

Issued September 30, 1916

U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF SOILS—MILTON WHITNEY, Chief.

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SOIL SURVEY OF FRANKLIN COUNTY,  
FLORIDA.

BY

CHARLES N. MOONEY AND A. L. PATRICK.

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W. EDWARD HEARN, INSPECTOR, SOUTHERN DIVISION.

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[Advance Sheets—Field Operations of the Bureau of Soils, 1915.]



WASHINGTON:  
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1916.

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## LETTER OF TRANSMITTAL.

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U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF SOILS,  
*Washington, D. C., December 28, 1915.*

SIR: In the extension of the soil survey in the State of Florida work was undertaken in Franklin County and completed during the field season of 1915.

The accompanying report and map cover this survey and are submitted for publication as advance sheets of Field Operations of the Bureau of Soils for 1915, as authorized by law.

Respectfully,

MILTON WHITNEY,  
*Chief of Bureau.*

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

## CONTENTS.

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	Page
SOIL SURVEY OF FRANKLIN COUNTY, FLORIDA. By CHARLES N. MOONEY and A. L. PATRICK.....	5
Description of the area.....	5
Climate.....	7
Agriculture.....	9
Soils.....	10
Norfolk fine sand.....	13
Norfolk loamy fine sand.....	15
St. Lucie fine sand.....	17
Leon fine sand.....	19
Portsmouth fine sand.....	20
Plummer fine sand.....	21
Plummer loamy fine sand.....	24
Hyde fine sand.....	25
Muck.....	27
Swamp.....	28
Tidal marsh.....	28
Coastal beach.....	29
Shell mounds.....	29
Summary.....	30

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## ILLUSTRATIONS.

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### FIGURE.

FIG. 1. Sketch map showing location of the Franklin County area, Florida....	Page. 5
------------------------------------------------------------------------------	------------

### MAP.

Soil map, Franklin County sheet, Florida.



# SOIL SURVEY OF FRANKLIN COUNTY, FLORIDA.

By CHARLES N. MOONEY and A. L. PATRICK.—W. EDWARD HEARN,  
Inspector.

## DESCRIPTION OF THE AREA.

Franklin County, Fla., is situated about 35 miles south of Tallahassee, near the center of the western extension of the State. It lies on the Gulf coast, along which it extends approximately 60 miles, and has a maximum width of about 20 miles. The total area is 541 square miles, or 346,240 acres.

Franklin County comprises a strip of mainland, crossed in the western part by the Apalachicola River and its broad delta of tidal marsh and swamp, and a string of outlying islands. Between the islands and the mainland is an extensive sound or bay, the different parts of which have different names. The central part, which is the largest and into which the Apalachicola River empties, is known as Apalachicola Bay; the western end is known as St. Vincent Sound, and the eastern end as St. George Sound.

The mainland of Franklin County is a part of a low coastal region, of little topographic relief, bordering the Gulf. It consists of a plain sloping almost imperceptibly seaward. Fourth-fifths of the area of the county consists of a practically featureless swampy plain, comprising open grassy areas, locally known as Savannas, areas of open pine woods covered with grass, areas having a dense growth of titi, cypress swamps, and low ridges forested with pine and saw palmetto.

At Sumatra, Liberty County, near the northern boundary of Franklin County, the elevation is reported to be 22 feet above sea level. Along the coast, except in the delta of the Apalachicola River, the elevation averages about 5 to 10 feet, and rarely exceeds 15 feet. Within the coast belt the accumulation of wind-blown sand has built up some areas, as in the sites of Apalachicola and Carrabelle, to an elevation of something over 25 feet.

Along the streams there are narrow belts of rather well drained land ranging from a few hundred feet to a few miles in width, depending upon the size of the stream. These belts, because of their



FIG. 1.—Sketch map showing location of the Franklin County area, Florida.

somewhat better drainage, are commonly thought to lie slightly higher than the land farther from the stream. Since the county as a whole is not alluvial, however, and since the drainage from the interior runs across these belts, the presumption is that they are little, if any, higher than the inland country.

The flood plain of the Apalachicola River has a maximum width of about 3 miles, and its delta has a width of about 5 miles and an area of about 25 square miles. The Ochlockonee River also is bordered by a swampy flood plain ending in a tidal marsh, while the New River flows in a sharply cut valley from 5 to 15 feet deep, without any flood plain above the junction with Trout Creek. The Crooked River, a tidal stream, winds through a well-defined flat valley about one-half mile wide.

The islands along the Gulf coast extend in a general northeast and southwest direction and lie from 1 mile to about 7 miles from the mainland. The western island, known as St. Vincent Island, is about 8 miles long. It is separated by a narrow pass from St. George Island, which is very narrow and continues eastward approximately 25 miles. Dog Island, which is about 5 miles long, is separated from St. George Island by a wide pass. St. James Island, the largest island included in the county, lies near the mainland. It is bounded on the east by Ochlockonee Bay, and is separated from the mainland by Crooked River and its broad swamps and tidal marshes.

The islands are composed of a series of longitudinal ridges and depressions, the ridges ranging in elevation from about 10 feet or less to something over 20 feet and having an average width of about 200 feet. The ridges on the Gulf side of the islands are highest. The intervening low areas are somewhat narrower than the ridges, rather smooth, and lie only a few feet above sea level. Usually a discontinuous fringe of marsh lies along the inner side of the islands.

The drainage of the county is effected by a large number of creeks and branches, which empty either directly or through the rivers into the bays and sounds bordering the county. The run-off is slow, and the streams are sluggish and are bordered by swamps. Owing to the lack of sufficient relief, a large number of swampy and marshy areas occur. During wet periods considerable areas are covered by water, which is removed largely by seepage and evaporation. However, during the summer season most of this land becomes dry and many streams, especially the smaller ones, go dry.

The settlement of Franklin County began early in the nineteenth century. Apalachicola was one of the earliest important towns in Florida along the Gulf of Mexico. The population of the county consists mainly of settlers from near-by Southern States. It is reported in 1910 as 5,201. About 41 per cent of this is rural. The rural sections are sparsely settled. The areas along the stream courses,

being better drained and apparently more elevated and more desirable under present conditions for cultivation, are most thickly settled.

The largest town in the county is Apalachicola, the county seat, situated at the mouth of the main channel of the Apalachicola River. Its population is reported in 1910 as 3,065. The oyster and shrimp industry is important, as are the lumber and turpentine industries. Carrabelle, on St. James Island, is the town of next importance, with a reported population of 900. Here lumbering and fishing are the chief industries, and formerly sponge fishing was important. Lanark, 6 miles northeast of Carrabelle, is a town of local importance. St. Teresa, a small village, lies northeast of Lanark. McIntyre, a village on St. James Island, is located at the junction of the Crooked and Ochlockonee Rivers, on the Georgia, Florida & Alabama Railroad.

Transportation is furnished by two railroads. The Apalachicola Northern Railroad, with a terminus at St. Joe, on St. Josephs Bay, 25 miles west of Apalachicola, crosses the western part of the county and connects with important trunk lines at River Junction, Fla., and Climax, Ga. On the east the Georgia, Florida & Alabama Railroad enters the county from Tallahassee and southern Georgia points. It extends to Carrabelle, from which point Apalachicola is reached by regular steamboat service. In addition to the railroad transportation facilities, water transportation is afforded by large boats for passengers and freight plying the Apalachicola River and its main tributaries and reaching points in Georgia and Alabama. Boats are operated also between Apalachicola and other Gulf ports, as Pensacola and Mobile.

