

U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE STATE OF ALABAMA, CHARLES HENDERSON,
GOVERNOR; J. A. WADE, COMMISSIONER OF AGRICULTURE AND
INDUSTRIES; EUGENE A. SMITH, STATE GEOLOGIST.

SOIL SURVEY OF WASHINGTON COUNTY,
ALABAMA.

BY

LEWIS A. HURST, IN CHARGE, E. H. STEVENS, AND HOWARD
C. SMITH, OF THE U. S. DEPARTMENT OF AGRICULTURE, AND
J. L. ANDRESS AND J. F. STROUD, OF THE ALABAMA
DEPARTMENT OF AGRICULTURE AND INDUSTRIES.

HUGH H. BENNETT, INSPECTOR, SOUTHERN DIVISION.

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



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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., October 18, 1916.

SIR: I have the honor to transmit herewith the manuscript report and map covering the survey of Washington County, Ala., and to request that they be published as advance sheets of the field operations of the Bureau of Soils, 1915, as authorized by law.

The selection of this area was made after conference with the State officials cooperating with the bureau in the work of surveying and classifying the soils of Alabama.

Respectfully,

MILTON WHITNEY,
Chief of Bureau.

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

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MAP.

Soil map, Washington County sheet, Alabama.

SOIL SURVEY OF WASHINGTON COUNTY, ALABAMA.

By LEWIS A. HURST, in charge; E. H. STEVENS and HOWARD C. SMITH, of the U. S. Department of Agriculture; and J. L. ANDRESS and J. F. STROUD, of the Alabama Department of Agriculture and Industries.—Area Inspected by HUGH H. BENNETT.

DESCRIPTION OF THE AREA.

Washington County, Alabama, is situated in the southwestern part of the State, the Mississippi State line forming its western boundary. The Tombigbee River, which separates it from Clarke and Baldwin Counties, forms the eastern boundary. Choctaw County borders it on the north and Mobile County on the south. The county is about 38 miles long and varies in width from about 22 to 32 miles. It comprises an area of 1,070 square miles, or 684,800 acres, and ranks as the seventh largest county in the State.

Washington County lies within the physiographic province known as the Gulf Coastal Plain. The county has a varied topography, ranging from the low, flat first bottoms and level terraces of the Tombigbee River and smaller streams on the east, through the undulating to choppy uplands in the southern and central parts, to the hilly, eroded sections in the northern part. Tidal influences are felt as far north as Lock No. 1 on the Tombigbee River, so that the elevations range from about sea level in the lowest bottoms to 300 or 400 feet above, the highest elevations being in the "lime-hills" section north of St. Stephens, Frankville, and Koenton. A chain of hills extending from Bassetts Creek to the county line on the south roughly marks the boundary between the high terraces of the Tombigbee River and the uplands, and comprises the highest elevations of this section of the county. Other high ridges are found between Deer Park and Dwight and to the north and east of Exsho. The northern part of the county consists of higher ridges and is more uniformly hilly or ridgy than the southern half, which is



FIG. 1.—Sketch map showing location of the Washington County area, Alabama.

broken by narrow ridges and sharp knolls with intervening broad expanses of gently undulating to level divides (crawfish flats).

The lime-hills region is one that has been subjected to severe erosion, resulting in a very dissected and broken country. The smaller streams usually flow in rather narrow, well-defined channels with steep and often precipitous sides. Palmer Bluff on Santa Bogue Creek, about 80 feet high, and Lovers Leap on the Tombigbee, 150 feet high, are the best examples of precipitous stream erosion. In the rougher parts of the lime-hills region stream cutting has produced an intricate system of wet-weather branches in narrow, steep, almost precipitous valleys, with narrow, winding ridges of varying elevation which alternate with roughly rounded, isolated knobs. The roughest topography of the county is in the Hatchetigbee Hills in the northeastern part.

