

U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE GEORGIA STATE COLLEGE OF AGRICULTURE, ANDREW M. SOULE, PRESIDENT; DAVID D. LONG, IN CHARGE SOIL SURVEY.

SOIL SURVEY OF BROOKS COUNTY,
GEORGIA.

BY

A. T. SWEET, IN CHARGE, AND B. W. TILLMAN.

W. EDWARD HEARN, INSPECTOR, SOUTHERN DIVISION.

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



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1918.

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LETTER OF TRANSMITTAL

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., May 25, 1917.

SIR: The accompanying report and soil map cover the survey of Brooks County, Ga., one of the projects undertaken by the bureau during the field season of 1916. This work was carried on in cooperation with the Georgia State College of Agriculture, and the selection of this area was made after conference with the State officials.

I recommend that the report and map covering this work be published as advance sheets of Field Operations of the Bureau of Soils for 1916, as provided by law.

Respectfully,

MILTON WHITNEY,
Chief of Bureau.

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

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MAP.

Soil map, Brooks County sheet, Georgia.

SOIL SURVEY OF BROOKS COUNTY, GEORGIA.

By A. T. SWEET, In Charge, and B. W. TILLMAN.—Area

Inspected by W. EDWARD HEARN.

DESCRIPTION OF THE AREA.

Brooks County, Ga., occupies a central position in the southern tier of counties. It is bounded on the north by Colquitt County, on the east by Lowndes County, and on the west by Thomas County. Jefferson and Madison Counties, Fla., border it on the south. Brooks County is situated approximately 200 miles southeast of Atlanta and 100 miles west and slightly north of Jacksonville, Fla. All the boundary lines are straight except that on the east, which is formed by the Little and Withlacoochee Rivers and is very irregular. The county has an approximate length from north to south of a little more than 25 miles, and its maximum width is slightly less than 23 miles. It has an area of 478 square miles, or 305,920 acres.

Brooks County lies within the Coastal Plain physiographic division of the United States. Although the county extends to within 40 miles of the Gulf coast, the topography resembles that of the central part of the Coastal Plain region, consisting of undulating to rolling uplands gently sloping toward the south. The prevailing topography is one of low, broad ridges and almost level areas, but in many places low, well-rounded hills occur, and there are a few flat, depressed areas.

The streams follow meandering courses through broad, shallow valleys. In periods of unusually heavy precipitation they overflow the entire first bottoms. Adjoining the flood plains of some of the larger streams are broad, level second bottoms or terraces not subject to overflow or inundated only during unusually high stages of the streams. In places these terraces are separated from the first bottoms by distinct escarpments ranging in height from 3 or 4 to as much



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

as 15 feet. The principal terrace developments occur in the eastern part of the county along the Withlacoochee River and Okapileo Creek.

From the larger stream valleys the uplands rise in many places so gradually that it is difficult to distinguish them from the adjacent stream bottoms, especially owing to the fact that the lower Coastal Plain streams deposit very little sediment over their flood plains. In other places well-rounded hills rise rather abruptly from the bottom land, attaining a height of 75 to 100 feet within a distance of one-half mile. In places these low hills abut upon the larger streams.

Tributaries of the larger streams minutely dissect all parts of the upland. In their lower courses these small streams flow in distinct channels bordered by gradual slopes, but in their upper reaches the valleys often consist merely of broad, shallow depressions through which seepage and rain water find their way to lower levels.

Well distributed throughout the county are a number of so-called bays and natural lakes. There are also several large artificial ponds and a number of small sinks. The large bays occur principally in the hilly southwestern part of the county and consist of depressions filled with water during a part of the year and forested with cypress, tupelo gum, and other trees and shrubs that thrive under wet conditions. A dense growth of vines and shrubs surrounds the depressions, and the trees are festooned with Spanish moss. The larger bays contain open water in the central part, with dead trees scattered about and flags and rushes growing profusely. Stanley Bay and McMullen Bay are good examples of these bays. Some bodies of open water in the county are called lakes, but there is considerable confusion in the use of the terms bay, lake, and pond. In many places there are large shallow artificial ponds that have resulted from the damming of small streams for power development at a time when lumbering was more important than at present. Some of the dams are still used to furnish power for small gristmills. Scattered throughout the county are circular or elongated depressions, 3 to 5 feet deep and varying in extent from less than 1 acre to several acres. These are inundated during a part of the year. They support a growth of cypress or gum and are referred to as "cypress ponds" or "gum ponds." These are supposed to be lime sinks. In places there are underground cavities into which small streams empty.

The general direction of slope, as indicated by the stream flow, is toward the south and southeast. The elevation above sea level at the Atlantic Coast Line Railroad station at Quitman is 173 feet, at the station at Dixie 130 feet, and at Piscola 190 feet.

Brooks County is drained principally by the Little and Withlacoochee Rivers, which form the eastern boundary. Their largest

tributary is Okapilco Creek, which has a flood plain approximately one-half mile in width. The channel of this stream is narrow and deep. It can be forded in but few places, and then only during low stages of water. The larger streams and some of the smaller creeks usually are bordered by strips of swamp, which are generally narrow, but in places are rather broad and well defined. These swamp areas are forested with a heavy growth of tupelo gum, cypress, bay, magnolia, swamp maple, and other trees, in many places overhung with Spanish moss. (Pl. I, fig. 1.)

The greater part of the bottom land is fairly well drained except during flood stages of the streams. The land supports an open forest of pine, with a growth of wire grass, carpet grass, and in many places gallberry bushes and saw palmetto.

Brooks County was formed in 1858 from a part of Thomas County. A few settlements were made in this region about 1830, but immigration was for a long time slow. In 1859 the railroad which afterwards became the Atlantic Coast Line was constructed through the county, and settlement increased somewhat. The development of lumbering and turpentineing, which began about 1875, also did much to stimulate settlement. By about 1890 there were a large number of sawmills in the county. The early settlers came largely from the older settled parts of Georgia, mainly from Bulloch, Screven, Burke, and Liberty Counties, and from the Carolinas. During the last few years there has been a considerable immigration from northern Georgia and from other States.

In 1880 Brooks County had a population of 11,727, which by 1910 had increased to 23,832. Of this number 83.6 per cent is classed as rural. The rural population is distributed rather uniformly throughout the county, though the more recently improved north-eastern and northwestern parts are the most densely populated, and comparatively large areas in the eastern and southeastern parts are sparsely settled. The red and reddish-brown hill lands were settled first, and these are, as a rule, still held in large tracts. The sandy lands in the southern and southeastern parts of the county are better suited to stock raising than to cotton growing, and also are held principally in large tracts and are sparsely settled. The pebbly, piny-woods soils in the northern and western parts of the county have proved well suited to cotton and a variety of other crops. Much of this land has been divided into small farms and is densely settled.

Quitman, in the south-central part of the county, with a population in 1910 of 3,915, is the principal town and the county seat. Dixie, 7 miles west of Quitman, and Morven and Barney, in the

northeastern part of the county, range in population from about 200 to 400. Pidcock, Empress, Barwick, and Ozell are small villages. Pavo, in the northwestern corner, lies partly in Thomas County.

Brooks County is well supplied with transportation facilities. The Savannah & Montgomery Branch of the Atlantic Coast Line Railroad crosses the county from east to west, giving direct communication with Savannah, Jacksonville, and other cities to the east. The South Georgia Railway, which crosses the county in a north and south direction, extends to Adel, in Berrien County, from which place the Georgia Southern & Florida affords direct communication with Macon and Atlanta. The Georgia Northern Railway, which extends north from Boston, in Thomas County, to Albany, follows the west line of Brooks County for a distance of more than 12 miles and connects with the Atlantic Coast Line and the Atlanta, Birmingham & Atlantic Railroad. The Valdosta, Moultrie & Western runs southeasterly, making connection with main lines of other railroads at Valdosta and Moultrie.

Public roads radiate from Quitman in several directions, some of them extending to important towns outside the county. Roads radiating from other towns in the county connect with these and are supplemented by other roads that reach every farm and plantation. Even in the unimproved uplands and in the creek bottom lands there are "blind" roads and "turpentine roads." Many of the public highways are so sandy that travel is difficult, but the principal roads are rapidly being improved. The improved roads are well graded and surfaced with a mixture of sand and clay, which forms a smooth, hard layer. Rural mail-delivery service reaches practically every part of the county.

Savannah is the principal market for the cotton and turpentine produced in Brooks County, but these products, as well as the lumber, are also disposed of to some extent at other points. A modern packing plant at Moultrie, in Colquitt County, constructed in 1915, purchases most of the live hogs, but some are shipped to Bainbridge, in Decatur County. Cured meat is handled principally through the local wholesale grocery companies and is shipped to various parts of the South. Poultry is shipped largely to Jacksonville and Savannah. Cabbage is shipped in carload lots to Atlanta and in smaller consignments to other near-by cities and towns. Watermelons and cantaloupes usually are shipped to points in the North and East.

CLIMATE.

The climate of Brooks County is well suited to agriculture. The rainfall is abundant and well distributed throughout the year. The

summers are long and humid, and the winters short and mild. Hardy vegetables, such as cabbage, collards, onions, radishes, turnips, and lettuce, grow throughout the winter. On many farms a few orange trees have been planted, usually in sheltered places; these bear well and are said to be rarely injured by cold weather. Roses bloom profusely until after December 1 and begin blooming again in March. Japonicas, violets, jonquils, and hyacinths bloom in January, and wild azalia and dogwood in March. Probably more than half the plowing is done in December and January.

The mean annual rainfall as recorded at Quitman is 52.48 inches, one-fifth of which falls in the spring, more than one-third in the summer, and approximately one-sixth in the fall. July normally has the heaviest monthly rainfall and November the lightest.

The mean annual temperature is 67° F. The mean temperature for the winter is 52.3° F. and for the summer 80.8° F. January, with a mean temperature of 50.8° F., is the coldest month, and July, with a mean temperature of 81.6° F., the warmest.

The average date of the last killing frost in the spring is March 11, and that of the first in the fall November 13. This gives an average growing season of 247 days. The latest killing frost in the spring, since records have been kept, occurred on April 8 and the earliest in the fall on October 24.

With the use of oats, rye, wheat, barley, bur clover, or rape during the winter, grazing is practicable throughout the entire year. There is usually, however, a shortage of pasturage in the early spring, especially if the season is dry, owing to the exhaustion of the winter crops before the native wild grasses have made sufficient growth.

The long growing season permits the production of two crops of certain kinds in one season. Oats, wheat, or rye may be harvested and followed by cotton, sweet potatoes, peanuts, cowpeas, corn, sorghum, or certain other crops. Spanish peanuts and Irish potatoes, if planted early, mature in time to allow a second planting on the same land. Watermelons may be followed by peanuts or cowpeas, planted between the rows, and winter cabbage by cotton, corn, or any other summer crop.