The towns of the county afford good markets for all farm products. Lumber, naval stores, and sea foods are shipped to outside markets.

#### CLIMATE.

Franklin County has a mild climate, with a mean annual temperature of 69.1° F. For the summer months the temperature averages about 81° and for the winter months about 55°, while for the spring and fall months the mean temperature is about 70°. The temperatures of both summer and winter are modified by breezes from the Gulf. The winters are usually pleasant, with occasional periods of cool weather, accompanied by frost and, rarely, by snow flurries.

The summer season is long, but the temperature rarely rises to 100° F. The nights usually are pleasant. The early morning, when the air is still, is the most uncomfortable part of the day.

The mean annual precipitation is 56.19 inches, with a range from 30.69 inches for the driest year recorded to 77.80 inches for the wettest. The rains, especially those of the summer, frequently are of torrential character. The rainfall is not equally distributed

throughout the year, there being two comparatively wet and two dry seasons. In the first two winter months, December and January, there is a moderately wet season, followed by about 5 months of a comparatively dry season, with a season of heavier rainfall beginning with July and continuing to October. August and September, the wettest months, are followed by a period of less rainfall, covering October and November.

The latest recorded killing frost in the spring occurred on February 20, and the earliest date of killing frost in the fall recorded is November 13. The average date of the last killing frost in the spring is January 30, and of the first in the fall December 6. This gives a normal growing season of 310 days, and those crops that can withstand slight freezes can be grown during the winter, garden vegetables, such as cabbage, onions, radishes, and lettuce being grown at this season for local markets. In protected places along streams orange trees withstand the cold.

The following table, compiled from the records of the Weather Bureau station at Apalachicola, gives the normal monthly, seasonal, and annual temperature and precipitation of Franklin County.

*Normal monthly, seasonal, and annual temperature and precipitation at Apalachicola, Fla.*

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.....	55.0	77	26	5.31	3.87	11.91
January.....	54.1	76	20	4.09	5.02	1.86
February.....	56.6	77	22	2.31	1.84	1.30
Winter.....	55.2	77	20	11.71	10.73	15.07
March.....	64.6	88	36	2.06	1.31	.55
April.....	67.5	88	42	2.77	2.51	6.92
May.....	75.0	91	49	4.90	2.10	8.62
Spring.....	69.0	91	36	9.73	5.92	16.09
June.....	80.4	95	62	3.29	3.84	7.20
July.....	81.6	100	70	6.73	1.62	10.50
August.....	81.5	93	64	9.29	3.65	12.20
Summer.....	81.2	100	62	19.31	9.11	29.90
September.....	80.2	96	58	10.06	1.87	12.87
October.....	70.6	96	42	2.80	.00	.39
November.....	62.2	81	31	2.58	3.06	3.48
Fall.....	71.0	96	31	15.44	4.93	16.74
Year.....	69.1	100	20	56.19	30.69	77.80

## AGRICULTURE.

While Franklin County was settled early in the last century, very little attempt was made to develop the region agriculturally. The first settlements were made along the streams or on the coast, and only enough land was cleared and cultivated to produce vegetables for home use and a small quantity of the staple crops. As early as 1835 Apalachicola is reported to have been the third in importance of the cotton ports on the Gulf of Mexico. The principal industry was the transferring of cotton from the river boats to the sailing and steam vessels carrying the product to foreign ports. The Apalachicola River was the outlet prior to the Civil War for an extensive cotton section. With the construction of railroads, about 1870, into Georgia and Alabama the cotton was largely shipped elsewhere, and Apalachicola declined in importance as a port.

About 1875 lumbering began in this county, and 15 years later the production of turpentine was taken up. These are now the important industries of the county.

The development of agriculture in Franklin County has hardly begun. The farms are confined largely to the well-drained soils along the streams. The use of other lands would necessitate more extensive drainage than the individual could afford to install. Small areas are devoted to corn, sugar cane, and sweet potatoes, and gardens are usually planted in which vegetables are produced mainly for home use. In the census of 1910 the largest acreage reported in any single crop is 38 acres in corn, yielding 450 bushels, or about 12 bushels per acre. A total of 16 acres is reported in sweet potatoes, 5 acres in potatoes, and 37 acres in all other vegetables. Sugar cane is grown in small patches to supply sirup for home use and the local markets. Some vegetables also are sold in local markets. Such crops are grown mainly near Apalachicola and at Eastpoint, across Apalachicola Bay. Cabbage and strawberries are profitable crops.

Some dairying is practiced near Apalachicola. The dairy herds are composed largely of Jersey grades. A few beef cattle and hogs are raised. The 1910 census reports 161 cattle and 194 hogs sold or slaughtered in 1909. The entire county is open range. The flat, poorly drained lands afford good pasturage and hogs find an abundance of mast. The cattle and hogs are of native stock, which, having developed under local conditions, are better able to withstand the hardships of their roving lives than better breeds would be. The stock could well be improved, however, by the introduction of improved sires for crossing with the native stock. There is opportunity for the development of stock raising in the county, and this probably constitutes the best use for much of the poorly drained land.

There is so little land cultivated that the question of adaptation has hardly been considered, except that the lightest sandy soils are held in low esteem.

In the areas cultivated the methods followed in this general region are practiced, including the use of one-horse and single-toothed implements. In many cases the work is done entirely by hand.

Very little farm labor is hired. The land is held in small tracts, usually of only a few acres, and the work is performed by the occupant and his family. The census of 1910 reports 3.5 per cent of the area in farms, with an average of only about 27 acres per farm improved. Of the farms, about 88 per cent are reported as operated by the owners. Large tracts are owned by turpentine and lumber companies. The value of land is low, the average being given in the 1910 census as \$4.09 per acre. Small holdings sell for \$10 or more an acre, depending upon the location and character of the land.

#### SOILS.

The soils of Franklin County are of marine sedimentary origin. The material originally was derived from the wash or erosion of the Piedmont-Appalachian country to the north, transported by water and deposited on the sea floor, and in time uplifted above the level of the sea. During the period of deposition and submergence the material was subjected to the action of the tides and waves, reducing the size of and assorting the particles. The soil material now consists almost exclusively of fine quartz sand, excepting the river flood plains and some beds of fine sandy clay in the northern and central parts of the county. The sediments are, according to the geological survey of Florida, of Pleistocene and Recent age.

The soils in this region are closely related to the topography. The soils in the poorly drained interior area are classed with the Leon, Portsmouth, Plummer, and Hyde series. In the better drained belts along the coast and the streams the soils belong to the Norfolk and St. Lucie series. The Leon, though grouped with the poorly drained soils, represents a zone of transition between the well-drained and the poorly drained soils.

The texture of the soil is generally uniform throughout the county. The material is predominantly sand of the finer grades; medium to coarse sands occur in a few small areas along the New River, and finer materials, clays and silts, are encountered in the northwestern part of the county and along the larger rivers. The dark-colored soils are confined to the poorly drained country and the light-colored soils to the belts of better drained land.

The well-drained, light-colored soils are the Norfolk and St. Lucie. The soils of the Norfolk series are characterized by light-

gray to yellowish-gray surface soils, underlain by light-yellow subsoils, extending to a depth of several feet. Two types are mapped, the fine sand and the loamy fine sand. The fine sand is one of the extensive types of the county. It supports a growth of longleaf pine, with some blackjack oak and a good cover of wire grass. The loamy fine sand is of small extent and its subsoil carries some clay. It constitutes the best soil in the county for agriculture.