In contrast with this section are the level to slightly undulating terraces and first-bottom lands of the Tombigbee River, which extend in a practically continuous belt along the river throughout the county, the greatest width being about 8 miles at Toinette, of which 6 miles or more is first-bottom land. A high third terrace included with this belt occupies a strip from Cowans Landing south and east to Bassetts Creek, and occurs north of Prestwick and Carson. It is most typically developed in the region about Leroy. The break from this high terrace to other terraces and the river is marked by rough areas, more characteristic of upland than of terrace, produced by severe erosion.

The northern and eastern parts of the county are drained mainly by the Tombigbee River and its tributaries. The river has a fall of about 4 inches to the mile, and is navigable throughout the county. Even normally the water is muddy and every year the stream deposits a thin layer of silty alluvium over most of the first bottoms. Overflows usually occur in the winter, but June floods are common, and occasionally floods interfere with the gathering of the crops in the fall. The main creeks, as a rule, flow in a general eastward direction to the river. The southern and western parts of the county are drained by the Escatawpa River (locally known as the Dog River) and Red Creek and their tributaries. In the southern part the streams, with the exception of the lower course of the Escatawpa River, are very tortuous and sluggish, with low banks, while to the north the larger streams, such as Pine Barren, Santa Bogue, and Tauler Creeks, have better defined channels. Throughout the county the larger streams are seldom muddy and erode very little, but the waters are dark, owing to organic coloration. The smaller branches mainly originate in springs in flat, swamplike depressions.

The first settlement within the area now known as Washington County was made at Old St. Stephens, a Spanish settlement and fort

on the Tombigbee River. For many years this was the head of navigation on the Tombigbee River. The present town of St. Stephens is 3 miles farther inland. The first territorial capital of Alabama was located at Old St. Stephens, and the first governor of Alabama was inaugurated at this place. The present county was established by proclamation of the governor of Mississippi Territory June 4, 1800, and is one of the oldest counties of the State.

The population was reported as 3,912 in 1870. It increased steadily to 14,454 in 1910, the entire population being classed as rural, and averaging 13.3 persons per square mile. In the past the increase has been due chiefly to the development of the yellow-pine lumber and turpentine industries, which furnished employment to a large part of the population, but recently a number of colonization projects have been developed on the cut-over lands now available for agriculture, and these are steadily bringing homeseekers into the county. Of the total population, according to the 1910 census, 6,064 are negroes.

Vinegar Bend, on the Mobile & Ohio Railroad, is the largest town in the county. At this place the largest lumber mill now operating in the county is located. Fruitdale, also on the Mobile & Ohio Railroad, has been built up chiefly through the efforts of a land-development company. Similar development is taking place at Yellow Pine and Deer Park, on the Mobile & Ohio Railroad, and along the Southern Railway, in the eastern part of the county, at Toinette, Slade, and Calvert. St. Stephens, a village in the northeastern part of the county, about which the population originally centered, was until recently the county seat, but the present county seat is Chatom, nearer the center of the county. Healing Springs is a small summer health resort in the northwestern section.

Transportation facilities are furnished by the lines of the Mobile & Ohio Railroad, the Southern Railway, the Alabama, Tennessee & Northern Railway, and the Alabama & Mississippi Railroad. The Mobile & Ohio traverses the western part of the county from north to south; the Southern extends north and south through the eastern part; and the Alabama, Tennessee & Northern has a general north-and-south course through the central part of the county. The Alabama & Mississippi Railroad extends from Vinegar Bend to Leakesville, Miss. The Washington & Choctaw Railway operates one train a week from Yellow Pine, on the Mobile & Ohio Railroad, to Rayton, in the southeast corner of Choctaw County. The extreme eastern part of the county is supplied with freight and passenger transportation by the Tombigbee River. Before the advent of railroads, McIntosh Landing was the main distribution point for the river traffic of the southern and western parts of the county and also for that of some parts of eastern Mississippi.

Some of the farm products of this county are marketed in Mobile, but the greater part of the truck crops is shipped to St. Louis and other northern markets, particularly from the western part of the county along the Mobile & Ohio Railroad, which furnishes quick transportation for the more perishable products.