The following table shows the normal monthly, seasonal, and annual temperature and precipitation as compiled from the records of the Weather Bureau station at Quitman:

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

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.
	° F.	° F.	° F.	Inches.	Inches.	Inches.
December.....	52.5	78	8	4.73	2.22	11.34
January.....	50.8	79	11	3.78	5.29	1.09
February.....	53.7	82	-6	4.56	5.04	5.37
Winter.....	52.3	82	-6	13.07	12.55	17.80
March.....	58.4	90	18	4.05	4.00	9.12
April.....	67.3	96	31	3.22	1.10	1.90
May.....	74.5	100	42	3.32	1.19	2.00
Spring.....	66.7	100	18	10.59	6.29	13.02
June.....	80.0	102	52	5.79	1.99	9.50
July.....	81.6	104	61	7.62	7.21	4.62
August.....	80.9	102	60	6.53	6.73	5.58
Summer.....	80.8	104	52	19.94	15.93	19.70
September.....	77.6	101	43	4.77	.79	7.97
October.....	67.6	92	30	2.09	2.06	4.08
November.....	59.1	84	22	2.02	.49	4.42
Fall.....	68.1	101	22	8.88	3.34	16.47
Year.....	67.0	104	-6	52.48	38.11	66.99

AGRICULTURE.

Parts of Brooks County, principally in the red and reddish-brown hill lands, have been under cultivation almost continuously for about 80 years. In other sections agriculture has been established much more recently. The acreage of the principal crops for the last four census years is given in the following table:

Acreage in principal crops, as reported in the 1880, 1890, 1900, and 1910 censuses.

Crop.	1880	1890	1900	1910
	A cres.	A cres.	A cres.	A cres.
Corn.....	23,027	26,157	38,428	40,121
Cotton.....	21,255	22,161	16,096	34,065
Oats.....	14,087	13,225	11,299	9,512
Sweet potatoes.....	733	961	1,136	1,239
Sugar cane.....	437	.....	995	898
Rye.....	161	111	160	279
Wheat.....	46	.....	38	.....
Rice.....	139	6	131	10
Peanuts.....	.....	6,884	10,307	14,775

Changes in farming methods since the beginning of agricultural development have led to the almost universal use of commercial fertilizers on cotton and their liberal use on other crops, the extensive growing of leguminous crops for soil improvement, and better methods of soil preparation and cultivation. Small grains and pasturage and forage crops have greatly increased in acreage. Some new crops have been introduced, and the general tendency is toward diversified farming in which live-stock raising is combined with the growing of several staple and a few special crops.

The area planted to cotton increased from about 21,000 acres in 1879 to 34,000 acres in 1909. The production increased from slightly over 6,000 bales in 1879 to about 14,000 bales in 1909, and the average yield, according to the census reports, from slightly less to a little more than one-third bale per acre. Both short-staple and long-staple cotton are grown. Some farmers grow only one variety, but many farmers grow both. Cotton is the principal money crop and is grown on almost every farm. Probably on a majority of the farms it is made a surplus crop, the farmers depending upon other crops and upon the live stock for living and maintenance expenses, so that they are practically independent of cotton prices at picking time. It is not uncommon for many farmers to hold their cotton for several months, or even a year or more, after it is ginned.

The following table shows the production of long-staple and short-staple cotton for the last six years, according to the estimates of the Bureau of the Census.

Production of long-staple and short-staple cotton, 1910-1915.

Year.	Long staple.	Short staple.	Total.
	<i>Bales.</i> ¹	<i>Bales.</i>	<i>Bales.</i>
1910.....	923	8,239	9,192
1911.....	2,586	13,292	15,878
1912.....	2,019	7,840	9,859
1913.....	1,968	12,173	14,141
1914.....	1,625	17,800	19,425
1915.....	3,522	12,349	15,871

¹ Bales of 500 pounds.

The area devoted to corn increased from 23,027 acres in 1879 to 40,121 acres in 1909. The production in this period increased from 173,530 bushels to 546,760 bushels, the average yield in the former year being $7\frac{1}{2}$ bushels per acre and in 1909 $13\frac{1}{2}$ bushels. Corn is grown on practically every farm, primarily to supply feed for work animals and to some extent for hogs and cattle. The crop also supplies meal, grits, and hominy, which are important food products

in every home. Many farmers grow corn to some extent as a cash crop, selling a few hundred bushels in the spring when it commands a good price.

Oats decreased in acreage from 1879 to 1909. The average yield, however, was 15 bushels per acre in 1909, as compared with about 12 bushels in 1879. The acreage of oats has increased materially since 1909, owing in part to the extensive use of this crop for winter and spring pasturage. The crop is grown on a large proportion of the farms, and fields ranging in size from 20 to 80 acres or more are sown to oats in many parts of the county. A part of the crop is cut with self binders and fed in the sheaf, and part is thrashed and either fed to work stock or sold. Oats are principally a subsistence crop, but some farmers, especially those having rather large areas of sandy land, make it an important money crop.

Wheat was grown rather extensively by the early settlers for home use, but for many years the crop has been neglected. Only 46 acres are reported for 1879 and 38 acres for 1899, with none reported in 1889 or 1909. Several small fields of wheat were noted during the progress of the survey, and with the tendency toward diversification of crops this grain is receiving increased attention. It is grown as a subsistence crop.

Rye was grown on 279 acres in 1909, with an average yield for the county of 7 bushels per acre. Rye is grown quite extensively for winter and spring pasturage and to an increasing extent as a grain crop. It is grown both as a subsistence and as a market crop.

The acreage devoted to peanuts more than doubled from 1889 to 1909. The yields also have increased materially. Peanuts are grown on almost every farm, principally for fattening hogs and for the beneficial influence of the plant on the soil. A few farmers grow small quantities for market, and the crop is becoming more important as a money crop.

Sweet potatoes have shown a steady increase from 733 acres in 1879 to 1,239 in 1909. They are grown on most of the farms, and are used extensively for fattening hogs and for home use. The crop is also grown to some extent for sale at the local markets. In the vicinity of Pavo and Barwick the growing of sweet-potato plants for the market has recently become a rather important industry. One grower at Pavo bedded 8,500 bushels in 1916, and another at Barwick 4,000 bushels. The Porto Rico and Nancy Hall are the principal varieties grown. The plants are shipped to growers in several States, shipping beginning about April 20 and continuing as long as the demand lasts. The price paid for potatoes for bedding in 1916 ranged from 50 to 75 cents a bushel.

In 1909 there were 898 acres planted to sugar cane. Nearly every farmer devotes a little land to this crop, and almost every

farm has a mill for grinding the cane and apparatus for making sirup (a typical mill is shown in Plate I, figure 2). Sugar cane is mainly a subsistence crop, but many farmers grow a surplus for sale in local markets. The importance of sugar cane as a money crop, however, is said to be decreasing, owing to the cost of making the sirup and to the greater attention given other crops.

Watermelons are a crop of considerable importance, especially in the western and northwestern parts of the county. They are grown principally as a source of income and are both sold at local markets and shipped out of the county. Cantaloupes are grown for market to a small extent in the northeastern part of the county.

Other crops which are grown both for sale and for subsistence are hay, cabbage, and pecans. Winter cabbage, planted in September and marketed between February and May 1, is a rather important crop in some parts of the county. Rice has been grown to a small extent for many years for home use. Red clover, alfalfa, bur clover, and white clover are grown to a small extent. Lespedeza, or Japan clover, grows wild in favorable situations throughout the county.

The following table, showing the total acreage and the average yield of certain crops on 44 farms situated principally in the Hickory Head district, is compiled from a report of the Brooks County Agricultural Club for the years 1892 and 1914. The soils on the farms covered by the report belong to the Norfolk and Ruston series and include quite large areas of deep sand. The total number of plows operated in 1914 was 225.

Total acreage and average yield of certain crops, 1892 and 1914.

Crop.	Total area planted.		Average yield per acre.	
	1892	1914	1892	1914
Cotton.....	<i>Acres.</i> 1, 151	<i>Acres.</i> 2, 391.0	<i>Pounds.</i> 233	<i>Pounds.</i> 308
Corn alone.....	523	1, 131.5	<i>Bushels.</i> 16.1	<i>Bushels.</i> 18.5
Corn and peanuts.....	1, 530	2, 393.0	¹ 11.4	¹ 14.5
Oats.....	1, 148	1, 668.5	9.7	14.0
Rye.....	193		5.5	
Watermelons.....		285.5	<i>Number.</i>	<i>Number.</i> 430

¹ Yield of corn only.

According to the same report, the total number of hogs on the 44 farms reporting was 3,814, or an average of 87 per farm, and the total number of cattle 680, an average of 15 per farm.

In 1909, according to the census, there were sold or slaughtered in Brooks County 354 calves, 1,924 other cattle, 140 horses and mules, 31,225 hogs, and 167 sheep and goats. The receipts from animals sold or slaughtered amounted to \$334,969, from dairy products sold \$34,077, from poultry and eggs sold \$74,944, and from wool sold \$644.

The following table gives the relative value of all farm products, as reported in the 1910 census:

Value of all agricultural products, by classes.

Cereals.....	\$488,316
Other grains and seeds.....	237,515
Hay and forage.....	42,573
Vegetables.....	133,040
Fruits and nuts.....	12,148
All other crops (mainly cotton).....	1,288,360
Live stock and products:	
Animals sold and slaughtered.....	334,969
Dairy products, excluding home use.....	34,077
Poultry and eggs.....	74,944
Wool, mohair, and goat hair.....	644
Total value.....	2,646,586

In 1915, according to reports of the tax collector, there were 4,003 horses and mules in the county, 7,895 cattle, 776 sheep and goats, and 20,816 hogs. Over 300 farmers report 20 or more head of hogs, and over 70 report 20 or more head of cattle. A few farmers report 100 or more head of cattle, and a slightly larger number report 100 or more head of hogs. Owing to the ravages of hog cholera and the unfavorable season, the number of hogs in the county in 1915 is said to have been much below normal.

Aside from cotton production, hog raising is the most important source of farm income. Between October 1, 1915, and April 15, 1916, one buyer shipped from the county 57 carloads of hogs, averaging 100 head each, and having a value of about \$1,000 a car. It is estimated by stockmen that during the same period a total of more than 80 carloads of hogs were sold within the county and that a much larger number were slaughtered, both for home use and for local markets. Formerly all the hogs disposed of were slaughtered on the farm, and the cured meat not needed for home use was sold to local dealers. Many farmers still slaughter from 25 to over 100 head of hogs each year. Through the killing of stock of good grade, careful curing of the meat, and extensive advertising, Brooks County hams have gained a state-wide reputation for excellence.

During the winter and early spring hogs are allowed to run at large in the open woods and swamps or are pastured on oats, rye, or rape. With early planting, fattening crops of corn, peanuts, cowpeas, and sweet potatoes are available by July 1. For fall and winter

fattening, North Carolina peanuts, sweet potatoes, cowpeas, and velvet beans are used, the hogs being allowed to forage on these in the field. In addition to the "piny-woods hogs," with which the county was first stocked, many standard-bred and registered hogs have been imported for breeding purposes, principally of Berkshire, Poland China, Duroc Jersey, Hampshire, and Essex blood.