The St. Lucie series is represented only by the fine sand type. It comprises the glittering white sands, more than 3 feet in depth, along the shores, and is the principal soil type of the islands. The hammock phase of this type occupies narrow ridges around lakes supporting a hammock vegetation, including cabbage palmetto, magnolia, and live oak, with some pine. The yellow-subsoil phase is distinguished by a yellow fine sand subsoil. It supports a scrub growth of spruce pine, evergreen oak, rosemary, and some saw palmetto.

The lower lying and poorly drained series of soils are the Leon, Portsmouth, Plummer, and Hyde. The Leon is a light-colored or nearly white flatwoods soil in which a hardpan stratum occurs at a depth of 15 to 24 inches. This hardpan consists of black to rusty-brown, compact sand high in organic matter. It is from 6 to 12 inches or more in thickness, grading below into white, water-soaked sand. In wet seasons the soil becomes soggy and during dry seasons it is very dry, the hardpan preventing the free movement of water. The Leon soil is characterized by a growth of longleaf pine, saw palmetto, and wire grass. Throughout Florida it is known as the "palmetto flatwoods."

The Portsmouth soil is dark gray to black, and high in organic matter. The subsoil is light gray to nearly white, and at a depth ranging from 15 to 24 inches a black to rusty-brown, compact sandy hardpan layer is encountered, overlying light-gray to white, compact, saturated sand. The Portsmouth, in association with the Leon, lies relatively low, and the conditions favor the accumulation of organic matter. Only the fine sand type is mapped.

The Plummer series is marked by gray surface soils, frequently mottled with dark-brownish colors, underlain at depths of 8 to 20 inches by light-gray, compact material, more or less mottled with streaks of brown and yellow. The lower part of the subsoil usually consists of sandy clay or sticky sandy material, including pockets or layers of mottled yellowish and drab, plastic sandy clay. These soils support a rank growth of wild grasses and sedges, and a scattered growth of pine and cypress, and some cabbage palmetto. The Plummer fine sand and loamy fine sand are recognized in this county. The former is uniformly a fine sand throughout the 3-foot soil section, and

has a dull-grayish color. The water table stands at or near the surface. It is spoken of as "crawfish land," crawfish being abundant in this soil, as evidenced by the large number of "chimneys." It supports a growth of wild grasses, sedges, and open pine, with some cypress. Some areas are treeless. A hammock phase is mapped along the shores. It supports a growth of cabbage palmetto, magnolia, and pine. The Plummer loamy fine sand is the heaviest soil encountered in the county, carrying considerable clay. The native growth is the same as on the fine sand type, except that there is also a scattering of saw palmetto.

Both the surface soil and subsoil of the Hyde series are black. The series has a high content of organic matter, making it more or less mucky. The Hyde fine sand is the only type mapped. It comprises the numerous titi bays and swamps of the county, its total area exceeding that of any other soil type encountered. The large areas, as Tates Hell Swamp and Picketts Bay, and to a less extent some of the other large bays, include areas of other soil types associated with the poorly drained sections, which are inaccessible and can not be mapped separately.

The miscellaneous materials encountered in the county are mapped as Muck, Swamp, Tidal marsh, Coastal beach, and Shell mounds.

Muck is the more or less thoroughly decomposed plant remains occurring in saw-grass ponds and titi and cypress swamps, and carrying from 25 to 60 per cent of mineral matter. It is mapped, according to its native vegetation, as typical Muck, as found in saw-grass ponds and swamps, and a titi phase, which supports a growth of titi bushes.

The term Swamp designates areas along streams which support a swampy vegetation, such as cypress, gum, bay, and ferns, and are covered by water most of the time. The soil materials are variable, ranging from silty and clayey to gravelly, and are more or less intermingled with peat and muck materials. Swamp constitutes the only alluvial formation in the county.

Tidal marsh includes flat areas inundated by salt or brackish waters at times of high tide. It is covered by a growth of marsh grasses. The soil is variable, usually consisting of silty and clayey, oozy material, with some peaty and mucky material.

Coastal beach comprises the beaches and the narrow ridges and depressions of sand back from the beaches, covered by a sparse vegetation, mainly sand grasses. It consists of sand, with some admixture of broken shells in places.

The Shell mound areas consist of an accumulation of oyster and clam shells left by aboriginal inhabitants. They occur along the immediate shores of the bays and sounds. A shallow soil has accumulated on the surface through the breaking down of the shells

and the accumulation of wind-blown sand, forming a dark-gray to black, loose, loamy sand soil rarely more than a foot deep.

The names and actual and relative extent of the different soils mapped in Franklin County are given in the following table:

*Area of different soils.*

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.	
Hyde fine sand.....	118,784	34.3	Portsmouth fine sand.....	10,816	3.1	
Plummer fine sand.....	75,904	22.6	Coastal beach.....	7,808	2.3	
Hammock phase.....	2,368		Plummer loamy fine sand.....	5,696	1.7	
Swamp.....	37,888	10.9	Muck.....	3,264	1.4	
Tidal marsh.....	26,048	7.5	Titi phase.....	1,792		
Norfolk fine sand.....	20,800	6.0	Norfolk loamy fine sand.....	4,864	1.4	
Leon fine sand.....	18,176	5.3	Shell mounds.....	320	.1	
St. Lucie fine sand.....	7,424	3.4	Total.....	346,240	.....	
Yellow-subsoil phase.....	3,776					
Hammock phase.....	512					

**NORFOLK FINE SAND.**

The typical Norfolk fine sand consists of a light-gray to yellowish-gray fine sand, from 4 to 8 inches in depth, grading into a pale-yellow to bright-yellow sand, which extends to a depth of more than 3 feet. There is a textural range in the type from fine to rather coarse, the greater part, however, being a fine sand. Over most of the type there is enough coarse sand present to impart a somewhat coarse feel. The areas in the southern part of the county are of fine texture, while to the north the texture becomes coarser. In the northwestern corner of the county near the boundary and along the Apalachicola River there are small areas of medium sand.

The type, as a rule, is loose and incoherent. The surface usually has some organic matter, from leaf mold, in the first inch or two, giving a somewhat darker color, some coherency, and a slightly loamy feel. The subsoil is even less coherent than the soil. There are some exceptions, however, in the flatter and more depressed areas, where the material is somewhat compact and coherent.

There is a considerable total area of Norfolk fine sand in the county. The largest body occurs on St. James Island, and a large area occurs also on St. Vincent Island adjoining the Coastal beach. The other areas are scattered over the county near stream courses.

The surface of the type is undulating to ridgy and hummocky, with occasional gently undulating to nearly flat areas, which usually are small. The ridges conform to the shore lines. They have narrow intervening troughs or sloughs, or pondlike, depressed areas. On St. James Island small ponds are common; these usually are too small to be shown on the map. Areas of this type occur also along stream courses, especially in the forks of streams.

The natural drainage is excessive. The loose sand permits rain-water to pass rapidly to lower levels. Its water-holding capacity is low, and it is so droughty that crops would soon suffer for lack of moisture in even ordinary dry spells. The lower and flatter areas, however, having a higher water table, maintain a better moisture supply, as is indicated by the growth of water oak and turkey oak.