There are comparatively few graded roads in the county, most of the roads consisting of trails used for conveying lumber, turpentine or railroad ties to railroad points. During the winter season the unimproved roads are in some places almost impassable. As the local tax funds become available, improved graded roads are constructed to connect the chief towns of the county, but owing to the lack of adequate funds the roads in many cases have not been properly constructed, and they are commonly too narrow and are subject to washing.

The school system is inadequate for the needs of the county. The construction of a State and county high school, however, is being considered.

Telephone lines connect most of the towns of the county, but the service has not been extended to the rural districts. There is one rural mail delivery route from Vinegar Bend and another from Mississippi, crossing the northwestern corner of the county. The only other rural mail delivery service is that furnished by a few star routes.

CLIMATE.

The climate of Washington County corresponds quite closely with that of the southern tiers of counties in Alabama and contiguous States adjoining the Gulf of Mexico. It is favorable to an intensive system of agriculture, and to dairying, horse raising, and hog raising. The winters are short and mild, the temperature being materially modified by winds from the Gulf. Owing to the influence of the Gulf and the low general relief of the southern half of the county, that section has a higher average temperature and humidity than generally prevails in the northern lime-hills region. The mean annual temperature is 63.5° F., according to the records of the Weather Bureau station at Healing Springs, and the mean annual precipitation, 57.79 inches.

Sudden temperature changes are unusual. The average temperature for the winter months of December, January, and February is 47.4° F. The lowest temperature ever recorded by the Weather Bureau is -7° F. The midday temperatures usually range from 55° to 65°, with a drop to 35° or 30° or lower at night. Light frosts are frequent during midwinter, and thin ice is not unusual. Snow to a depth of several inches fell in 1915, but soon melted. This is said to have been the first snowfall recorded in 13 years. Severe freezing

weather is rare and of short duration. The winter rainfall averages 17.24 inches, an amount in excess of the needs of the soil at this period of dormant vegetation. The rainfall usually occurs as general showers of several hours' duration; during the winter season it sometimes occurs as a steady, slow rain lasting several days.

The average spring temperature of 63.1° is favorable to early crop development. The rainfall, averaging 13 inches, is, as a rule, well distributed and ample for all crops, although in 1914 there were 16 weeks and in 1915 13 weeks without rain over most of the county. Thunderstorms and heavy rains are common. The heavy rains flood the smaller branches and erode the hilly soils.

The summer months of June, July, and August are characterized by a steady temperature, with occasional periods of extreme heat. The temperature seldom reaches 100°, although it may be above 90° on 40 days or more each year. A maximum of 90° or 96° in the day usually is followed by a drop to 85° or 80° at night. In general, the elevation favors an air movement which renders the climate comfortable, although the heat in the lowlands, which are largely uninhabited, may be oppressive owing to the humidity. For the summer months the rainfall averages 18.66 inches.

The fall months have but 8.85 inches of rainfall, the cotton-harvest season being the driest part of the year. Cotton and other crops are generally gathered with little damage. Rainfall occurs on about 125 days of the year, and crop failures from drought are unknown. The number of clear days is about equal to the number of rainy days, although there are more cloudy and partly cloudy days than in counties to the north.

The average date of the last killing frost in the spring is March 6, and of the first in the fall November 17. The latest date of killing frost in the spring recorded is April 10, and the earliest date in the fall is October 19. There is an average growing season of 256 days. Hardy pasture grasses grow throughout the year, and a wide variety of garden vegetables may be grown for winter use.

The climate is subject to local variation, due to the differences in elevation in the county. The greater length of the growing season in the uplands is of considerable importance since the advent of the boll weevil, and corn has almost entirely displaced cotton on the lowlands.

The prevailing winds from November to April are from the north or northwest, from May to August from the southwest, and from September to October from the northeast. High winds and tornadoes are of rare occurrence.