Almost every farmer in the county raises a few cattle, and some have rather large herds. On some farms the cattle tick has been eradicated, and cattle are kept within inclosures. Most of the stock, however, runs at large during a part of or all the year. In the late fall and winter cattle are pastured in the field on cowpeas, velvet beans, and other roughage, or on oats and rye. In the winter the woods are burned over to remove the dead grass, and by the first part of March the native grasses furnish considerable pasturage. Wire grass and carpet grass constitute the early growth, with crab grass and broom sedge coming in later. If they are not pastured too closely the wild grasses, except broom sedge, improve with the advancing season, and cattle are normally in good condition by early summer. Most farmers, instead of fattening cattle for market, sell them as feeders to outside buyers at the age of 2 to 3 years or more. Some farmers make a business of fattening cattle and shipping or selling to local buyers, finishing from one to several carload lots each winter. (See Plate II, fig. 1.) A few small dairy herds of registered Jersey or good Jersey grades are kept to supply milk, cream, and butter to meet the local demand. The native cattle are being slowly improved by the introduction of improved stock for breeding purposes. The Hereford and Shorthorn seem to be the favorite breeds for beef production, and the Jersey for dairying. On account of the prevalence of the cattle tick, the improvement of cattle has been difficult. At present a campaign is being conducted by the Bureau of Animal Industry in cooperation with the county to eradicate the tick by means of dipping tanks and inclosed ranges.

A few colts are raised by the farmers, but a greater part of the work stock, consisting largely of mules, is imported, principally from Tennessee and Kentucky, at an outlay which constitutes an important part of the farm expenses. In the winter of 1915-16 between 400 and 500 horses and mules were shipped into the county and sold at Quitman. Considerable poultry, consisting principally of chickens and turkeys, is raised annually.

In a broad sense the nature of the soils has a rather marked influence on the prevailing type of agriculture. Brooks County is one of the foremost live-stock counties in the State, apparently owing in part to the fact that large areas of rather sandy land were early found to be not well suited to the growing of cotton. Live-stock raising was begun in an important way, particularly in the Hickory Head dis-

tract, and stock raising and diversified farming gradually extended to other parts of the county and to surrounding counties. In the more restricted sense there is a relation between soils and crops and also between topography and crops, from place to place. The best crops of cotton are grown where there is a surface soil of 12 to 16 inches of friable sandy loam, underlain by a fairly friable clay loam or sandy clay. Soils of this character occur principally on gently undulating uplands and on long slopes. Corn, grain crops, and pecans give best returns on similar soils, and, in general, on types high in organic matter and retentive of moisture, as along the foot slopes and in shallow depressions. Soils having a surface covering of 30 inches or more of sand or very light sandy loam, as well as those having a very shallow, light-textured surface layer, such as frequently occur on steep slopes, are less productive than those in which the heavy subsoil lies moderately near the surface. If the surface covering is coarse in texture or deficient in organic matter the soil is still less desirable. Soils in which small iron concretions occur abundantly are almost uniformly recognized as productive, owing probably to the influence of the concretions on the soil structure.

The farmers generally recognize that certain crops do best on certain soils. In general, the better upland soils are selected for cotton. If the farm includes large areas of less productive sandy soil this is used for corn and oats, which are grown at a lower cost than cotton. Low-lying soils, especially those high in organic matter, usually are avoided for cotton because the plant makes too large a growth and is more subject to diseases. Such areas, locally called "gallberry land," are generally recognized as better suited to sugar cane, giving fair yields of sirup of the best quality.

In growing cotton the methods of preparing the soil, planting, and cultivating vary widely. The better farmers cut the stalks of the preceding crop with a stalk cutter, and in the winter they flat break the land to a depth of 5 to 8 inches, all the stalks and trash being turned under. The best results are obtained where the land is broken with a 2-horse or 3-horse turning plow, but much of the work is done with 1-horse implements. About 10 days before planting time the ground is thoroughly disked and either thrown into low, broad ridges or left level. Some farmers ridge with a disk cultivator and then work the field crosswise or diagonally with a spike-tooth harrow. A furrow is then opened, the fertilizer applied and covered, and the seed planted. The rows usually are placed about $3\frac{1}{2}$ feet apart, and the plants stand at intervals of 15 to 18 inches in the row. The spacing of the rows and of the plants depends upon the productivity of the soil and the amount of fertilizer used, wide spacing being practiced on productive or highly fertilized land. On account of the larger size of the plants, long-staple cotton usually is planted in rows

about 4 feet apart. The stand is thinned by chopping. Cotton usually receives two hoeings and three to five cultivations with the plow, the number depending upon the season. The tendency in cotton growing is toward more thorough preparation of the seed bed, planting on low, broad ridges or on a level seed bed, and frequent shallow cultivation. Many tenants follow the old method of burning all stalks and trash and of rebedding without preliminary plowing.

Land is prepared for corn in much the same way as for cotton, but corn is almost universally planted in the water furrow. The rows are placed about 6 feet apart if peanuts are to be planted between; otherwise about $3\frac{1}{2}$ feet apart. The table on page 13 shows that more than twice as much corn is planted with peanuts as without, and indicates that peanuts reduce the corn yield about one-fourth. Corn is cultivated three to five times. At first the plow is run close to the corn and fairly deep, but the later cultivations are shallow, the purpose being to kill the weeds and grass and to make a surface mulch without disturbing the corn roots. Some successful farmers apply one-half the fertilizer before planting, the remainder being added as a side application when the plants are a few inches high.

Oats are seeded between the middle of October and the last of January, the period from November 1 to 15 probably being the most favored. The crop is either drilled or sown broadcast. Some farmers use fertilizer on this crop. Self-binders are used in harvesting.

The system of cropping varies considerably. On many farms cotton is grown continuously year after year, manure being applied to keep up the organic-matter content of the soil. Some farmers follow cotton with oats or rye for winter pasturage and then return the land to cotton. Others sow oats or rye for grain, followed by cowpeas for hay, with cotton planted the second year, the 2-year rotation thus including three crops, one a legume. A rotation used to a considerable extent consists of corn and peanuts in alternating rows, followed the second year by oats, which are succeeded immediately by cowpeas. This gives a 2-year rotation of four crops, two of which are legumes. Two-year and four-year rotations in which bur clover, cotton, corn, cowpeas, and oats are grown are recommended by the Georgia Agricultural Experiment Station.¹

In 1879, according to the census, the expenditure for fertilizers in Brooks County amounted to \$32,247. In 1889 the outlay was nearly \$50,000, in 1899 a little over \$57,000, and in 1909 almost \$144,000. Under ordinary conditions practically all the land in cotton is fertilized, the applications ranging from 200 to over 600 pounds per acre. Various grades are used, the most common being 9-2-3, 9-2-5, and 10-4-4 mixtures. During the last two years these prepa-

¹ See Bulletin, 117, Ga. Agr. Expt. Sta.



57801

FIG. 1.—PISCOLA CREEK NEAR DIXIE.

Showing typical swamplike growth along the small streams of the county. Maple and tupelo gum on left, and cypress on right; Spanish moss hanging from trees.



57899

FIG. 2.—TYPICAL CANE MILL.

A mill like this is found on almost every farm in Brooks County.



57747

FIG. 1.—CATTLE IN FEEDING PEN ON A FARM EQUIPPED FOR DAIRY FARMING AND STOCK RAISING.

Farms of this kind are found on the Norfolk sandy loam and Ruston sandy loam. Note mixture of breed.



58179

FIG. 2.—IMPROVEMENTS ON A FARM EQUIPPED FOR DIVERSIFIED FARMING AND STOCK RAISING.

Typical of the Tifton and Norfolk sandy loams. Note modern barn and tank for water system. Oats in foreground.

rations, especially fertilizers high in potash, have not been obtainable and lower grades have been used. In many cases the applications also have been materially reduced, or in the case of many farmers abandoned, only the available barnyard manure being applied. Some use cotton seed and others cottonseed meal or hulls. Many farmers mix their own fertilizers. About the same grades of fertilizer are ordinarily used on corn as on cotton, but the applications as a rule are somewhat lower, and much more corn than cotton is grown without the use of fertilizer. Only a part of the land in oats is fertilized. Some farmers use a top-dressing of nitrate of soda for this crop. Garden vegetables, cabbage, and watermelons are fertilized rather heavily. On one farm land devoted to cabbage receives five wagon loads of manure and 2,000 pounds of an 8-2-2 mixture to the acre. Yields of 1 bale per acre of cotton are obtained without additional fertilization the following year. Watermelons receive an application of manure and about 600 pounds of an 8-4-4 mixture per acre. Some farmers keep live stock principally to lower the expenditure for fertilizers.

Farm labor in Brooks County consists mainly of negroes, and the supply is fairly abundant. The laborers are paid about \$12 a month and rations, consisting of 1 bushel of meal and 12 pounds of meat. Ordinarily day laborers are paid 75 cents a day. Fifty cents per hundredweight usually is paid for picking short-staple cotton, and \$1 for picking long-staple cotton.

The 1910 census reports 2,646 farms in Brooks County.¹ The average size of farms decreased from 297 acres in 1880 to 106.6 acres in 1910. The proportion of improved land in farms increased from 27.7 per cent to 43 per cent during the same period. Of the value of all farm property, land constitutes 65.5 per cent, buildings 16.4 per cent, farm machinery 3.6 per cent, and domestic animals 14.5 per cent.

According to the 1910 census, over 40 per cent of the farms are operated by their owners. Much of the tenanted land is rented for cash, the rent ranging from \$3 to \$5 an acre. On some of the old run-down farms where the improvements are poor lower rent is paid. Under the share system a standing rent of about 2 bales of cotton for a farm of 25 to 30 acres is sometimes paid. Where the landowner furnishes work stock and seed and one-half the fertilizer he receives one-half the crop. If the tenant furnishes work stock, feed, and one-half the fertilizer, the owner receives one-third the corn and one-fourth the cotton produced.

Prices of farm land range from \$5 an acre in the flat, sandy areas along the Withlacoochee River to \$50 or more an acre for small tracts well situated and improved. When purchased in large tracts, which

¹ The census tabulates each tenancy as a "farm."

invariably include some waste land, the price of the better grade of farming land ranges from \$30 to \$45 an acre.

Many of the farms throughout Brooks County are particularly well equipped for diversified farming and stock raising. The buildings on two such farms are shown in Plate II, figure 2, and Plate III, figure 1. The barns and other outbuildings are large and well constructed. The farmhouses are large and commodious, many having private water systems and some being equipped with electric-lighting systems. A few farms have silos. Woven wire is used extensively for fencing, and most farms are well fenced. Even the farm buildings in the older settled sections, as well as the recently built tenant houses, are well improved and kept in good condition. (See Plate III, figure 2, and Plate IV, figure 1.)

SOILS.

The soils of Brooks County have been derived from unconsolidated sediments of late geological age. Since the deposition of this material many changes have been brought about through the agencies of weathering and erosion, through differences in drainage conditions, and through the influences of animal and plant life. The action of the streams has played an important part. On the slopes in many places there has been a bodily removal of the surface material, leaving the heavy sandy clays exposed. In places the finer sediments have been removed from the higher positions to lower levels near the base of the slopes. At varying depths beneath the unconsolidated Coastal Plain sediments giving rise to the various soil types is a rock formation which may be seen in deep road cuts in a few places and in outcrops along the Withlacoochee River in the southeastern part of the county. This formation consists of a light-gray, rather soft, chalklike limestone, which becomes yellowish brown on exposure. The occurrence of the few small sinks noticed in the county probably is due to the solution of this formation. Only locally has the limestone affected the character of the soils.