This type comprises the greater part of the cultivated area of the county. The total acreage in cultivation, however, is not large. This type of soil has been selected because it does not require drainage, and makes comparatively healthful home sites. It is regarded as a soil of low productiveness, but by the use of fertilizers fair crop yields are obtained. Sweet potatoes, sugar cane, and corn are the main crops. It gives best results with sweet potatoes, which crop does best on this class of soil. Sugar cane gives good yields of forage, and produces a sirup of good quality. Corn, except under best conditions, makes low yields. The average is about 10 bushels per acre, but yields of 25 bushels or more are sometimes obtained. All these crops are given moderate applications of commercial fertilizers, and in addition barnyard manure and compost is used. They are grown for home consumption, though a small surplus finds its way to the local markets.

Some citrus fruits are grown on this soil; a small grove, not of bearing age, is located on St. James Island, and there are some trees along the Apalachicola River. The recent plantings are of the Satsuma varieties, which are more or less resistant to cold. The older trees are orange and grapefruit. The oranges are of good quality. Where desirable locations are available near bodies of water the conditions are favorable for the development of citrus-fruit growing on a commercial scale. The Satsuma varieties of oranges are best suited to the climatic conditions. Peaches of the Jewel variety do well on this soil. The product finds a ready sale at fair prices in the home markets.

The Norfolk fine sand in this county is popularly known as the "rolling pine lands." The tree growth is longleaf pine with blackjack oak and a cover of wire grass. This vegetation stands out conspicuously from that of the typical flatwoods. In the area on St. Vincent Island there is very little blackjack oak but considerable scrub evergreen oak and shortleaf pine. In depressed or flat areas of the type and on some of the gentle slopes water oak and turkey oak are present.

The value of the Norfolk fine sand is low, ranging from \$2 to \$10 an acre.

The following table gives the results of mechanical analyses of samples of the soil and subsoil 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 cent.</i>						
261415.....	Soil.....	0.0	0.2	2.2	93.6	3.0	0.2	0.6
261416.....	Subsoil.....	.0	.2	1.8	94.2	3.3	.1	.1

## NORFOLK LOAMY FINE SAND.

The surface soil of the Norfolk loamy fine sand varies in color from a light gray to rather dark gray. The immediate surface is generally darkened by organic matter, and in the lower positions and flatter areas the darker color frequently continues to greater depth. The lower part of the surface soil is yellowish or yellowish gray, grading into a yellow subsoil below. The depth of the surface soil ranges from 4 to 10 inches, and averages 6 or 8 inches. The surface material consists of a fine sand or loamy fine sand, the loaminess in large part being due to the incorporated organic matter and to the presence of a large percentage of very fine sand. The greater part is a fine sand, but there is a textural range from very fine to medium, these extremes occurring in such small areas that they can not be shown satisfactorily on the soil map. The fine-textured areas occur in the southern and western parts of the county, and the coarsest texture along New River, particularly in the vicinity of Knox Still.

The subsoil is more variable than the surface soil, especially in texture. It is predominantly yellow, ranging from pale yellow to bright yellow, but in places, especially in the areas of heavier material, the lower part is mottled with drab. The subsoil for the most part is a loamy fine sand to light fine sandy loam, but the range is from a loamy sand to sandy clay. The variations from the typical soil are of small extent.

In those areas adjoining the Norfolk fine sand this soil differs from that type in having a darker or more grayish surface soil and a compact subsoil, containing some iron concretions and iron crusts, and becoming very hard in the lower part, much like a hardpan. Some of the iron crusts are more or less decomposed, and often form brick-red mottlings in the subsoil. Beneath this compact subsoil and sometimes mixed with the lower part is a sandy clay, which is bright yellow mottled with red or it is pale yellow and drab. These colors are found in flat areas. Where the type is slightly undulating or ridgy, as along the stream courses, the subsoil either continues as a loamy fine sand throughout the 3-foot section or becomes somewhat heavier with depth, grading into light sandy loam or even

heavy sandy loam, and in a few places into sandy clay. Where the subsoil becomes heavier or more clayey it usually is mottled with yellow and drab, and is much like that of the heavier parts of the Plummer loamy fine sand, which sometimes adjoins this type. Iron concretions or iron-cemented particles of sand, forming small pebbles, occur in small quantities on the surface and in the soil mass throughout the type, but are not conspicuous.

The Norfolk loamy fine sand occurs entirely in the mainland portion of the county. Its principal development is along stream courses, mainly the Apalachicola River and the larger creeks in the western part of the county, and on both banks of the New River. The areas are small and discontinuous, being broken by areas of other soil types. They extend only a short distance, from one-fourth to one-half mile, back from the streams. Two occurrences along the northern boundary of the county, one west of the New River in several areas and the other near Black Creek, merge with the higher lands to the north. Small areas occur on low ridges in the large swamp in the central part of the county, known as Tates Hell Swamp.

The Norfolk loamy fine sand occupies flat to gently undulating or ridgy areas, the greater part of it occurring along stream courses, in places being separated from the swampy borders of the streams or bluffs along the streams by sharp boundaries, while the broader areas slope gently back from the stream, merging with the flatwoods country beyond. In some places, as in areas along the northern boundary of the county, the surface is broken as a result of stream erosion.

The drainage of the type for the most part is good, as it is so situated that the water falling upon it readily drains away, but where it is flat it is poorly drained and becomes saturated during ordinary wet periods. The loamy character of the subsoil and the nearness to the underlying clays make the type fairly retentive of moisture and capable of maintaining a supply favorable for plant growth. It supports a tree growth of longleaf pine, and in places water oak. The pines on this type are the largest in the county. The undergrowth is saw palmetto, with wire grass and broom sedge. A plant locally known as "dollar-bonnets" is common on this type.

This soil under present conditions constitutes the best soil of the county, but as yet it is undeveloped, except for home garden patches. Garden vegetables do well on it, and it is also well suited to the field crops of the county, such as sugar cane, corn, sweet and Irish potatoes, and forage crops. Peach trees thrive. The Jewel, a variety of peach well suited to Florida conditions, is grown successfully. For the most part this soil is easily improved and maintained in a high state of productiveness. As it occurs along streams in favor-

able localities, it would be suitable for the production of citrus fruits, especially the Satsuma oranges.

Both because of its greater productiveness and its location along streams which are navigable to small power boats, this type has a higher agricultural value than the associated soils.

The results of mechanical analyses of samples of the soil and subsoil of this type are given in the following table:

*Mechanical analyses of Norfolk loamy fine sand.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
261407 .....	Soil.....	0.2	1.5	2.3	50.9	34.0	6.6	4.5
261408 .....	Subsoil.....	.2	1.5	1.9	47.2	29.4	8.8	10.6

ST. LUCIE FINE SAND.

The St. Lucie fine sand throughout the 3-foot soil section and to greater depths consists of a light-gray to nearly white, loose fine sand. The immediate surface may be slightly grayish owing to the presence of a small percentage of organic matter. The texture is a pronounced fine sand, the material analyzing 96 per cent fine sand. In small spots the typical "hardpan" of the Leon series is encountered just below the soil section, and in places an orange-yellow sand lies within 36 inches of the surface, but such occurrences are small. These yellow subsoil areas occur on St. Vincent and St. George Islands at relatively high elevations.

The St. Lucie fine sand occurs in ridgy and hummocky areas, and only a small part of the type is flat or nearly flat. The less broken areas are on St. George Island, reaching back from the Coastal beach to the inward shore. The type occurs mainly on the islands, but to some extent on the mainland along the shores of the sound. Owing to its elevation and the loose character of the material, it is excessively drained and droughty.