The water supply for farm and domestic use is generally good. In the flat lands drinking water is obtained from driven wells by sinking a perforated pipe a few feet. In the higher regions the

water is obtained from dug wells from 30 to 80 feet deep. These wells usually need little or no curbing. It is difficult to obtain water in the lime-hills region except from deep, bored wells. Artesian wells are common along the river, but for the most part the water is salty and unfit for stock.

The data in the following table are compiled from the records of the Weather Bureau station at Healing Springs:

Normal monthly, seasonal, and annual temperature and precipitation at Healing Springs.

Month.	Temperature.			Precipitation.		
	Mean.	Absolute max- imum.	Absolute mini- mum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.
	° F.	° F.	° F.	Inches.	Inches.	Inches.
December.....	46.8	83	8	5.28	4.69	2.77
January.....	46.8	83	10	5.59	5.98	5.22
February.....	48.6	81	-7	6.37	4.91	6.11
Winter.....	47.4	83	-7	17.24	15.58	14.10
March.....	55.8	89	19	5.25	3.40	2.96
April.....	62.9	94	29	3.91	0.76	3.35
May.....	70.5	97	34	3.88	1.77	11.47
Spring.....	63.1	97	19	13.04	5.93	17.78
June.....	77.1	100	40	5.58	3.66	7.43
July.....	79.4	107	57	6.41	4.71	12.22
August.....	79.6	102	57	6.67	3.49	6.82
Summer.....	78.7	107	40	18.66	11.86	26.47
September.....	75.3	98	35	3.57	0.32	5.53
October.....	64.0	93	29	1.92	1.58	3.10
November.....	55.1	90	16	3.26	3.99	5.20
Fall.....	64.8	98	16	8.85	5.89	13.83
Year.....	63.5	107	-7	57.79	39.6	72.18

AGRICULTURE.

Up to the present time agriculture in Washington County has been of secondary importance, lumbering and turpentine ranking as the leading industries. The agriculture of the early settlers was confined to the production of supplies needed for home use, including corn, rice, sugar, cotton, and a few vegetables. At first the lighter textured river bottoms and "prairie" or "lime-hill" soils in the vicinity of Old St. Stephens were the only areas cultivated, being selected because of their natural productiveness. Later Old Wake-

field and McIntosh Landing became thriving settlements. For protection against Indian raids the settlers lived near forts and in settlements. It is said that settlement was largely confined to the higher terraces and uplands because of the prevalence of malaria in the bottoms. The land for the most part was held in large tracts or plantations, which prior to the Civil War were generally self-supporting. The "piny-woods" lands were considered thin and poor by early settlers and were valued only for their timber growth or for pasture.

The agricultural development of the county has been very gradual, but now that the lumber and turpentine resources are nearing exhaustion the cut-over land must be utilized for other purposes. (See Pl. I, figs. 1 and 2.) Approximately 50,000 to 60,000 acres in the interior of the county is about all that remains of the 600,000 acres or more of the valuable yellow-pine forests, which included some of the best timber in the South. The present cutting and turpentine cropping is largely from the younger growth or from left-over timber from the earlier mill operations, and the close turpentine and lumbering now practiced leaves almost nothing for future development until the forests have been renewed, which with continuation of the frequent fires that destroy the young pines, does not promise rapid or important development. It is becoming necessary for those who have depended upon lumbering and turpentine to turn their attention to agriculture in some form. The transition has already begun in some sections, where the former method of obtaining supplies from the commissary has been supplanted by the better method of producing at home most of the food products required for the family and for stock. In order to do this, the landholders are gradually enlarging their fields and in addition are inclosing pasture lots for stock.