The soils of Brooks County are all sandy in character, ranging from medium or coarse in the western and northern parts of the county to fine and very fine in the southeastern part.

Considerable alluvium has been deposited along the Withlacoochee and Little Rivers and the larger creeks, and in places terraces are developed, in addition to the overflowed first bottoms. The alluvial deposits represent the sediments which have been brought down from the upland Coastal Plain soils and deposited along the streams at times of high water.

The soils of Brooks County are divided into types, according to the proportions of gravel, sand, silt, and clay which they contain. The types alike in manner of formation, in structure, color, drainage, and

in topography are grouped into series. The Norfolk, Tifton, Ruston, Orangeburg, Portsmouth, Plummer, and Leon series, which have already been encountered in other areas in the Coastal Plain, are recognized in the uplands of Brooks County. In the bottoms the Kalmia, Myatt, and Thompson series are mapped. The permanently wet material, which may have various textures, is classed as Swamp.

The Norfolk series is characterized by the light-gray to grayish-yellow color of the surface soils and by the light-yellow color and friable structure of the subsoils. These soils occupy nearly level to gently rolling uplands and long slopes, while the soils of the Orangeburg and Ruston series occupy the more rolling uplands and steeper slopes. Three types of the Norfolk series occur in this county, the sand, sandy loam, and fine sandy loam. In many places the sandy loams and fine sandy loams of the Norfolk, Tifton, and Ruston series are not well defined, and their separation on the soil map is more or less arbitrary.

The soils of the Tifton series have gray to yellowish-gray or brown surface soils, underlain by yellow to slightly reddish yellow or brownish-yellow, friable sandy clay subsoils. Distributed through both surface soil and subsoil are from 15 to 40 per cent of reddish-brown iron concretions and small sandstone gravel. The soils of the Tifton series occupy almost level uplands and the crests of broad ridges. They differ from those of the Norfolk series in carrying iron concretions, and having in places a slightly redder or browner color and a firmer subsoil structure. Two types of this series, the Tifton sandy loam and fine sandy loam, are recognized in Brooks County.

The Ruston soils vary in color from gray to brown. The subsoils show a rather wide range of color from dull yellowish brown to reddish brown, reddish yellow, or almost red, and consist of sandy clay, clay loam, or clay. They are fairly friable, but more plastic and sticky than the subsoils of the Orangeburg series. The Ruston series is intermediate in color of subsoil between the Orangeburg and the Norfolk. Three members of the Ruston series are recognized in Brooks County; the sand, sandy loam, and fine sandy loam.

The types included in the Orangeburg series have surface soils ranging in color from gray to reddish brown, and underlain by bright-red, compact, but friable sandy clay or sand subsoils. The topography usually is undulating to rolling, and drainage is good to excessive. Oxidation of the iron compounds has proceeded further than in the associated soils. The series is represented in Brooks County by a single type, the Orangeburg fine sandy loam.

Where the upland Coastal Plain soils have been subjected to almost continuous moist or wet conditions, as in flat, poorly drained areas, in sinks, and along small streams, the surface soil usually is gray,

brownish gray, or black, and the upper subsoil light gray. The lower subsoil is a mottled gray and brown or gray and red, sticky, sandy clay. The soils of this character in Brooks County are classed with three series, the Portsmouth, the Plummer, and the Leon.

The Portsmouth series includes dark-gray or almost black surface soils, underlain by plastic sandy clay subsoils which are gray, mottled with yellowish brown and in the lower subsoil with red or purple. The topography is flat. This soil does not have the oozy, seepy structure of the Plummer. Only one type is recognized in this county, the Portsmouth fine sandy loam.

The types included in the Plummer series have gray to light-gray soils and a very light gray or almost white upper subsoil. The lower subsoil is light gray, mottled with yellowish brown, and, in this county, with splotches of red, and consists of sandy clay. These soils are poorly drained and occur as narrow strips along the small streams and outer edges of the larger valleys. Only one type is recognized in Brooks County, the Plummer fine sandy loam.

The types included in the Leon series have light-gray to nearly white surface soils, underlain by a dark-brown or coffee-colored layer at a depth of 12 to 24 inches, below which the material is light gray or white. The series is represented in this county by a single type, the Leon fine sand.

The soils of alluvial origin, but not at present subject to overflow or subject to overflow only by unusual floods, and occupying high bottoms and terraces along the larger streams, are classed with the Kalmia series. The surface soils of this series are gray to grayish yellow; the subsoils are light yellow and usually somewhat mottled with gray. Two types are recognized in this county, the fine sand and fine sandy loam.

The soil in poorly drained areas on the terraces and high bottoms is mapped as the Myatt. The Myatt soils are gray to dark gray, and the subsoils gray to mottled gray and yellow or rusty brown. Only one member of this series is recognized in Brooks County, the fine sand.

The alluvial first-bottom soils subject to frequent overflows are classed with the Thompson series. The surface soils are dark gray to grayish brown, with light-yellowish subsoils, usually mottled with gray and brown, and sometimes reddish brown, in the lower subsoil. Two members of this series are mapped in Brooks County, the Thompson fine sand and fine sandy loam.

Swamp consists of a mixture of soil materials, usually carrying a high percentage of organic matter. It is low lying and poorly drained, much of it being covered with shallow water during a part of or all the year.

The following table gives the area of several soils of the county.

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Norfolk sandy loam.....	54,400	24.1	Tifton fine sandy loam.....	9,728	3.2
Deep phase.....	19,392		Swamp.....	9,088	3.0
Ruston sandy loam.....	34,368	14.8	Kalmia fine sand.....	8,640	2.8
Gravelly phase.....	10,880		Ruston sand.....	6,208	2.0
Portsmouth fine sandy loam..	28,864	9.4	Thompson fine sand.....	4,992	1.6
Tifton sandy loam.....	25,728	8.4	Kalmia fine sandy loam.....	4,800	1.6
Plummer fine sandy loam.....	23,808	7.8	Myatt fine sand.....	3,392	1.1
Norfolk sand.....	16,896	5.5	Orangeburg fine sandy loam..	2,368	.8
Norfolk fine sandy loam.....	15,936	5.2	Leon fine sand.....	1,152	.4
Thompson fine sandy loam.....	13,696	4.5			
Ruston fine sandy loam.....	11,584	3.8	Total.....	305,920	.....

NORFOLK SAND.

The Norfolk sand is a gray, light-gray, or almost white sand of medium texture, underlain at a depth of 4 or 5 inches by a pale-yellow, yellowish-gray, or light-gray sand of the same texture, which extends to a depth of 3 feet or more with little change in color or texture. In the surface few inches the type in many places carries sufficient organic matter to give it a loamy structure, and where the color is light brown the soil usually is slightly loamy throughout the soil section and distinctly so below 30 inches.

In some places this type carries a small percentage of the red iron concretions found in the sandy loam. The quantity of these usually is slight, but in the northwestern part of the county a small area near Excelsior School carries probably 15 per cent. In many places the soil also contains sufficient coarse sand and small, sharp quartz gravel to give it a distinctly rough feel and to cause a grating sound when driven over. In other places, especially in the eastern part of the county and to the east and southeast of Quitman, the material is distinctly a fine sand. The same gradation from medium sand in the western and northwestern part of the county to fine sand in the eastern part and from soil of medium depth in the northern part to greater depth in the southern part is noted in this type as in the Norfolk sandy loam.

The largest areas of the Norfolk sand occur in the southwestern part of the county in the vicinity of Piscola and in the southeastern part in the vicinity of Nankin and Ochlawilla Church. Smaller areas occur throughout the county, in most cases adjoining areas of the Norfolk sandy loam. Like that type it has two principal occurrences. In the larger areas it extends over the tops of low, broad ridges and divides, frequently having an undulating or broken and choppy topography, and commonly being variable in depth and texture. Many areas, especially those of smaller extent, occupy low, almost

level, slopes immediately above the stream bottoms. The under-drainage, especially in the higher lying areas, is excessive. In many places the lower lying areas have a much higher moisture content, on account of their position and because they are better supplied with organic matter.

This is an unimportant type agriculturally, as only a small part of it is under cultivation except where it is associated with some more productive type. Much of it is forested, the upland areas largely with blackjack and runner oak, and the level areas with a growth of long-leaf pine, largely cut over, and wire grass.

Oats probably are grown to a greater extent than any other crop on this soil. Corn is grown to some extent, especially in the low-lying areas. The type under present conditions probably is best used for oats, rye, or barley, as pasture or grain crops. The level areas are well suited to Bermuda grass for pasture.

NORFOLK SANDY LOAM.

The Norfolk sandy loam is a light-gray to slightly brownish gray, medium-textured loamy sand, grading at an average depth of about 6 inches into a pale-yellow loamy sand or light sandy loam, which becomes slightly brighter yellow and slightly heavier with increasing depth. At depths ranging from 15 to 24 inches and averaging about 18 inches the material grades into a lemon-yellow or yellow, friable light sandy clay or fine sandy clay. This remains uniform in color to a depth of 3 feet or more, but usually is heavier in the lower part of the soil section. In the lower subsoil mottlings of reddish brown, apparently from the breaking down of iron concretions, are of frequent occurrence. Throughout the greater part of this type the percentage of fine sand is high, and the material is practically intermediate between a sandy loam and fine sandy loam. In some areas it is a fine sandy loam, but in many places the percentage of medium and coarse material is slightly too high for it to be so classed. In but few places does it approach a coarse sandy loam. The type in many places carries in both soil and subsoil a small percentage, usually less than 10 per cent, of the small red gravel or iron concretions common to the soils of this region.

The surface soil varies in color from dark gray where it adjoins poorly drained areas to brownish gray or reddish gray near areas of Ruston soils or where material from the Ruston has washed down the slopes. In areas on the short, steep slopes adjacent to small streams and around the heads of streams and ponds the subsoil is dull yellow, yellowish brown or mottled gray, brown, and red, such areas representing a variation toward the Ruston or Susquehanna soils. In these areas of mottled subsoil, however, the material does not have the heavy, plastic structure of the Susquehanna soil. There

seems to be a gradual change in texture from the western and north-western parts of the county toward the south and east, the soil in the latter sections carrying a somewhat higher percentage of fine sand and the areas of fine sandy loam being more pronounced. The depth to the sandy clay subsoil is somewhat greater in the southern part of the county than in the northern and central parts.

The Norfolk sandy loam is an important type in the southwestern part of the county. Small detached areas are distributed throughout all sections. The type occurs principally as nearly level or gently undulating upland areas, on long, gentle slopes, and as narrow strips at the foot of slopes, the upper parts of which are occupied by other types. The topography is rarely steep. Drainage, both surface and subsurface, is good, but seldom excessive.