This soil is held in low esteem, and is not utilized to any extent for the production of crops. Small spots on lower slopes, where a favorable moisture supply is maintained by seepage, are farmed. In small garden plots vegetables are produced successfully, but in general the type is not desirable for agriculture.

The type supports a cover of scrub evergreen oak, rosemary, a sprucelike shrub, saw palmetto, and some wire grass. On St. Vincent and St. George Islands there is a growth of shortleaf pine, which is sparse and stunted on the higher ridges and moderately thick and of fair size on the lower slopes.

Except for the possibility of turpentineing, this land has little value, though there are a few lots on St. James Island which, because of their favorable situation near the water, have some value as building sites.

*St. Lucie fine sand, hammock phase.*—The surface soil of the hammock phase of the St. Lucie fine sand to a depth of 6 or 8 inches consists of a fine sand, containing sufficient organic matter to give it a light-gray color and a slightly loamy feel. The subsoil is a light-gray to nearly white fine sand, continuing to a depth of more than 3 feet. This phase is distinguished from the main type by a different vegetation and the slightly more coherent material of the soil.

Areas of the hammock phase are found only on St. Vincent Island, where they occur in belts bordering the interior lakes. The surface is ridgy to hummocky, with bowl-shaped and trough-like depressions. The phase is sufficiently high to be well drained, but the character of the native vegetation indicates that the water table is not far below the surface. On these areas there is a rather heavy hammock growth of cabbage palmetto, live oak, water oak, and magnolia, and a rather dense undergrowth largely of scrubby live oak.

This soil is not utilized for farming, being included in a game preserve. Where the natural growth thrives, truck crops and citrus fruits could be grown successfully. Heavy applications of fertilizer and irrigation would be necessary.

*St. Lucie fine sand, yellow-subsoil phase.*—The yellow-subsoil phase of the St. Lucie fine sand differs essentially from the typical soil in having a yellow subsoil and in occupying a slightly higher position. The surface soil consists of white fine sand, ranging in depth from 4 to 12 inches. This is underlain by yellow, loose, incoherent fine sand, which extends to depths greater than 3 feet. The yellow color occurs in different shades. The texture is uniform throughout the soil section and to greater depths. The sand particles are rather sharp.

This phase occurs in the southern part of the county, extending along the shore of St. George Sound from the vicinity of Eastpoint eastward to Alligator Bay on St. James Island, the largest area occurring on St. James Island between Carrabelle and Lanark. The surface is ridgy and hummocky, with depressions in places holding ponds and small lakes. The elevations attained on this phase are the highest in the county.

Owing to its loose, sandy character and its elevated position, the phase is excessively drained and very droughty, as is indicated by the character of the native vegetation. It is not used for agricul-

ture, except for small gardens in the town of Carrabelle, where vegetables are grown with some success, the gardens being given considerable attention. This soil is generally recognized as very poor, but the better situated areas might, with proper management, be used for light trucking and for citrus-fruit production. It supports a growth of spruce pine, scrub oaks, evergreen oak, and rosemary.

Its location near the shore line gives the phase some value for building sites.

In the following table the results of mechanical analyses of samples of the soil and subsoil of the typical St. Lucie fine sand are given:

*Mechanical analyses of St. Lucie fine sand.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
261417.....	Soil.....	0.0	0.2	2.0	96.0	1.4	0.1	0.4
261418.....	Subsoil.....	.0	.2	1.8	95.2	1.6	.2	.8

LEON FINE SAND.

The Leon fine sand consists of a light-gray, fine-textured sand grading at 8 to 12 inches into a lighter colored fine sand. This type is characterized by a dark-brown layer, locally called a "hardpan," consisting of organic matter mixed with fine sand and some iron compounds. This layer is usually about 10 inches thick, though it varies from 2 to 12 inches or more, and is encountered within the 3-foot section, usually at a depth of 15 to 18 inches. The hardpan layer is underlain by a brownish-yellow fine sand which becomes lighter in color with depth until at 30 to 36 inches it is white or very pale yellow. In different parts of the county this soil has a textural range from fine to medium.

This type occurs in the "flatwoods" region, on small palmetto ridges bordering small streams and titi swamps, and in places it extends along the coast in narrow strips between the higher sand hills and the water edge. The largest and most important areas are back of Eastpoint and west of Apalachicola; other small tracts occur in various places on the mainland and on St. James Island.

The Leon fine sand is slightly higher than the greater part of the flatwoods, though the water table is encountered at a depth of only a few feet. The hardpan layer prevents the upward and downward movement of water, so that during the wet season water stands on the surface and during dry seasons the surface is too dry for crop growth.

The local name for the Leon fine sand is "palmetto flatwoods," owing to its heavy growth of saw palmetto. In addition the type

supports wire grass, oak runners, and a scattered growth of long-leaf pine.

This type is undeveloped agriculturally. Its main use, aside from the turpentine industry, is as a range for hogs and cattle. Hogs seem to thrive on the berry of the saw palmetto. With careful management the type can be made to produce truck crops for winter markets. Irrigation is necessary during the dry seasons and underground drainage during wet seasons. In some sections of Florida tile is laid upon the "hardpan" layer, and a combination of subirrigation and underground drainage is thus provided. In addition the soil requires fertilizer and organic matter. The latter can be added by plowing under cowpeas, velvet beans, and similar crops or by the addition of large quantities of stable manure, or both.

The following table gives the results of mechanical analyses of samples of the soil, subsoil, and lower subsoil of this type:

*Mechanical analyses of Leon fine sand.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>er cent.</i>					
261434.....	Soil.....	0.0	0.8	4.2	92.6	0.6	1.2	0.6
261435.....	Subsoil.....	.0	4.6	10.6	72.4	5.4	2.8	4.2
261436.....	Lower subsoil...	.0	5.0	11.8	73.0	4.9	1.0	4.3

PORTSMOUTH FINE SAND.

The surface soil of the Portsmouth fine sand, extending to depths of 8 to 12 inches, consists of a dark-gray to black fine sand, which is more or less loamy or mucky, owing to the presence of organic matter. It is a fine sand throughout most of its extent, but locally it varies to slightly coarser than a medium sand. Below the dark surface soil the material is a compact fine sand, similar in texture to the surface soil, but ranging in color with depth from dark gray to nearly white. At depths of 15 to 28 inches a black to coffee-grounds-colored stratum of compact fine sand, locally known as "hardpan," is encountered. This layer is from 6 to 12 inches or more in thickness. When wet it is easily penetrated by the soil auger, but when dry it is quite hard and impenetrable to the roots of plants. It is composed largely of organic matter, with some iron compounds. Beneath this hardpan the color gradually fades with depth to whitish and the material becomes a compact, water-soaked sand. The hardpan layer occurs at the normal water-table level.

The Portsmouth fine sand occurs in small areas throughout the mainland section of the county, with a few small areas on St. James Island. The areas are flat to slightly ridgy, and frequently occur

as interstream areas or narrow bodies along streams. The type is locally known as "gallberry and palmetto flatwoods," and the slight ridge areas in swamps are known locally as "palmetto and pine ridges."

The tree growth is longleaf pine, with a characteristic undergrowth of gallberry, saw palmetto, and a number of wild grasses and sedges. The huckleberry is also common.

Owing to the generally flat surface, the drainage is poor. Water stands on the type after rains, and the land remains wet for considerable periods, as the water is removed slowly. It is dry for short periods, and as the hardpan substratum prevents the rise of capillary water crops suffer from lack of moisture during these dry spells.