Land development companies have purchased large holdings of cut-over land from the lumber companies and have subdivided them into 5, 10, 20, and 40 acre tracts for trucking, fruit growing or general farming. These tracts are being taken up largely by settlers from outside the county, principally from the North and West. The native farmers seldom grow the specialized crops, preferring to carry on general farming or stock raising instead. Trucking and fruit growing are being developed along the railroads because of the shipping advantages. Large holdings still remain to be developed; these are used only for grazing for sheep, goats, hogs, and cattle. No stock laws are in force in the county, so that the stock has free range over these large areas. Common "scrub" stock is raised. The cattle gain subsistence almost entirely from the open range. At certain times of the year the stock is "rounded up" and that suitable for market is

taken from the herds, while the remainder, including younger stock, is marked with the owner's brand and turned back on the range. Some of the stock is lost through lack of attention, and some sheep are killed by dogs and wild animals, but the cost of production is small and the net returns are on the whole such that the industry is profitable, particularly to the few who own large herds of stock. The sheep are sheared, the wool constituting an extra source of profit. The census reports a total of 126 calves and 3,790 other cattle sold or slaughtered in Washington County in 1909. A total of 6,744 hogs and 676 sheep and goats is reported sold or slaughtered, and 147 horses and mules sold. The live-stock products are sold largely at the local lumber camps and towns, some being marketed at Mobile.

The following table gives the value of the agricultural products of the county as reported in the 1910 census:

Value of agricultural products, Washington County, Ala., 1909.

Product.	Value.	Product.	Value.
	<i>Dollars.</i>		<i>Dollars.</i>
Cereals.....	148,148	Live stock and products:	
Other grains and seeds.....	15,432	Animals sold and slaughtered.....	120,495
Hay and forage.....	20,885	Dairy products, excluding home use.....	23,094
Vegetables.....	113,212	Poultry and eggs.....	45,005
Fruits and nuts.....	14,263	Wool, mohair, and goat hair.....	7,176
All other crops.....	489,068		
			996,778

The agriculture of the county up to within recent years centered largely about cotton, which, after the introduction of the cotton gin, became the money crop, its production being limited only by the supply of labor or by the ability of the planters themselves to cultivate and gather the crop. This gave rise to a "one-crop" system of farming, cotton being produced to the exclusion frequently of even home supplies, so that most of the meat, flour, meal, and other foodstuffs were shipped in from northern and western States. The ravages of the boll weevil in recent years have so reduced the yields that in many cases the cultivation of cotton has been unprofitable, particularly in the river bottoms. The census of 1880 reports 3,280 acres in cotton, with a production of 1,246 bales. The 1910 census reports 11,146 acres in cotton in 1909, with a production of 4,144 bales. The production was increased to 4,628 bales in 1911. The weevil then invaded the county, and in 1912 only 2,287 bales were ginned, and production was further reduced, to 1,124 bales, in 1915. The cotton is marketed mainly in Mobile and Demopolis, Ala.

Corn is now the principal crop. Although it has not been the money crop of the county, it has for many years occupied a greater

acreage than cotton. The area in corn has increased from 4,259 acres in 1879 to 11,341 acres in 1909. No statistics for 1915 are available, but it is generally estimated that the acreage in this crop would far surpass that of any previous year. The corn is largely used on the farm as feed for stock and as meal. On the Tombigbee bottoms some corn is grown for sale. An expenditure of \$40,577 in this county for feed is reported in the census of 1910.

The area devoted to oats increased from 464 acres in 1879 to 619 acres in 1909. The drought of 1915 greatly reduced the yields, although the acreage was said to be greater than that of any previous year. This crop is generally fed in the sheaf or baled.

A few farmers in 1915 grew wheat in small fields, with good results. This crop, however, has never been grown to any extent. The fields were sowed under the direction of the State department of agriculture and industries at Montgomery and the experiment station at Auburn, Ala. The grain from these fields was thrashed largely with flails and was ground in the local water mills for home use.

Both Irish and sweet potatoes are grown throughout the county. The census reported the total area in Irish potatoes as 229 acres and in sweet potatoes as 975 acres in 1909. There were in this year 742 acres in all other vegetables. Although some potatoes are shipped out of the county, most of the crop is consumed locally, mainly in the lumber camps and sawmill towns.