The Norfolk sandy loam is an important soil in this county. It is estimated that over 60 per cent of it is under cultivation. Where not cultivated it is sparsely forested with cut-over and burned-over longleaf pine and oak and supports a growth of wire grass, carpet grass, and other grasses. Corn, oats, peanuts, velvet beans, cow-peas, and sweet potatoes are the important crops, but cotton and all other crops common to the region are grown on this soil. Hog raising has probably reached its highest development in the county on this type. Cattle also are raised extensively, and some dairying is practiced. The average yield of corn is low, probably being about 15 bushels per acre, but some farmers, by deep plowing and the use of manure and leguminous crops, obtain average yields of 20 to 25 bushels or even more. The average yield of oats is about 15 bushels per acre, but where sown early, following a legume, yields of 30 to 50 bushels are frequently obtained in favorable seasons. Deep plowing is not practiced for oats, because on soil that is too loose they tend to suffer from drought. Serious injury to this crop often results from the occurrence of dry weather in March and April. Fulghum is the principal variety grown. The average yield of cotton is between 225 and 300 pounds of lint per acre. Sweet potatoes yield 100 to 150 bushels or more. Sugar cane yields well, and the quality of the sirup is good.

When obtainable, fertilizers somewhat higher in potash than those used on the red soils of the region are used on this type. Cotton receives 150 to 500 pounds or more of a good grade of fertilizer per acre, and in some cases about 150 to 300 pounds per acre are applied to corn, but as a rule the corn is not fertilized, leguminous crops being depended upon to add organic matter and nitrogen.

On probably more than 60 per cent of this type the pine stumps have not been removed. Their removal would permit the use of two-horse or three-horse teams and heavier farm machinery, which would give better results with less cost for labor. In the improve-



FIG. 1.—AN ATTRACTIVE FARMSTEAD ON THE RUSTON SANDY LOAM TYPE, TYPICAL OF BROOKS COUNTY.

Showing garage and neat, well-kept appearance of surroundings Cattle barns are in rear of house.

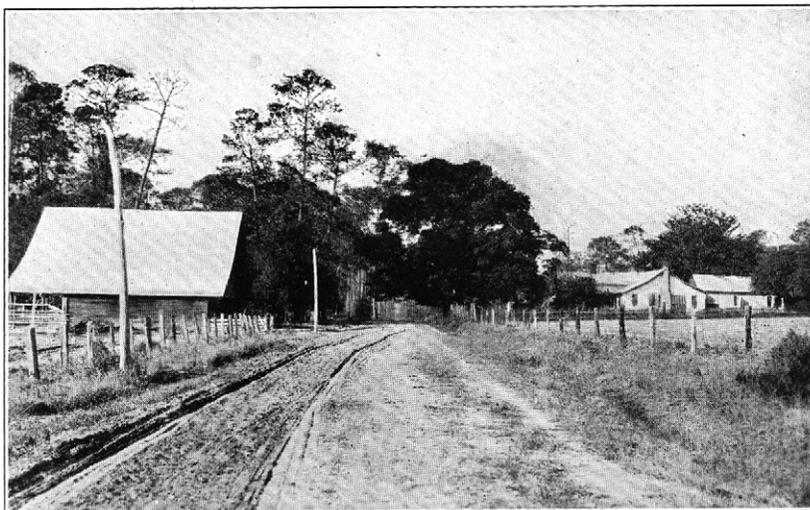
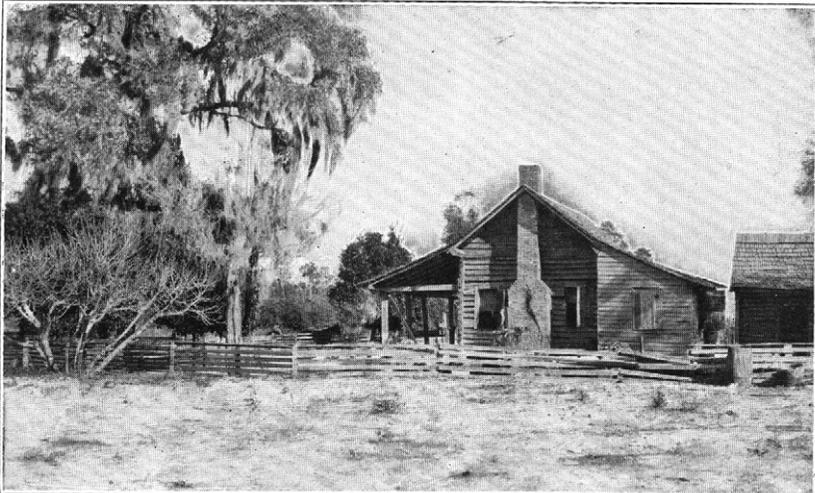


FIG. 2.—CHARACTERISTIC FARM IMPROVEMENT OF OLDER TYPE.

Showing well-built house with large live oak in front. Barn is on opposite side of public road. Soil type of Norfolk sandy loam.



S7692

FIG. 1.—IMPROVEMENTS TYPICAL OF OLDER FARMS AND OF MORE RECENTLY BUILT TENANT HOUSES.

The outside chimney, shed room, detached kitchen, and board blinds instead of windows are typical.



S7797

FIG. 2.—FIELD OF CABBAGE ON TIFTON SANDY LOAM.

Photographed January 12, 1916.

ment of the type there is a general need for deeper plowing for corn, turning under instead of burning all farm refuse that will add organic matter to the soil, a wider use of leguminous crops, the production of more winter and spring pasturage, and the keeping of more live stock. Where clovers, vetch, or alfalfa are to be grown, the use of lime or ground limestone is necessary for best results. Lime is beneficial also for peanuts. In Grady County, Ga., sugar cane yields well on this type.

Norfolk sandy loam, deep phase.—The principal difference between the deep phase of the Norfolk sandy loam and the typical soil is in the depth to the sandy clay subsoil. In the phase the sandy clay has a surface covering of 20 to 30 inches of lighter material, ranging from sand or loamy sand to light sandy loam. In many places the surface is more nearly white than in areas of the typical soil, and the same textural variations from fine to medium occur, with some areas somewhat coarser than the main type. In places the phase is distinctly a deep fine sandy loam.

The phase is intimately associated with the typical soil throughout the county, occurring as nearly flat areas on the crests of low ridges and as narrow strips at the foot of slopes occupied by the Norfolk sandy loam or along the points between convergent streams. On account of the depth of the surface soil this phase is excessively drained, and much of it is droughty and less productive than the typical soil.

There is a smaller percentage of the phase under cultivation than of the main type, and the yields are lower. The phase is intermediate between the sand and the sandy loam. Its productiveness is more easily increased and maintained than in case of the sand.

NORFOLK FINE SANDY LOAM.

The surface soil of the Norfolk fine sandy loam consists of a gray to brownish-gray loamy fine sand, passing into a pale-yellow loamy fine sand at about 6 inches. The subsoil is encountered at 12 to 20 inches, and consists typically of a yellow to slightly brownish yellow, friable fine sandy clay. In many places it is difficult to draw definite boundaries between this type and the Norfolk sandy loam, as the soils merge with almost imperceptible change.

This type occurs in small areas scattered throughout the eastern half of the county. It occupies almost level, undulating, and gently sloping areas. The natural surface drainage is good, except in the flatter areas. The level areas can be adequately drained by means of small ditches. The moisture-holding capacity of this type is slightly greater than that of the sandy loam, and it requires a longer time after heavy rains for this soil to dry out sufficiently for cultivation.

The greater part of the Norfolk fine sandy loam is under cultivation. It is devoted to the same crops and gives about the same yields as the sandy loam, and requires about the same treatment for improvement.

TIFTON SANDY LOAM.

The Tifton sandy loam consists of a brownish-gray to light-brown loamy sand. At a depth of 6 to 8 inches the material has a light-yellow or light-brown color, grading into a light sandy loam and becoming heavier in texture with increasing depth. Below depths of 12 to 20 inches a yellow to brownish-yellow friable sandy clay is encountered. The clay content of the subsoil increases with depth, reaching a maximum between 24 and 30 inches. Below this the material usually is slightly more friable. Scattered over the surface and distributed through both soil and subsoil are numerous small, nearly round, reddish-brown iron concretions and rounded fragments of ferruginous sandstone having much the same appearance as the concretions.¹ The pebbles usually range from about one-sixteenth to one-half inch in diameter, although some are as large as 2 inches in diameter. They constitute from 15 to over 40 per cent of the soil mass, the quantity often varying greatly within comparatively short distances. They are sometimes distributed rather uniformly through the soil and subsoil, but more frequently there is a layer in which the pebbles are more or less concentrated. This layer usually occurs at a depth of 18 to 24 inches. The presence of this ferruginous material in large quantities, the slightly darker color, probably due largely to a breaking down of this material, and the more uniformly favorable depth to a sandy clay subsoil of good texture, constitute the principal differences between this type and the Norfolk sandy loam.

Near Barney and in the vicinity of Ione there are a few patches of Tifton sandy loam in which the sandy clay subsoil does not occur at less than 24 to 30 inches from the surface. Such areas, if of sufficient extent to be important, would be mapped as a deep phase, but they differ only slightly in agricultural value from the main type.

As with the Norfolk sandy loam, a part of this type carries a considerable quantity of fine sand and approaches in texture a fine sandy loam. The greater part of the type, however, is neither distinctly medium nor fine in texture. The same slight gradation from west to east noted in the Norfolk soils also occurs in this type.

The Tifton sandy loam is an important type in the northern two-thirds of the county, or in that part north of the Atlantic Coast Line Railroad. South of this line it does not occur in areas larger than a few acres. It is most extensive in the northeastern part of the

¹ This material is locally called "red pimples" or "red pebbles," and the land on which it occurs "red pimply" or "red pebbly" land.

county, where it is the predominant soil from near Little River almost to Okapilco Creek. It occupies large areas also in the vicinity of Dixie, Ozell, and northeast of Pavo.

The topography is almost level to gently rolling, the type occupying low, broad ridges and long, uniform slopes. Where the surface is more broken, as around stream heads and ponds, the Tifton usually gives place to the Ruston soils, and on the lower slopes adjoining small streams or longer stream flood plains it grades into the Norfolk soils. Both surface drainage and underdrainage of the greater part of the type is good. The soil is retentive of moisture.

This is considered by many farmers the most important type in the county, although by the early settlers it was thought to be of little value for agriculture. Probably 75 per cent or more of the type is under cultivation, the remainder being sparsely forested with second-growth longleaf pine and some red oak and black oak.

The principal crop on this type is cotton, both long and short staple being grown. Corn ranks second in importance, and peanuts, sweet potatoes, and other crops common to the region also are grown. The average yield of cotton is between 300 and 400 pounds of lint per acre, that for long-staple and short-staple cotton being about the same. Corn averages between 20 and 25 bushels, but some farmers obtain yields of 30 to 45 bushels year after year. Oats ordinarily yield between 15 and 25 bushels, although a yield of 50 bushels per acre is often obtained. Peanuts do well. Sweet potatoes average about 100 bushels per acre, with yields of 200 bushels under most favorable conditions. Cabbage is grown for market to some extent (see Pl. IV, fig. 2). A small acreage is devoted to sugar cane, and good yields of a good quality of sirup are obtained.

