-red sand or sandy loam, which continues to a depth of 36 inches, usually becoming heavier with depth. It is seldom that a true sandy clay subsoil is found, and in this respect the soil in Escambia County differs from that found in other surveys.

This is a minor type, and the total extent in the county is only 8,704 acres. While the areas of this type are not confined to any one section of the county, they occur somewhat more frequently in the northern part.

The larger areas of this soil usually occupy an elevated position between stream courses and are nearly level and the surface drainage is rather poor. On the other hand, the open, porous nature of the soil and subsoil allows the drainage water to pass readily downward, and the absence of fall is of little importance. The smaller and more irregular areas usually occur on more or less steep slopes and represent a gradation between the heavier soils of the uplands and the Norfolk sand almost invariably found along the streams.

The Orangeburg sand is derived from deposits of the Lafayette age. In productiveness and general agricultural value it is superior to Norfolk sand, owing mainly to its heavy, more compact subsoil. The forest growth is longleaf pine, dogwood, and some scrub oak. The crops grown show that it is a first-class truck soil and is also suitable for general farming. Cotton yields about one-half bale per acre where fertilizer is used, and corn about 20 bushels. Sweet potatoes and sugar cane, as well as forage crops and some fruits, also do well.

The following table gives the average results of mechanical analyses of samples of this type.

*Mechanical analyses of Orangeburg sand.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14416, 14645.....	Soil.....	2.5	21.9	15.3	28.8	10.0	13.0	8.4
14417, 14646.....	Subsoil.....	2.9	21.1	12.9	28.5	11.6	12.2	10.5

## ORANGEBURG LOAM.

The surface 8 inches of the Orangeburg loam consists of a dark reddish or chocolate-brown loam, the sand content of which is principally of the fine grade, though a considerable quantity of medium sand is present. The soil is mellow and loamy under most conditions, and contains a larger percentage of organic matter than most soils with which it is found associated.

This fact is largely responsible for its characteristic color and other desirable features as regards structure. The subsoil, from 8 to 36 inches or more, possesses the same desirable features as the subsoil of the Orangeburg sandy loam, having the characteristic red color and being but slightly heavier in clay content. It contains sufficient quantities of fine and very fine sand to render it permeable to water, yet sufficiently retentive of moisture to prevent leaching. It yields a much larger percentage of its moisture content to growing crops during times of drought than does a true heavy clay of more compact and tenacious character.

This soil is not extensively developed in the county, but occurs in small detached areas in the extreme north-central part. It occupies quite level areas in very slight depressions. The natural drainage is thus rendered imperfect and in many instances open ditches or tile drains would be very beneficial. The origin of this type and the process of formation is the same as that of the Orangeburg sandy loam, except that as this soil is more level and in many instances slightly depressed, there has been a greater accumulation of silt and clay, as well as of organic matter, in the soil.

The Orangeburg loam is nearly all cleared and under cultivation, but where found in its native state it supports a dense and thrifty growth of longleaf pine, which at one time occupied its entire area. The original growth was large and valuable for lumber. Where these larger trees have been cut off, if left unmolested for several years, a very thick growth of young pines springs up.

This soil is especially well adapted to cotton and corn, being probably the strongest soil in the area for these crops. Acid phosphate is about the only fertilizer used for cotton. With moderate applications of this, cotton yields from one-half to three-fourths of a bale and occasionally 1 bale per acre. Corn yields from 25 to 45 bushels per

acre with fair cultivation and with but little fertilizer. As high as \$50 per acre is being asked for small areas of the type even where several miles distant from the railroad.

The following table shows the average results of mechanical analyses of this soil:

*Mechanical analyses of Orangeburg loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14414, 14643.....	Soil.....	0.6	9.1	10.3	21.3	13.2	22.4	22.5
14415, 14644.....	Subsoil.....	.3	5.6	7.3	22.1	11.9	18.7	33.5

GALVESTON SAND.

The soil of the Galveston sand is a white or gray medium to coarse waterworn sand with a depth of 36 inches or more. Usually there is little difference either in texture or appearance between the soil and subsoil, but occasionally the latter has a yellowish color. Recent shell fragments are scattered over certain areas, but these are not especially prominent.

This soil is the typical beach sand found upon the shore line along the Gulf of Mexico and lower bays. Most of the areas are snow white, and under the summer sun of this latitude reflect an almost blinding light. As a rule the beaches are narrow, and the greater part of the type is found just back of these in the form of irregular wave and wind heaped hillocks and small dunes.

This soil has no agricultural value at present. Upon some parts of the type there is a growth of stunted pine and scrub oak, but a large proportion is devoid of vegetation, except for a few bushes and scanty tufts of grass.

The following table gives the results of a mechanical analysis of a sample of this type:

*Mechanical analysis of Galveston sand.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14397.....	Soil.....	0.0	15.5	56.1	28.3	0.1	0.0	0.0

MARSH.

On the lee side of the barrier beach fronting the Gulf of Mexico and about the heads of one or two of the bayous there are found several small areas of a low, marshy character, which have been classified as Marsh. The soil consists for the most part of a dark medium sand mixed with varying quantities of partially decayed organic matter. In a few cases the quantity is sufficient to justify the classification of the soil as Peat, but usually there is only enough

organic matter present to give the soil a texture similar to that of a light sandy loam. The areas are normally but slightly elevated above tide water and at times are subject to overflow. They are covered with coarse marsh grass and reeds, and afford some pasture, but aside from this are of no present agricultural value.

The following table gives the results of a mechanical analysis of a sample of this type of soil:

*Mechanical analysis of Marsh.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14398.....	Soil.....	0.2	17.5	59.0	19.0	0.1	2.3	1.9

MEADOW.