The total area of the Portsmouth fine sand is not large, the areas being small and scattered. The only section in which the soil is used is in the vicinity of Apalachicola, where there are some small gardens and one dairy farm. It is reported to produce heavy yields of cabbage, turnips, and sweet potatoes. Strawberries have also been grown. In the production of these crops heavy applications of stable manure are made and some commercial fertilizer is used. The wild grasses on the type afford good pasturage, the areas of the type being in the open range.

This type is now included mainly in large holdings of timber and turpentine companies. It is held in higher esteem, however, than any of the other flatwoods soils.

In the handling of this soil type an effort should be made to maintain and increase the organic-matter content. This can be done by green manuring or by growing cover crops, using preferably some of the legumes, as cowpeas, soy beans, and velvet beans. To produce profitable yields on this soil, as experience elsewhere has shown, commercial fertilizers are needed. The soil also requires thorough drainage, which can be effected generally by open ditches, especially where it is to be intensively used, as for trucking. With its impervious hardpan, subirrigation by tiles is found in other sections of the State to be preferable to sprinkling or surface systems.

The Portsmouth fine sand, with proper treatment, especially with the proper control of the moisture supply, is well suited to a wide range of field and truck crops. This soil in other parts of the State is successfully producing a large number of truck crops. In some sections it is devoted mainly to strawberries and in others to cucumbers, while in some well-developed centers celery, lettuce, and onions are grown successfully.

#### PLUMMER FINE SAND.

The Plummer fine sand consists of a dull-gray fine sand extending throughout the 3-foot section and to greater depths. There is

very little difference between the surface soil and the subsoil, though in places the surface few inches is slightly darker, owing to the accumulation of organic matter, while in other places the subsoil is lighter gray than usual. The lower subsoil is nearly always completely saturated. In the northern half of the county varying quantities of coarse and medium sand are mixed with the fine sand, while in the southern section a greater proportion of the type is a distinct fine sand. Some small areas of medium sand, as well as some of coarse sand, are included in this type, which, because of their small extent, are not of sufficient importance to warrant separation.

The Plummer fine sand is one of the most extensive soils in Franklin County. It is the predominating soil of the flatwoods region. It is easily distinguished by its luxuriant growth of grasses and other water-loving plants, including two so-called carnivorous plants, the pitcher plant and sundew. A part of the type is treeless and is locally known as "savanna." A considerable part of it is covered with a scattered growth of longleaf pine, while in the slight depressions occur slash pine and small cypress.

The largest areas are those bordering Tates Hell Swamp and Picketts Bay, those along both sides of Crooked and New Rivers, near Bald Point, west of Apalachicola, and those on St. Vincent Island. The type has a flat surface and a high water table, so that natural drainage is very poor, water standing on the surface during wet seasons.

Very little of this type is under cultivation, its main use being as a range for cattle. In a few places sugar cane, sweet potatoes, Irish potatoes, and truck crops are grown. The productiveness can be increased by the addition of organic matter, either by applying stable manure or plowing under green manuring crops, such as velvet beans or cowpeas. Both drainage and irrigation systems are needed. In places crawfish are present in large numbers, and the type is locally referred to as "crawfish land."

The greater part of this type is held for turpentine and lumbering. Its agricultural value is very low.

In addition to the typical soil, there are areas in the interior of St. Vincent Island, occupying interridge strips, where the soil in a few places is somewhat darker at the surface, approaching the color of the Portsmouth fine sand. The vegetation is the same as that on the Portsmouth soil, consisting of saw palmetto, gallberry, huckleberry, and a good growth of wire grass and broom sedge, with narrow troughs in which saw grass and wild oleander are prominent. In these troughs the surface 2 inches of soil frequently is black and

more or less mucky, but at 4 to 6 inches the grayish or dingy-white sand peculiar to the typical Plummer fine sand is encountered. The tree growth is shortleaf pine instead of longleaf pine, as on the typical soil. Within these narrow belts there are slight hummocks or mounds on which the soil is typically the St. Lucie fine sand, and a low scrub oak and saw palmetto constitute the characteristic growth.

The areas on St. Vincent Island might properly be classed as a wet phase of the St. Lucie. The material under present conditions is saturated, as the water table lies near the surface. It is not cultivated, and lies so low that it is doubtful whether it could be sufficiently drained to grow crops successfully.

*Plummer fine sand, hammock phase.*—The Plummer fine sand, hammock phase, does not differ materially from the main type, except in the vegetal growth. It is covered with what is considered a hammock vegetation. Cabbage palmetto and magnolia are conspicuous in a predominating growth of slash pine. However, there are places, as on St. Vincent Island and along the shores of the mainland, in which cabbage palmetto is the exclusive growth. Water oak is found in some areas.

The surface soil of this phase probably averages a little darker than the typical, containing considerable organic matter, but below a depth of 6 to 10 inches the color becomes grayish, with occasional brown stains. At lower depths the phase is moist or saturated, as in the case of the typical soil. In the higher areas in these hammocks the soil approaches the hammock phase of the St. Lucie fine sand and small patches of true St. Lucie may be included.

The areas of this phase occur as slight ridges or low forelands along the mainland shores of the sound, as small hummocks and low ridges bordering and within areas of Tidal marsh, and around the lakes on St. Vincent Island. The areas are all associated with salt or brackish waters. The phase occupies narrow areas on gently rounded ridges and low, hummocky areas. The elevation is from 1 foot to not more than 5 feet above sea level.

Owing to their low elevation and the nearness of large bodies of water, these areas are subject to frequent inundation by salt or brackish water during severe wind storms. Those areas lying along the Apalachicola River are subject to flooding by fresh water. Where these areas have sufficient elevation or can be protected from inundation, they are fairly productive in seasons of favorable rainfall. The soil, however, is leachy, and in growing crops heavy applications of fertilizer are necessary, and it is advisable to apply the fertilizer in small quantities at frequent intervals rather than all at one time.

The results of mechanical analyses of samples of the soil and subsoil of the typical Plummer fine sand are given in the following table:

*Mechanical analyses of Plummer fine sand.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
261405.....	Soil.....	5.9	8.2	2.9	34.2	42.7	2.9	2.5
261406.....	Subsoil.....	4.6	8.0	3.0	29.8	47.6	3.9	2.6

PLUMMER LOAMY FINE SAND

The surface soil of the Plummer loamy fine sand to a depth of about 8 inches consists of a dull-gray to dark-gray loamy fine sand, with some brown mottlings or stains. It usually carries a high percentage of very fine sand, but also carries almost enough sand of medium texture to warrant classing the type as a sand. A particularly coarser textured area is the prairie north of Fort Gadsden. The surface is more or less loamy, carrying some clay and some organic matter. The subsoil is a loamy fine sand of dull-grayish or light-drab color, carrying enough clay to make it cling together when wet. In places the clay content increases at greater depths, and a fine sandy loam or even fine sandy clay is encountered in the lower part of the 3-foot section or just below a depth of 3 feet. Usually in the heavier areas the gray or drab is mottled with yellow or yellow and brown, and in places the color ranges to bright yellow, with occasional brick-red mottlings. There are also a few areas, too small to be shown separately, in which the material is comparatively sticky, the clay content being great enough to make the soil a sandy clay or heavy sandy loam, which becomes heavier with depth.

Areas in which there is a fine sandy clay substratum are of small extent. Such a substratum occurs in spots in the area west of the Apalachicola Northern Railroad. There are included in the type some cypress-pond or swamp areas which consist of the same material as the main type, except that the surface is somewhat darker colored or even somewhat mucky to a depth of an inch or two. These areas are indicated by swamp symbols. There are, in addition to these cypress swamps, some comparatively large areas of this type in the large swamp in the central part of the county, which are covered with a low growth of bushes. The soil here does not differ from the typical.