A large number of farmers on this type use 2-horse and 3-horse teams for plowing, but plowing with one horse is practiced to a considerable extent, as on other soils. Disk harrows and disk cultivators are used to some extent, and some farmers cross cultivate or cultivate diagonally with weeders as soon as the cotton is well up. Some use spacing cotton planters, but the ordinary 1-horse planter is in common use. One-horse planters or drills are used to some extent for corn, though a large part of the corn and practically all the peanuts and velvet beans are planted by hand. Cotton is planted on low, broad ridges or on the level, and is given frequent shallow cultivations. Corn is drilled in the water furrow and receives shallow cultivation at frequent intervals. The same grades of fertilizers are used on this type as on the Norfolk soils. The average application per acre is probably heavier.

The average value of land of this type is about \$40 an acre. The price varies according to improvements, location, and other factors.

The principal improvements needed on this soil are the removal of stumps; the wider use of 2-horse and 3-horse teams, enabling deeper and better plowing; the use of labor-saving implements; systematic crop rotation, including a greater use of the legumes; and the raising of more and better live stock.

From results obtained on soils of this character in other places it is believed that alfalfa can profitably be grown on this type. To grow this crop successfully the soil should first be built up by growing cowpeas or velvet beans to be plowed under, or by applying manure and commercial fertilizer. Weeds and grass should be eradicated by frequent cultivation before seeding, and lime or ground limestone should be applied. For best results the soil should be inoculated. After a good stand has been obtained and the crop becomes well rooted, cultivation with the spring-tooth harrow or spading disk after each cutting to eradicate weeds and grass will be necessary. Alfalfa, especially when young and on sandy soils, will not stand very much pasturing and is often ruined by the trampling of stock. By using like methods of preparing the soil, alsike, red clover, bur clover, and hairy vetch can be grown on this type.

TIFTON FINE SANDY LOAM.

The Tifton fine sandy loam, prevailingly has a surface soil of brown or grayish-brown loamy fine sand, grading at about 6 inches into a deep-yellow or slightly reddish yellow loamy fine sand which extends to a depth of 18 to 24 inches. The subsoil is a deep-yellow, brownish or faintly reddish yellow, friable fine sandy clay. From 15 to 40 per cent of small, rounded, brown or reddish iron concretions or accretions are distributed over the surface and disseminated through the soil, and to a less extent through the subsoil. This type, like its related types, is mellow and easily tilled under a wide range of moisture conditions.

The Tifton fine sandy loam has a moderately extensive development in the northeastern part of the county. Some of the largest areas lie in the vicinity of Morven. Small areas occur in the northwestern and northern parts of the county and south of Simon Hill Church in Dixie Township.

The surface is prevailingly level to gently rolling. Both surface and internal drainage are good. The presence of the pebbles in both the soil and subsoil seems to improve the physical condition of the type and to permit a freer movement of soil moisture.

About 75 or 80 per cent of this type is under cultivation. It is one of the better soils in the county for the production of the ordinary staple crops. The crops grown and the yields obtained are the same as on the Tifton sandy loam, and for its improvement the same treatment is required.

RUSTON SAND.

The Ruston sand consists of a gray to brown medium sand of loose and incoherent structure, grading at about 6 inches into a lighter colored, reddish-yellow or yellowish-brown sand or slightly loamy sand. Below 18 inches the color is more distinctly reddish, and in a few places the material grades below 30 inches into a light sandy loam which is rather sticky. The subsoil of this type varies in color from the yellowish brown of the Norfolk series to the deep-red shades of the Orangeburg, and in texture from fine to almost coarse. A few areas in which it is a fine sand occur about 3 miles southeast of Pavo and between Bethel Church and Okapilco Creek.

The largest areas of this type are situated in the south-central part of the county, between Empress and Piscola and east of Empress. There are other areas east of Nankin, and many smaller areas are mapped, principally in the southern part of the county. The type occurs in two principal positions topographically, as undulating upland areas with numerous ridges and depressions, and as narrow strips at the foot of slopes. In places it occupies small, depressed areas around stream heads and ponds. Underdrainage, owing to the depth of the loose sand, is excessive in much of the type.

This is not an important soil in the county, and probably not more than 40 or 50 per cent of it is under cultivation, the remainder being forested with blackjack, red oak, and longleaf pine. Where it occurs at the foot of long slopes, moisture conditions are better, and the forest growth includes many other trees, with a number of shrubs and vines.

The type is used principally for oats, rye, and corn, and to some extent for other crops. The yields are lower than on the sandy loam. Land values where this soil predominates are also lower than where the sandy loam is the prevailing type.

The Ruston sand can best be improved by using it largely for leguminous crops and increasing its organic-matter supply.

RUSTON SANDY LOAM.

The Ruston sandy loam consists of a gray or rusty-brown, and occasionally reddish-brown, loamy sand of medium texture which at a depth of about 6 inches grades into a yellowish to brownish-yellow light sandy loam. The subsoil is encountered at depths of 8 to 16 inches and typically consists of a reddish-yellow, yellowish-brown, and in places dull-red, friable but somewhat sticky sandy clay. Locally the subsoil is a heavy, tough, and rather plastic sandy clay or clay.

This soil has much wider variations in color, depth, texture, structure, and topography than have the other upland soils of the county. It is an intermediate soil between the Norfolk and Tifton

on the one hand and the Orangeburg on the other. In surface color it resembles in places the gray or brownish-gray of the former, and in other places it approaches the brown color of the latter. The surface of the type as a whole presents all variations between these extremes, with the dull rusty or slightly reddish brown color predominating. The variations in color are most pronounced in the hilly regions, where erosion on steep slopes exposes deeper colored subsoils or brings them near the surface. There is some variation in depth, due to the translocation of material from slopes to depressions. Some small areas carry considerable coarse material and in texture approximate a coarse sandy loam. One area of this kind occurs in the vicinity of Dry Lake, one east of Empress, and others in the southwestern part of the county. In some areas the material approaches a fine sandy loam. Much of the type, however, is not distinctly medium nor fine in texture. A variation in the subsoil frequently is noted on short, steep slopes where in small areas it has the mottled color typical of the subsoils of the Susquehanna series, but it does not have the tenacious, plastic structure of the Susquehanna subsoils.

The Ruston sandy loam has the second largest total area and the widest distribution of any soil type in the county. Large areas are mapped in the south-central and southwestern parts of the county, along the Florida State line, and in the vicinity of Brices Pond, and along the upper course of Okapilco Creek in the northwestern part of the county.

The topography prevailingly is gently rolling, with low, well-rounded hills. The slopes are not too steep for cultivation, but large areas are in need of terracing. Either terracing or contour cultivation is practiced to prevent erosion throughout the greater part of the type. The Ruston sandy loam as a rule occupies convex or rounded surfaces, in contrast with the Tifton soils and much of the Norfolk, which occupy smooth, level, or concave surfaces.

The surface drainage of practically all the type is good to excessive. On the steeper slopes the run-off is rapid, and the soil is subject to injurious erosion. Where the heavy, plastic subsoil has a covering of only a few inches of lighter material it is somewhat difficult to cultivate and has a tendency to be droughty. This is especially noticeable with such crops as corn or oats, which require relatively large quantities of moisture. In such areas pecan trees make a stunted growth and are susceptible to disease.

This is an important type agriculturally and has been so since the first settlement of the county. The early settlers regarded this soil, with small included areas of the Orangeburg sandy loam, as the farming land of the county, while the piny-woods lands comprising the Norfolk and Tifton soils were used for grazing. The

type is still farmed extensively, and on it are located some of the most productive and best improved farms in the county (see Pl. III, figs. 1 and 2). Considerable areas, however, have been seriously injured by erosion and by continuous cultivation to intertilled crops. Some areas which were at one time cultivated are now partly reforested, and others have never been cultivated. At present probably between 60 and 75 per cent of the type is under cultivation. The forest growth on the remainder of this type is in striking contrast with that on the Tifton and Norfolk soils and includes, in addition to longleaf pine, black pine, white, red, and live oak, dogwood, hickory, and sweet gum.

The important crops are cotton, corn, peanuts, oats, and sweet potatoes, ranking in the order named, but all crops of the county are grown to some extent on this type. Hog and cattle raising are important industries.

Owing to wide variations in the condition of the soil, there are also wide variations in crop yields. In areas of the type that are well managed the maximum yields of the county probably are obtained, but much of it has been under cultivation for a long time and has not been well handled. Many fields have been more or less depleted of organic matter, and, having a heavy subsoil near the surface, give low yields. The average yields for the type as a whole probably are lower than on the Tifton sandy loam. Cotton yields from one-fourth bale to more than 1 bale per acre. Corn yields range from less than 10 to more than 40 bushels, with an average of about 15 to 20 bushels per acre. Oats have about the same range, although much larger yields frequently are obtained.

The stumps have been removed from a large part of this type, and a considerable part of the plowing is done with 2-horse and 3-horse teams. On account of the heavy, sticky subsoil, in places deep plowing, even with the equipment used, is difficult. The methods of planting and cultivating are practically the same as on other types. In fertilizing, the quantity of potash applied is slightly less on this type than on the other upland soils.

Land values range from \$20 to \$40 an acre, depending upon location, improvements, and the condition of the soil.

This is one of the most durable and naturally productive soils in the county, but through long use and shallow, clean cultivation it is locally the most run down. It can be built up by gradually increasing the depth of plowing, by growing and plowing under legumes, and by using lime.

Ruston sandy loam, gravelly phase.—Areas of the Ruston sandy loam shown on the soil map with cross lining represent a gravelly phase of the type. In these areas there is distributed over the surface and through both soil and subsoil a large quantity of the

brown to red concretions or accretions found in the Tifton soils. The variation in size of these pebbles seems to be somewhat wider than in the Tifton, and large pebbles are more numerous. In one small area on the Pavo-Tallockas Road immediately west of Adams Mill Creek there are large quantities of concretions 2 inches or more in diameter. The pebbles constitute 15 to as much as 50 per cent of the soil mass.

This phase is regarded by many farmers as one of the most productive soils in the county. The presence of the pebbles improves the structure of the heavy soil.¹

RUSTON FINE SANDY LOAM.

The surface soil of the Ruston fine sandy loam is prevailingly a brown or grayish-brown loamy fine sand, passing at 4 to 6 inches into a subsurface layer of brownish-yellow or reddish-yellow loamy fine sand. The typical subsoil is encountered at 12 to 20 inches and consists of a reddish-yellow to yellowish-red or yellowish-brown, friable fine sandy clay. In places, however, the subsoil is a heavy, tough clay having somewhat the characteristics of the Susquehanna clay. In such areas the surface soil usually is only a few inches deep, and the heavier subsoil occurs at 8 or 10 inches from the surface. Some areas carry a high percentage of medium sand, and the type grades into the Ruston sandy loam. Each type contains small areas of the other.