The term Meadow has been used to designate bottom lands in various parts of the county, which because of their low, wet character are unsuited to cultivation. They consist of isolated, poorly drained areas or strips along the stream courses, usually from one-eighth to one-half mile in width.

Some of the areas are distinctively swampy over a considerable part of their extent, while others are overflowed only during the winter; but no satisfactory line could be drawn between the two. The more prominent swamp areas have, however, been indicated by symbol upon the map. A part of the bottom along the Escambia River forms the largest single area of this character.

The native vegetation covering the Meadow is of rank growth and distinctly different from that on the higher lands. It consists of holly, black gum, bay, magnolia, poplar, gallberry, and pine, with some cypress in the more swampy areas. This timber constitutes the only present product of these lands.

SANDHILL.

The soil of the Sandhill is a loose gray or whitish, medium to coarse sand of uniform composition. There is practically no difference in texture between the soil and subsoil, but the latter has a yellow or cream color, which begins within 2 or 3 inches of the surface.

This soil is found only in the southern part of the county and principally close to the water front of the Big Lagoon and harbor entrance. Along this front for almost the entire distance there is a low bluff, back from which the country drops off into the "flat-woods" or Portsmouth sand area. The Sandhill comprises the main part of the bluff or rise and varies from one-eighth of a mile to 1 mile in width. While over a large part of it the topography is ridgy or hummocky, there are some comparatively level areas. The soil of these presents the same loose incoherent character as that of the rougher areas.

The type is undoubtedly the remains of old beach lines formed when the sea extended farther inland than at present. The bluff is a prototype of the present barrier beach between the Big Lagoon and the Gulf.

The Sandhill areas are covered principally with a growth of scrub pine and oak, with an occasional longleaf pine. Little grass has taken root, so that in most cases the soil presents a bare appearance.

In structure and agricultural value this is an intermediate type between the Galveston sand and Norfolk sand, and the boundaries are not sharply defined in all cases.

A few gardens represent the extent of the agriculture on the type at present and will probably do so for some time to come. For any more extensive agriculture humus and fertilizer must be supplied in large quantities, and in most cases some means of irrigation would have to be employed.

The following table gives the results of a mechanical analysis of a sample of this type:

*Mechanical analysis of Sandhill.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14399.....	Soil.....	0.1	14.2	45.1	35.2	0.4	2.9	1.9

#### SUMMARY.

Escambia is the most westerly county in Florida. It is bounded by Alabama on both the west and north and by the Gulf of Mexico on the south. The county lies entirely within the Gulf Coastal Plain. There are two distinct physiographic divisions within the county. The smaller consists of the peninsula formed by the inclosing waters of the Gulf, where the country is flat and in part low, and the larger of the remainder of the county lying north of this, where the country is higher and more rolling.

The population of the county, about 42 per cent of which is colored, is mostly native born. The county is very sparsely settled, except for a strip along the railroad and in a few other localities. Improved farm lands constitute about 4 per cent of the area. Large tracts of land are held by lumber companies. Pensacola is the only city or town of importance. It is an important local market and shipping point.

Except in the eastern part the county is poorly supplied with transportation facilities, but one line of railway traversing it. There are large sections of country remote from any means of transportation.

The climate is the warm temperate. The winters are open and mild, and the growing season is about nine months long. The rainfall is usually abundant.

Until recently lumbering has been the chief industry in Escambia County. Within the last few years the county has begun to develop its agricultural resources and the acreage devoted to crops is steadily increasing. The cheapness of land and lumber, the mildness of the climate, and the comparatively low cost of living all make it easy to obtain a start in farming. There is a tendency toward the development of general farming upon the heavier soils, with cotton, corn, oats, hay, sugar cane, and sweet potatoes as the principal crops. Along the railroad and in the southern part of the county the trucking industry is being developed to a limited extent. There is an unlimited opportunity along the railroad for the successful growing of truck crops for shipment to northern markets. The soils, climate, and transportation facilities are equal to those of other sections along the Gulf coast where this industry has proved profitable. Experiments are now being tried to determine whether the peach industry can be profitably developed. There is also a probability that the growing of Sumatra tobacco would be successful. Lumber, ties, turpentine, etc., form the largest part of the county's products at the present time. Stock raising is of some importance.

The Census of 1900 gives the average size of the farms as 93 acres. The average number of acres under cultivation at present is about 40. Nearly 90 per cent of the farms are operated directly by the owners. Farm labor is difficult to secure, because of the abundance of employment afforded by the lumber camps.

Fourteen types of soil, including Meadow, were recognized in the area. These have the characteristics of soils found throughout the Coastal Plain, being for the most part light sands or sandy loams. The soils are derived from the Lafayette and Columbia formations, and are grouped in the following series: The Norfolk series, 5 members—a loam, sandy loam, fine sandy loam, sand, and fine sand; the Portsmouth series, 1 member—a sand; the Orangeburg series, 3 members—a sandy loam, a loam, and a sand; and the Galveston series, 1 member—a sand. The soils, being light and naturally unproductive, need fertilization for the growing of good crops. The soil type having the greatest extent is the Norfolk sand, but for the most part this can not be used for successful general farming and there are many areas of this type which have little agricultural value. As a general rule cotton growing should be confined to the Orangeburg sandy loam, Orangeburg loam, Norfolk fine sandy loam, Norfolk loam, and the heavier areas of the Norfolk sandy loam. These soils are also the best for corn and other general farming crops as well as the heavier truck crops.

The county as a whole is susceptible of much greater agricultural development.

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