The Plummer loamy fine sand is not an extensive type and is confined largely to the northwestern part of the county.

The areas are flat and poorly drained, being covered by water or at least saturated during rainy periods of even short duration. The

underlying material or clay prevents the rapid downward movement of water, but the areas lie sufficiently near the stream courses to give some surface drainage, and probably are high enough to be drained by ditching.

This type, owing to its present undrained condition, is not cultivated, but with thorough drainage it is capable of producing crops successfully. It is comparable to the soils of Putnam and St. Johns Counties, on which commercial potato growing has been developed. Good yields of corn could be obtained, as in the potato-growing sections, following the potato crop. After corn a forage crop could be grown or a volunteer crop of crab grass.

This soil is characterized by open prairie or "savanna" areas which support a rank growth of wild grasses, and there are thinly forested areas of pine, with the same rank grassy cover. Slight depressions support a thick growth of slash pine and some cypress.

This land is not for sale, but it would probably bring \$20 or more an acre.

#### HYDE FINE SAND.

The Hyde fine sand consists of a black, more or less mucky, fine sand to a depth of more than 3 feet. The surface 6 to 12 inches is generally of a decidedly mucky character, but with depth the organic material decreases and the sand content increases. As mapped, this soil type has a wide variation. The larger areas include bodies of other soil types which because of their inaccessibility can not be outlined satisfactorily. Parts of the type contain considerably larger quantities of organic matter than the typical, while other areas continue sandy throughout the soil section, the black color being replaced in the lower part by grayish to white sand. In some areas the type could properly be described as a sandy Muck. In places the material consists of muck of varying depths, overlying sand which is reached within the 3-foot section, and it even includes areas of Muck over 3 feet in depth, but wherever such areas can be defined they are classed with Muck. In this type the sand ranges from fine to medium.

The Hyde fine sand is the most extensive soil in the county. It occurs in all parts of the mainland, but is not found on the islands, with the exception of St. James Island. The areas range in size from small bays of less than an acre to those comprising thousands of acres. The largest is that between Apalachicola and New Rivers, known locally as Tates Hell Swamp; the next largest is that between the New and Crooked Rivers, known as Picketts Bay or Thousand Yard Bay. These depressions are of a swampy character, being covered by water the greater part of the year.

The bays support a more or less dense growth of titi, a shrub which, where not kept down by fires, attains a height of 15 to 20 feet. This growth, which is of rather twisted character, and a growth of vines, chiefly smilax and blackberry, make most of these places almost impenetrable. The vegetation in these bays also includes red bay, willow, and myrtle. There usually is some slash pine and an occasional black pine, and in some areas cypress is abundant, together with a shrub of the wort family.

The clearing and cultivation of these bays has not been undertaken, largely because of the cost of clearing and the difficulty of draining. With clearing and proper drainage the areas would make desirable truck and staple-crop farms. The soil is comparable with Muck, except that the organic-matter content is more quickly depleted. Where improved the Hyde fine sand is suited to a wide range of truck crops, especially celery, onions, and lettuce. Experience elsewhere in the State on similar material indicates that strawberries and Irish potatoes do exceptionally well. The liberal application of commercial fertilizers, especially those containing a high percentage of potash and phosphoric acid, is necessary, as on Muck. Liming also is beneficial, and cowpeas, velvet beans, and similar crops should be plowed under occasionally to maintain the content of organic matter. These areas would be valuable for the production of forage crops. The coarse grasses that thrive under moist conditions, such as Rhodes grass and Para grass, would probably give profitable returns.

At the present stage of agricultural development this class of land is not in demand, and no market value can be given it.

Included with the Hyde fine sand are areas of other soil types which are so inaccessible that they can not be definitely outlined. Soil-survey work in these sections is of necessity largely of a reconnaissance character. While in the main the large areas mapped as the Hyde fine sand consist of that type, they include areas of practically all the soils common to the region, with the exception of the higher and excessively drained soils of the St. Lucie and Norfolk series.

This condition applies particularly to the large swamp area known as Tates Hell Swamp and to a less extent to Picketts Bay and other large bays in the county. Probably the largest occurrences of any soil type in the general body is that of the Plummer fine sand, which characteristically occurs as open grassy areas, or "savannas," as grassy flatwoods with a scattered growth of longleaf pine, and depressions or sloughs where cypress and slash pine are the predominant trees. The Hyde fine sand also includes some Plummer loamy fine sand in the northern part. Low palmetto and pine ridges, rang-

ing from areas of a few acres to comparatively large bodies are encountered in which the soils are the Portsmouth fine sand, Norfolk loamy fine sand, and Leon fine sand. In the interior of the swamps there are said to be open ponds, saw-grass ponds, large cypress swamps, and quaking bogs of Muck and Peat.

From the large swamps a number of streams flow in different directions. Apparently some of these inaccessible areas could be drained by the construction of ditches of sufficient size to carry off water rapidly after rains.

#### MUCK.

Muck consists of more or less decomposed vegetable remains resulting from the rank growth and decay of vegetation in the presence of water and under conditions favorable for its accumulation. As found in this county it is black and generally finely divided, although in places it is somewhat fibrous or peaty. Except along the borders, where it adjoins sand areas, the Muck generally is practically free from sand, but contains a considerable quantity of silt and clay. In the narrow slough areas on St. Vincent and St. George Islands, however, the muck in places is not over 10 or 12 inches deep and is underlain by gray to white sand, with an admixture of small quantities of sand in the muck.

For the most part the muck is 3 feet or more in depth. In saw-grass ponds it may be 8 feet or more in depth. The typical Muck is found in the saw-grass ponds. These ponds are small and are scattered throughout the county. The largest area of Muck is along the Crooked River and around Tucker Lake at the east end of St. James Island. It occupies depressed areas which are little above sea level and are covered by water generally throughout the year.

The only agricultural development on Muck is at Eastpoint, where several acres, comprising a number of small saw-grass ponds, have been drained and put under cultivation. Garden vegetables, strawberries, sugar cane, and Irish potatoes are grown successfully. Celery does well, and an effort is being made to produce this crop commercially. The Muck areas are limed to correct acidity, and applications of potash and phosphoric acid are made. Where these areas can be properly drained they should prove valuable for the development of trucking.

*Muck, titi phase.*—This phase is shown on the soil map by cross lining. The surface has a thin veneering of partly decayed leaves and twigs, and under this a black muck, containing some sand, silt, and clay is encountered. The fine sand increases with depth, and a substratum of fine sand is found at a depth of 4 to 6 feet. Under the immediate surface layer the material in its natural state has a soft, oozy structure, due to the large amount of moisture present.

The titi phase of Muck occurs in small, widely scattered areas, the largest being found on St. James Island, near Lanark and Carrabelle, west of Apalachicola and north of Marsh Point. It occurs in low, swampy areas usually bordered by the Hyde fine sand. The drainage is very poor, water standing on the surface during the greater part of the year.

The characteristic vegetation is a dense, rank growth of titi, with some cypress and slash pine.

Very little of this soil has been cleared, except at Carrabelle, where one or two small patches are used for growing vegetables and strawberries for local use. It is well suited to these crops.

#### SWAMP.

Swamp includes low-lying areas bordering streams. The soil material is variable. It usually is of a mucky to peaty character, though frequently silty. In places, mainly along the smaller streams, clay or even sand material predominates.