This type occurs mainly in the southeastern and east-central parts of the county, although many small areas are mapped in other sections. The type occupies gently rolling areas, rounded hills, and gradual slopes. The run-off of rain water in places is rather rapid, and unless checked by terraces is likely to cause serious erosion. The smoother areas are well suited to cultivation. Practically all the type is well drained.

Probably 70 per cent of the Ruston fine sandy loam is under cultivation, the remainder being forested with scattered longleaf pine, oak, some dogwood, hickory, and sweet gum. Cotton, corn, oats, peanuts, and sweet potatoes are the principal crops on this soil. Hog raising is an important industry, the sale of the hogs being one of the principal sources of income. The yields obtained on this soil are comparable with those on the Ruston sandy loam. This type differs from the sandy loam only in having a firmer structure and in places more favorable moisture conditions for the production of corn and oats.

The Ruston fine sandy loam is held at \$20 to \$50 an acre, according to location and improvements.

¹ In the survey of the adjoining county of Colquitt, many small areas of the gravelly phase of the Ruston sandy loam were included with the Tifton sandy loam.



57703

FIG. 1.—FIELD OF SUGAR CANE ON NEWLY CLEARED LAND.
Typical of the Norfolk sandy loam and Portsmouth fine sandy loam.



57898

FIG. 2.—TYPICAL FOREST GROWTH ON LEVEL, SANDY SOILS IN EASTERN PART OF COUNTY.

The Leon fine sand, Myatt fine sand, and parts of other sandy types have this open forest. The trees are principally longleaf pine; the undergrowth is saw palmetto and gallberry.

One of the principal needs of this soil is organic matter, which can be supplied easily and cheaply by growing and plowing under leguminous crops or by adding barnyard manure. The growing of rye and vetch as winter cover crops is beneficial. Light applications of lime are advantageous.

ORANGEBURG FINE SANDY LOAM.

The Orangeburg fine sandy loam consists of a gray, brownish-gray, or brown loamy fine sand, which changes to reddish yellow at a depth of 2 to 5 inches and becomes distinctly heavier with increasing depth. At depths ranging from 8 to 18 inches, but averaging about 10 inches, a bright-red, friable sandy clay, which extends to a depth of 3 feet or more, is encountered. The lower part of the surface soil occasionally is slightly more friable than the upper subsoil.

† a large part of the type as mapped in this county small iron concretions, similar to those found in the Tifton sandy loam and the gravelly phase of the Ruston sandy loam, are distributed through the soil and subsoil. The type also includes eroded areas, or gall spots, in which the soil is a clay loam, but these are too small to be indicated on the soil map. Some areas of soil sufficiently red to be mapped with this type are, on account of their plastic structure, included with the Ruston sandy loam.

The principal areas of this type lie in the southwestern part of the county, in the northwestern part, and in the hilly section along the east side of Okapilco Creek. The type occurs principally as small detached areas on the crests of ridges and knolls and on the steep slopes of hills where conditions have favored erosion. The surface drainage, owing to the steepness of slope, is in most places excessive. In this county the soil is not typical of the Orangeburg fine sandy loam as encountered in large areas in other sections.

Because of its small extent this is not an important type. The greater part of it is under cultivation. In forest growth, crops, and yields it differs but little from the best areas of the Ruston sandy loam, and it requires the same treatment as that soil for its improvement.

PORTSMOUTH FINE SANDY LOAM.

The surface soil of the Portsmouth fine sandy loam consists of a dark-gray to black loamy fine sand or fine sandy loam having a depth of 10 to 16 inches. The subsoil is a light-gray, slightly yellowish gray, or almost white fine sandy loam or loamy fine sand. At a depth averaging about 24 inches, but ranging from 20 to 28 inches, this grades into a light-gray, mottled gray and yellow or brown, sticky, plastic fine sandy clay. Usually below 30 inches there are mottlings of purplish, reddish brown, and red. The type has two notable varia-

tions. In many places, and especially in the poorer drained areas, at an average depth of about 8 inches, a layer of dark, coffee-brown material is encountered, which extends to about 16 inches and abruptly grades into lighter colored material. The texture of this layer differs but little from that of the typical surface soil. It is sometimes referred to as "hardpan," although it is neither especially compact nor cemented. In the second variation the red and reddish-brown mottlings are absent in places in the lower part of the subsoil. It is believed, however, that the mottlings occur under all the type, but that in some places they are deeper than 3 feet. Included in this type are a few slight depressions occupied by the Grady clay loam, consisting of a gray loam or clay loam underlain by mottled yellow, gray, and red plastic clay.

The Portsmouth fine sandy loam is closely associated with the Plummer fine sandy loam, and in many places the boundaries drawn between these types necessarily are largely arbitrary.

The Portsmouth fine sandy loam occurs principally along the South Georgia Railway south of Piscola Creek, between Drew School and the Dry Lake Road, and in the extreme northwestern corner of the county. Small areas are encountered in almost all parts of the county, especially in sections in which the Norfolk soils predominate. The type occurs in broad, flat areas or slight depressions, in narrow strips along and around the heads of some of the smaller streams and drainage ways, and in long, narrow areas bordering some of the larger valleys.

The topography is flat, gently sloping, or slightly depressed. On account of the almost level surface the natural surface drainage is poor over the greater part of the type.

Under present conditions this type is not important except for the pasturage it affords. Where it merges with the Norfolk soils strips are cultivated, and there are a few small fields composed almost entirely of this type. Less than 10 per cent of the type is under cultivation. It supports a growth of longleaf and shortleaf pine, gallberry bushes, and in places scattered saw palmetto, with a thick growth of carpet grass and some wire grass.

Corn and sugar cane are the principal crops grown on this type (see Pl. V, fig. 1), and after it has been under cultivation two or three years it is said to produce cane which makes sirup of better quality than that obtained from cane grown on any other soil in the county. The yields also are good, ranging from 100 to over 300 gallons per acre.

Land where this is the predominating type ranges in value from \$10 to \$20 an acre.

On soil of this type near Moultrie in Colquitt County an excellent growth of alsike was obtained after applying manure and lime

Where this soil is to be used for pasture, it could be greatly improved by draining and seeding to redtop, orchard grass, and alsike. Where used for cultivated crops, the organic-matter supply should be carefully maintained, and this can be done by growing and plowing under cowpeas and velvet beans. The liberal application of lime is highly beneficial.

PLUMMER FINE SANDY LOAM.

At the surface the Plummer fine sandy loam is a gray fine sand or loamy fine sand, dark gray to almost black in color when moist. Below the surface 2 or 3 inches it grades into a very light fine sandy loam of steel-gray color, which at about 12 inches passes into a light-gray to almost white fine sand. At depths varying from 18 to 30 inches this is underlain by a mottled light-gray and yellowish-brown, sticky clay, which is slightly plastic in places. Locally at about 8 inches from the surface a coffee-brown layer, similar to that of the Portsmouth soil, extending to a depth of about 15 inches, is encountered. The lower part of the subsoil frequently is mottled with red, reddish brown, and pink. In places these mottlings are sufficiently pronounced and the structure is sufficiently plastic for the soil to be classed with the Susquehanna series, but such areas are too small to be shown on the map.

There are a number of other variations from the typical soil. In places the surface is quite black and fairly heavy, with pronounced red mottlings in the subsoil. Such areas approach the Grady soils. In other places, especially where this soil is located at the foot of slopes occupied by the Ruston soils, material from higher up the slope has washed down and partly covered the typical Plummer.

This type has a wide distribution. It occurs in narrow strips along the small streams and drainage ways and in places bordering the outer edge of the flood plains of the larger streams. Some areas are inundated a part of the year.

Drainage is very poor, and during a part of the year the soil is saturated by seepage from higher areas. A few small areas of this type have been drained and are cultivated, but the crop yields are low.

The native growth consists of gallberry, bay, swamp maple, mayhaw, some saw palmetto, longleaf and slash pine, tupelo gum, and cypress. The pitcher plant, or "bugle," grows luxuriantly on this soil.

Land values where this type prevails are low. The type under present conditions is best used for pasture. Much land could be greatly improved by clearing away the trees and undergrowth and draining it by ditching.

LEON FINE SAND.

The Leon fine sand consists of a light-gray to almost white loose, incoherent fine sand, which at a depth of 8 or 10 inches grades into a coffee-brown fine sand, compact in structure and commonly called a hardpan. At a depth of 16 to 18 inches the brown color changes abruptly to light gray or almost white, the texture continuing a fine sand to a depth of 3 feet or more. In some places a light-gray to slightly mottled, sticky sandy clay occurs below 30 inches.

The principal areas of this type are mapped in the northwestern corner of the county and along the South Georgia Railway a short distance south of Baden. A number of small areas not of sufficient importance to be outlined on the map are included with other types, mainly the Plummer soil.

This is an unimportant type. The native growth consists of pine, saw palmetto, gallberry, and runner oak (see Pl. V, fig. 2). A small part of one area has recently been put under cultivation. The type has a low agricultural value.

KALMIA FINE SAND.

Typically the Kalmia fine sand consists of a light-gray to gray fine sand, grading at a depth of about 10 inches into a yellowish-gray fine sand. This in turn is underlain at 18 to 20 inches by a light-gray fine sand. A minor variation occurs in which the subsoil below about 18 inches is a yellowish-gray to yellow or mottled grayish and yellowish fine sand.

As mapped, this type includes approximately 50 acres about 5 miles southeast of Morven, in which the material consists of fine sand, with a reddish-yellow color in the subsoil. This would be mapped as the Cahaba fine sand if of sufficient extent and importance to warrant separation. The type also includes a few spots of gray to brown, loose, incoherent, coarse to medium sand, underlain by a light-gray to almost white sand. These spots occur along Little River and Okapilco Creek. They are much less desirable for farming than the typical Kalmia fine sand, the moisture conditions being less favorable. The Kalmia fine sand is most extensive along the Withlacoochee River east and southeast of Nankin and northeast of Quitman. Small areas occur along Okapilco Creek.

The type occupies a terrace lying from 10 to 20 feet above the level of the bottom lands. The descent from the terrace to the bottom lands usually is marked by a well-defined escarpment, although there are small areas east of Nankin, about $2\frac{1}{2}$ miles south of Knight Bridge, where the line of demarcation is indistinct, the slope to the lowland being gradual. The Kalmia fine sand characteristically lies between the Myatt fine sand and the lowlands, or first bottoms.

It lies 2 to 3 feet higher than the Myatt soil, and is much better drained in both surface soil and subsoil. The soil material is alluvial in origin, having been deposited in times of flood by the streams along which it occurs when they flowed at higher levels than now.

The topography is prevailingly flat to undulating, except where stream channels occur. There usually is sufficient slope to insure adequate drainage.

It is estimated that about 50 per cent of the type is in cultivation, cotton, corn, beans, and cowpeas being the main crops. The remainder is in timber and is used for grazing. Oak and pine constitute the principal tree growth.