Some effort has been made to establish the manufacture of sirup in the county. At Cortelyou, and near Calvert and Leroy, several small mills are manufacturing and canning sirup for market. The acreage in sugar cane apparently is increasing, particularly on the lighter colored soils, from which a mild-flavored, light-colored sirup is obtained. The greater part of the sirup produced is used locally. The 1910 census reports 361 acres in sugar cane.

Peanuts are grown in a small way, mainly as a forage crop for hogs. Cowpeas also are grown, not only for feeding purposes but as a soil improver. Some of the peas are used for food, but for the most part they are picked for seed. The production is reported in the 1910 census as 6,211 bushels, from 665 acres. This, however, does not fully represent the extent to which the crop is grown, as the greater part is used as forage. Velvet beans are grown in a small way, but are increasing in importance. These crops are valuable not only for use as forage crops but also for the organic matter and nitrogen that they add to the soil.

Of the hay and forage crops, the 1910 census reports 661 acres in tame or cultivated grasses and 227 acres in wild grasses, with grains cut green from 403 acres.

In addition to the production of the general farm crops, fruit growing and trucking have been developed to some extent, mainly along the Mobile & Ohio and Southern Railroads. About 10 years ago both small and large tracts were set to peaches in the vicinity of Dwight, Deer Park, Fruitdale, and Yellow Pine and peach production became an important and profitable industry. The peaches were largely marketed in St. Louis and Chicago. Some of the plantings were neglected and became diseased, other orchards were affected, and the industry was soon completely ruined. Of the thousands of trees planted only a few isolated ones remain. Since that time several attempts have been made to revive the industry, the largest recent planting being located in sec. 36, T. 6 N., R. 5 W. This orchard has received careful handling, including spraying, pruning, etc., and is said to be profitable. Other fruits, including pears, apples, and strawberries, are grown to some extent.

In the vicinity of Deer Park, Calvert, Slade, and Toinette, Satsuma oranges, grapefruit, and pecans are being planted on a commercial scale. The growing of these products is only in an experimental stage, however, and no statistics are available to show to what extent they can be profitably grown. In the winter of 1914-15 many of the grapefruit trees were injured or killed by the cold. Most of the pecan plantings are young. A few orchards are in bearing, the nuts being sold locally for the most part at an average price of 15 cents a pound. The 1910 census reports a total of 36,365 peach trees in the county in 1909, which is probably more than at the time of the survey. In addition 2,558 apple trees and 9,149 grapevines are reported.

In the vicinity of Fruitdale, Yellow Pine, and Deer Park, where the land is subdivided into 10, 20, and 40 acre plots, the prices at which land may be obtained frequently are so high by the time it is improved that it can not be used profitably for general farming. Trucking has therefore been introduced, and colonies have been established at the above places in an attempt to place the industry on a firm basis.

Fruitdale at present is the most active trucking center. The season usually opens with radishes, kale, spinach, and mustard greens. Asparagus, strawberries, beans, peas, cucumbers, cabbage, potatoes, and tomatoes are among the crops grown. Those engaged in trucking are largely immigrants from the North or are of foreign birth. The success has been largely commensurate with the experience and resources at the command of the trucker.

Owing to their comparatively level topography, the better drained terrace soils are generally preferred to the uplands for farming, the latter being more often rolling to hilly. But little attention is given to the adaptation of soils to crops, except that the overflow bottoms

are used largely for corn. There is also some tendency toward using the lighter colored soils for sugar cane, since they produce a milder and lighter colored sirup than the darker soils and the types with red subsoils.

The land generally is plowed shallow with light turning plows, mainly in the early spring or, in the river bottoms, as soon as moisture conditions permit. The soil is seldom plowed deeper than 3 to 5 inches. Very little level cultivation is practiced, most crops being grown on beds or ridges. The planting season usually begins between the latter part of March and the first of April, although corn planted as late as the first of June will mature, and some of the largest yields in the county have been reported from such plantings.

The farm equipment is light, and only in a few cases is labor-saving machinery used. Cultivation is done largely with the one-horse plow or cultivator, although a few riding two-horse cultivators are in use in the vicinity of Leroy.