The largest areas of Swamp occur along the Apalachicola, Jackson, Ochlockonee, and Crooked Rivers and their tributaries. They are of value only for their cypress timber, and the gum swamps only as bee pasturage. This latter is of considerable importance, as a number of apiaries are situated near swamps of this character.

The areas mapped as Swamp support a growth of water-loving trees and shrubs. They comprise what are known as cypress and gum swamps. In places they support a thick growth of cypress of large size, while in other areas, although the cypress predominates, there is a growth of gum and bay, with some magnolia and hickory in the higher bodies or in small hummocks in the swamps. On the other hand, some areas support a heavy growth of gum, including the different tupelo gums, with a large variety of other trees and shrubs, conspicuous among which are cabbage palmetto, magnolia, bay, and myrtle, and a luxuriant growth of ferns. The growth in these swamps is dense. The Swamp is covered by water a large part of the year, and especially during flood stages of the streams.

Where the cypress timber has not been removed this land is assessed at \$2 an acre.

#### TIDAL MARSH.

Tidal marsh consists of the low, flat, marshy areas at the mouths of rivers and along the shores of both the mainland and the islands that are gradually being built up from débris deposited by the tides and the streams. They are subject to inundation by tides or floods and have a salty or brackish character, depending upon the source of the overflow water. The areas along the sounds are

always more salty than those farther up the streams, but all are within reach of salt water.

The material forming these marsh flats is variable; it is usually silty and consists in part of silty Muck or silty Peat. These areas represent recent soil material still in process of formation. They support a growth of marsh grasses.

The largest areas are those in the delta of the Apalachicola River, up the Jackson River to Lake Wimmico, and in the lower courses of the Ochlockonee, Crooked, and New Rivers. Relatively large areas occur also on St. Vincent, St. George, and Dog Islands, and narrow strips occur along the shore of the mainland.

The Tidal marsh areas are of no agricultural importance, except that they afford some grazing for cattle.

#### COASTAL BEACH.

Coastal beach consists of sandy material along the shores of the islands on the Gulf side, thrown up by waves and tides and carried inland by the wind, forming a succession of billowy, hummocky ridges with intervening troughlike depressions. In most places the Coastal beach has a very uneven surface, though in others it occurs as flat plains, over which the water is blown by gales. These flat plains are generally barren, excepting possibly a sparse growth of sand grasses and a few other plants, while in a few areas as toward the east end of St. Vincent Island, there is some pine. The soil material is being fixed by vegetation, although there are small areas of dunelike character, in which the sands are shifted by the wind.

The material is largely composed of loose sands of varying texture. The color is white or light gray at the surface, becoming pale yellow beneath. In places there are large quantities of finely broken shells, and the apron upon which the waves play varies from sand to almost entirely shell material.

Coastal beach occurs in continuous strips, from one-eighth to one-fourth mile or more in width on the Gulf side of all the islands. It occupies all of Sand and almost all of Dog Islands. The exposure to winds and salt spray retards the growth of any plants except those that can withstand these adverse conditions. The areas support a sparse growth of sand grasses and some other vegetation.

Coastal beach has no agricultural value except for scant grazing in places for cattle and hogs.

#### SHELL MOUNDS.

Along the shores of the sounds and bays of the mainland and islands there are many heaps, or mounds, consisting almost entirely of oyster and clam shells accumulated by aboriginal people, as evidenced by the presence of broken pottery and implements embedded

in the mounds. These are mapped as Shell mounds. They usually form low, ridgelike areas along the immediate shores. The depth of the shell material is usually only 2 or 3 feet, but in some cases it is much greater. The elevation of the mounds rarely exceeds 10 feet.

The weathering of the shells, together with the addition of sand particles thrown up by the waves and wind, results in the formation of a shallow soil consisting of a gray to black loose sand, which has a loamy character, owing to the high content of organic matter. The depth of the soil mantle averages 6 to 10 inches, and rarely is it greater than 12 inches. In places, however, it consists entirely of loose shells. The open spaces between the shells permit water to pass downward rapidly, so that the material is droughty, but owing to the high water table a good supply of moisture is available, especially to deeply rooted vegetation. The Shell mound areas support a hammock growth consisting largely of cabbage palmetto, with some oak and considerable pine. They are not used for cultivation in this county, but in other parts of the State garden vegetables and citrus fruits are grown successfully on such soil, the use of fertilizers being necessary.

Included with Shell mounds is the area of oyster shells on what originally was the point of a marsh in the city of Apalachicola, with a similar area at Eastpoint. Each of these areas represents the accumulation of years of the refuse from the oyster industry.

#### SUMMARY.

Franklin County is situated near the center of the western extension of Florida, on the Gulf coast. It consists of a mainland area with a number of outlying islands. It has a land area of 541 square miles, or 346,240 acres.

The county is within the low coastal region bordering the Gulf of Mexico. The surface is a flat, featureless plain, and only along the coastal borders and up the main streams is there any topographic relief. These borders apparently are higher and are well drained, while the interior of the county is flatwoods country comprising a large number of almost impenetrable bays or swamps. The elevation ranges from about 20 feet above sea level in the northern part of the county to 5 to 10 feet along the coast.

The county is drained by small creeks and branches emptying directly into the sounds and bays or into the larger streams. The Apalachicola, bordering the county on the west, is the main river. New River crosses the county near the center, and the Ochlockonee River forms a part of the eastern border. The small streams are generally sluggish and have swampy borders.

The settlement of this county began early in the last century. The settlers were from near-by Southern States, and the present popula-

tion consists largely of their descendants. The population is reported in the 1910 census as 5,201, and is largely concentrated in Apalachicola, the county seat, and Carrabelle, the next important town, both of which are Gulf ports. The rural population is small and scattered over the county.

Franklin County is traversed by the Apalachicola Northern and the Georgia, Florida & Alabama Railroads. Steamboat lines operate on the Apalachicola River and its tributaries, and coastwise ships furnish water transportation to different Gulf ports.

The climate is mild and is modified by winds from the Gulf. The mean annual temperature is 69.1° F. and the mean annual precipitation 56.19 inches. There is a normal growing season of 310 days, although crops that can withstand slight freezes can be grown throughout the winter.

Agriculturally the county is undeveloped. Lumbering and turpentine are the chief industries, the latter being of greatest importance. Small areas are cultivated to subsistence crops, including corn, sweet potatoes, and sugar cane, and garden vegetables. There is a small trucking industry to supply the towns and lumber and turpentine camps. A few cattle and hogs are raised, being grazed in the open range. Dairying is practiced in a small way near Apalachicola. Only 3.5 per cent of the area is reported in farms in the 1910 census, there being a total of 17 farms in the county, with an average size of about 717 acres. Of this land in farms, only about 4 per cent is given as improved. Stock raising offers good opportunities, and trucking can be successfully developed.

The soils of the county are of marine sedimentary origin and are predominantly sandy. There are two general groups, the light-colored, well-drained soils and the poorly drained, or dark-colored soils. The former includes those of the Norfolk and St. Lucie series and the latter the Leon, Portsmouth, Plummer, and Hyde series and Muck. A large total area of miscellaneous materials is classed with Swamp, Tidal marsh, Coastal beach, and Shell mounds.





[PUBLIC RESOLUTION—No. 9.]

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

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

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

Approved, March 14, 1904.

[On July 1, 1901, the Division of Soils was reorganized as the Bureau of Soils.]



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