Cotton yields from one-fourth to three-fourths bale per acre, depending upon the care given in cultivation and the condition of the land. Corn yields from 15 to 20 bushels. A complete fertilizer is generally used for cotton and corn. Velvet beans are recognized as a profitable crop, not only for feed for cattle and hogs, but also for soil improvement. The prevailing practice is to pasture the cattle on range land during the summer and early fall and to follow this with a few months' pasturing on velvet beans. Cattle managed in this way are in prime condition for beef by the first of December, and the gains in weight are made at a minimum expenditure of time and labor.

This type is valued at \$8 to \$12 an acre, depending on location with respect to markets and improvements.

KALMIA FINE SANDY LOAM.

The Kalmia fine sandy loam consists of a gray to dark-gray fine sand or loamy fine sand which grades at 4 to 6 inches into a light-yellow fine loamy sand. At 16 to 20 inches the material becomes heavier, and at about 24 inches it grades into a gray, mottled with yellowish-brown, fine sandy clay. Variations occur in which the surface soil is darker in color and the subsoil heavier. Such areas, if of sufficient extent to warrant separation, might properly be classed as the Myatt fine sandy loam. The type also includes small areas of Swamp and of the Kalmia sand and fine sand.

The principal areas of this type are mapped along Okapilco Creek, in the north-central part of the county. It occupies a low second bottom that is not a distinct terrace. The surface of the greater part of the type is level, with numerous narrow, low troughs and pond-like depressions. It is subject to occasional overflow.

At present this soil has a low agricultural value and is used mainly for pasture. One area of a few acres was under cultivation at the time of the survey. The type supports an open, sparse growth of cut-over longleaf and slash pine and a growth of gallberry bushes and native grasses. The poorly drained areas support a number of other kinds of trees.

MYATT FINE SAND.

The soil of the Myatt fine sand prevailingly is a dark-gray fine sand to a depth of 10 to 12 inches, below which the color changes to light gray. At 18 to 20 inches the subsoil changes abruptly to a chocolate-brown or coffee-colored, compact, fine sand, which either continues throughout the remainder of the 3-foot section or is underlain at 27 to 30 inches by a gray to white sand.

The type as mapped includes an important variation in which the surface 10 inches consists of dark-gray fine sand. This is underlain by a gray fine sand, which extends to a depth of about 20 inches, below which there is a variable subsoil, which may be a gray or white fine sand or a mottled gray and yellow fine sand, the mottled section usually being more loamy in texture than the gray or white material.

The greater part of the type as mapped in Brooks County is not typical of the Myatt fine sand as mapped in other areas, the distinguishing feature being the occurrence of the brown stratum in the subsoil. This material underlies approximately four-fifths of the total area of the type, the largest single area in which it is encountered being in the extreme eastern part of the county near the junction of the Little and Withlacoochee Rivers. The variations are not indicated on the soil map, as they have the same agricultural value as the main type and are relatively unimportant in the county.

The Myatt fine sand is most extensively developed as a terrace in the Withlacoochee flood plain about 10 miles northeast of Quitman. Small isolated areas occur in the flood plains of the smaller streams. The type occupies a low, depressed position on the terrace or second bottom at the foot of the bordering upland. Characteristically it is situated between the upland and the better drained *Kalmia* soils of the terrace. It lies from 10 to 20 feet above the level of the first bottoms, and is above usual high water.

Drainage of both the surface soil and subsoil is very deficient. Frequently the surface water from the upland collects over large areas of the type and remains standing until dissipated by leaching and evaporation. Such areas support a dense growth of water-loving shrubs and grasses and might properly be regarded as a poorly drained phase of the type, but since all the type is poorly drained, these areas are not separated on the soil map. In some places the subsoil when bored into behaves like quicksand, it being impossible to remove the material below 30 to 33 inches with the soil auger on account of the rapid creep of the sand. Although some of the type can be improved by ditching, such work is everywhere difficult, and in some areas it is impracticable on account of the flat surface.

The Myatt fine sand is not cultivated. The forest growth consists of gum, cypress, and red oak, with considerable saw palmetto and gallberry (see Pl. V, fig. 2). Nearly all the timber has been cut, and

the remainder is rapidly being removed. The type is of value only for its timber and the grazing it affords. It can be bought in conjunction with the Kalmia fine sand for \$5 to \$7 an acre. The grazing value of this type could be greatly enhanced by the introduction of nutritious grasses adapted to poorly drained soils.

THOMPSON FINE SAND.

The Thompson fine sand typically consists of a light-gray to brownish-gray, mellow fine sand, about 12 inches deep, which grades into a light-gray or yellowish-gray fine sand extending to a depth of 36 inches or more. The yellowish-gray color is more pronounced below about 25 inches. The percentage of very fine sand is high in this type. Where large quantities of organic matter are present the surface soil is much darker than typical, approaching a dark-brown color to a depth of about 8 inches. As mapped the type includes areas of fine sand having a white to gray color in the surface section, with a loose, incoherent white sand subsoil. A typical example of this is found in an area extending along the river at Blue Springs, and there are isolated areas along other streams. The white fine sand areas are noticeably deficient in organic matter, and in order to utilize them for crop production large quantities of this constituent must be added as well as commercial fertilizers. The organic-matter content of the areas where there is a large percentage of very fine sand is generally greater than in the typical areas, a condition which causes a much more vigorous growth of grasses on the former and renders them much more valuable for grazing.

The Thompson fine sand is a first-bottom soil. It owes its origin to the deposition of material by streams in times of overflow. The largest areas of the type occur along Little River. The type is subject to overflow, which limits its use to grazing.

The surface is prevailingly flat, except where broken by sloughs and abandoned stream channels. Many patches of swamp occur along the drainage ways, but these are too small and irregular to be separated satisfactorily on the soil map.

The forest growth consists largely of pine, with some oak. Most of the merchantable timber has been removed.

The type is not cultivated, and being subject to overflow it has little or no present agricultural value except for grazing. Improvement of the pasturage can be effected by the introduction of more nutritious grasses. This land can be bought in conjunction with the Thompson fine sandy loam for about \$5 an acre.

THOMPSON FINE SANDY LOAM.

The surface soil of the Thompson fine sandy loam is a gray to dark grayish brown, loose, loamy fine sand to fine or very fine sandy loam,

in most places carrying a rather high percentage of organic matter. At a depth of about 6 inches this grades into a light-gray or drab loamy fine sand which is fairly uniform in color and texture to a depth of 12 to 18 inches, where a gray fine sandy clay mottled with yellowish brown is encountered. This extends to a depth of 3 feet or more.

The type as mapped includes areas of material of different texture and color. Some areas, especially near the stream channels and along the outer edge of the valleys where the drainage is poor, have a black surface soil. Some low, wet areas that comprise mixed soils and support a swamp timber growth are included with the type. Other areas are much like the Leon sand in appearance, and the dark-brown layer characteristic of this and some other soils is present in places. In areas of deeper soil red mottling frequently occurs.

Considerable areas of the Thompson fine sandy loam extend along the first bottoms of Piscola Creek, Okapilco Creek, the Little River, and the Withlacoochee River. Smaller areas are encountered along the first bottoms of all the large streams.

The type is low lying and subject to frequent or annual overflow. Although considerable areas have fairly good drainage, the type is not used for cultivated crops. Much of it has an open forest growth of cut-over pine. It supports a good growth of native grasses and is used principally for pasture. Land values range from \$5 to \$10 an acre.

The utilization of land of this character, including all the poorly drained and low-lying sandy and at present nonagricultural lands of the county, apparently is receiving no attention. By preventing the burning over of the forests in the spring, which injures the young pines, and by cutting the small oaks which in places tend to choke the pine trees out, this land would soon become reforested and in 25 years or less would be producing merchantable timber. If the natural drainage ways were deepened and straightened and lateral ditches dug, much of this land could be drained. With drainage it is capable of producing good crops of corn, sugar cane, and pasturage.

SWAMP.

Swamp includes the low-lying, poorly drained areas which are partly or wholly inundated during a large part of the year. The soils in places carry a high percentage of partly decomposed organic matter and are so mixed that definite types can not be established. The Swamp areas support a dense growth of large timber, including cypress, tupelo gum, sycamore, bay, and magnolia. Around the edge of the areas a dense growth of shrubs and vines usually is encountered. In its present condition the Swamp is nonagricultural, and its reclamation would be very expensive. Since there is a large

total area of undeveloped upland in the county, it is not probable that any attempt will be made to utilize the Swamp areas in the near future.

SUMMARY.

Brooks County is near the center of the southern boundary of the State and has an area of 478 square miles, or 305,920 acres.

The topography is undulating to rolling. Some of the slopes require terracing, but they are not too steep for cultivation. Throughout the greater part of the county the drainage is good.

In the 1910 census the population of Brooks County is reported as 23,832. About 84 per cent of this is classed as rural. The population is increasing, especially in the cotton-growing section of the northern part of the county. The railroad facilities are good, and the public roads are being improved.

According to the 1910 census there are 2,646 farms in the county, of an average size of about 107 acres, so that about 86 per cent of the area of the county is in farms. Of the land in farms 43 per cent, or about 46 acres per farm, is reported improved.

The ordinary price of farm land ranges from about \$30 to \$45 per acre. Where well located and improved and sold in small tracts, the price is considerably higher. Grazing lands can be bought for \$5 to \$15 an acre.

The climate is favorable for a wide range of crops and for stock raising. The mean annual temperature is about 67° F., and the mean annual precipitation about 52 inches. There is a growing season of more than eight months.

The money crops of the county are cotton, corn, oats, and hay. Hogs and cattle are also important sale products. Cotton is grown in many cases as a surplus crop. The subsistence crops are corn, peanuts, sweet potatoes, and sugar cane.

The Tifton and Ruston soils are recognized as the better cotton soils, but all the crops common to the region are grown to some extent on all the tillable soils.

Stumps are being removed throughout the county, and considerable flat breaking of the land is done. The tendency is toward deep breaking, especially for corn, with thorough soil preparation and frequent shallow cultivation.

The 1910 census reports 40 per cent of the farms operated by the owners. On many of these farms the buildings are modern, and the farm equipment is generally good.

The soils of Brooks County are of Coastal Plain origin. The principal soils belong to the Norfolk, Tifton, Ruston, and Orangeburg series. The sandy loam types are most important.

The Norfolk sandy loam occurs in all sections of the county and is the predominating soil in the southwestern part. It has a gray surface soil and a yellow, sandy clay subsoil.

The Tifton sandy loam has about the same surface soil and subsoil color as the Norfolk, but carries from 15 to 40 per cent of iron concretions. It is most extensive in the northwestern and northeastern parts of the county.

The Ruston sandy loam has a rusty-brown to reddish-brown surface soil and a deeper colored subsoil. It is the principal type in the more undulating parts of the county and has been under cultivation longer than any other type.

The Orangeburg fine sandy loam has a gray to reddish-brown surface soil and a red, friable subsoil. On account of its small extent it is not an important type in the agriculture of the county.

In poorly drained upland areas the Portsmouth and Plummer fine sandy loams and the Leon fine sand are the principal types. These soils are used principally for pasture. The Portsmouth fine sandy loam is used to some extent for cultivated crops, mainly corn and sugar cane.

The terrace soils are classed with the Kalmia and Myatt series, and the first-bottom soils with the Thompson series.



[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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