Crop rotation is practiced to only a very small extent. With the advent of the boll weevil cotton has become a secondary crop, and on some farms its production has been discontinued and the growing of velvet beans, peanuts, cowpeas, and other forage crops as feed for stock has taken its place.

Since the amount of barnyard manure produced is small, commercial fertilizers are used in relatively large quantities. The 1910 census reports an expenditure of \$48,464 for fertilizer, or an average of \$53 for each farm reporting its use. Farm labor was generally scarce when the lumbering industry was important, but in recent years it has been more plentiful and at present farm laborers are easily obtained for \$1 to \$1.25 a day or, where hired for long periods, for \$12 to \$15 per month with rations. The census of 1910 reports a total expenditure of \$58,746 in the county for labor.

The average size of the farms is given by the 1910 census as 205.6 acres. Of this an average of only 25.6 acres is reported improved. There is wide variation in the size of holdings. Many small farms of 5, 10, 20, and 40 acres have been opened in the trucking section. About one-half the area of the county is in farms. A total of 1,676 farms is reported. Of these 69.3 per cent are operated by the owners, and practically all the remainder by tenants.

The value of the land varies widely, depending on the character of the soil, topography, location, and improvements, ranging from \$2 to \$50 an acre.

SOILS.

The upland soils of Washington County are derived from Coastal Plain material, which consists of water-transported material from the crystalline, limestone, and sandstone-shale rocks of the older land

areas to the north, such as the Appalachian, Piedmont, and Limestone Valley belts. The first-bottom and terrace (second-bottom) soils along the streams are derived from more recently deposited material washed from the upland soils of the drainage basins of the several streams, including chiefly the Ruston, Orangeburg, Susquehanna, and Norfolk soils. The alluvium in the first bottoms is of recent deposition, and material is still being added by overflows, while that on the terraces was laid down when the overflows reached higher levels than at present.

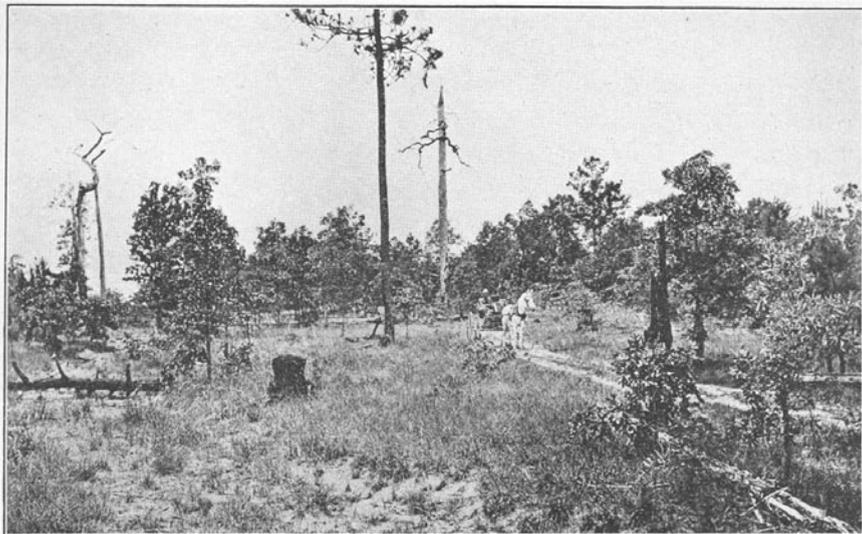
Through agencies of weathering the original material has been changed considerably, especially in color. In the poorer drained situations the soils are prevailingly grayish or mottled grayish and yellowish, while in the better drained sections they are more uniform in color, yellowish and reddish colors predominating. The character of the original beds of the uplands, however, has had a very important influence upon the soils derived therefrom. The heavy clay beds have formed stiff clay soils or soils with stiff clay subsoils, while the sandy beds have produced friable sands or sandy clay soils. The limestone formations in the northern part of the county have given rise to soils distinctly different from those derived from other sources. Erosion has played an important rôle in shaping the surface features, in washing off surficial material, and in exposing the underlying beds. Vegetation has influenced the surface color of the soils in most places.

In the bottoms, where fresh material is being added by every overflow, the nature of the soils depends upon the character of the soils in the drainage basins and the condition of drainage between periods of overflow. On the terraces the soils resemble more closely the upland types, weathering agencies having given the terrace material many of the characteristics of the upland materials.

The Coastal Plain material is predominantly sandy, but not infrequently heavy clay and lime-bearing strata are encountered. The geological formations of the county¹ are the St. Stephens (limestone), Claiborne, Buhrstone, and Hatchetigbee divisions of the Eocene in the northern and northeastern parts, and the Grand Gulf of the lower Miocene in the southern part, or roughly south of a line passing through Healing Springs and Cortelyou. However, the soils for the most part are derived from what appears to be a thin mantle of sand, gravel, and sandy clay capping the underlying formations.

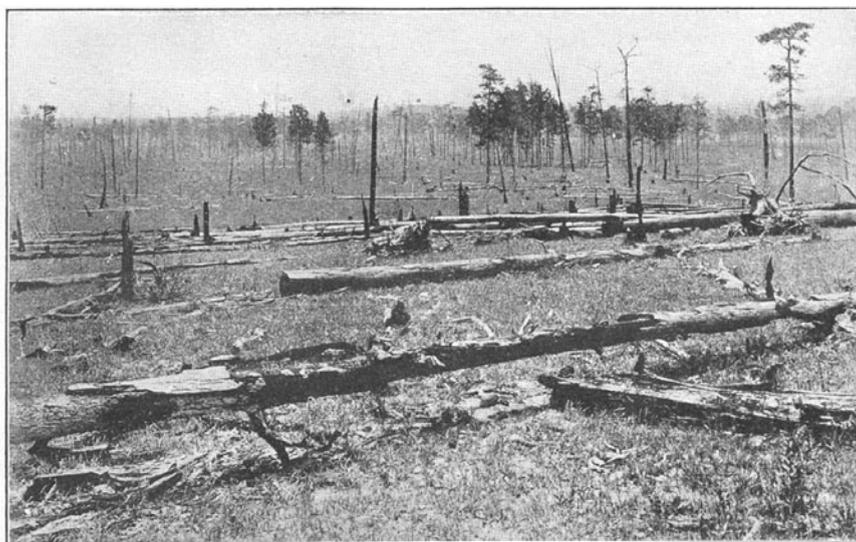
The soils are predominantly sandy at the surface and are composed largely of quartzose material, but in the subsoil there is considerable sandy clay and heavy clay, with a comparatively low sand

¹ The geological data in this report are from the report on the Geology of the Coastal Plain of Alabama, by Dr. Eugene A. Smith, State geologist.



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FIG. 1.—CUT-OVER LAND NEAR CHATOM, SHOWING HARDWOOD AND PINE ON WELL-DRAINED RUSTON AND NORFOLK SOILS.



58169

FIG. 2.—CUT-OVER LAND ON MYATT FINE SANDY LOAM, SOUTH OF VINEGAR BEND, NEAR DOG RIVER.

In the background is seen the upland above the terrace on which the Myatt soil occurs.

content. In the uplands gravel of chert and quartz occurs to some extent in such soils as the Orangeburg and Ruston, while angular fragments of iron-cemented sandstone are of common occurrence on the heavy Susquehanna soils. Ferruginous concretions or accretions occur in places.

The limestone soil (Sumter) occurs in the northeastern part of the county. The grayish, poorly drained upland soil (Plummer) is confined to the valleys and slopes of the southern part of the county. The other upland soils are well distributed over varied topographic situations. The more dissected or rougher country in the northern part of the county is occupied by different soil materials so intricately associated that they can not be satisfactorily separated into types. Such areas are classed with the Guin series.

Twenty-seven soil types, not including Swamp and Muck, are mapped in the county. These have been grouped in 16 soil series. The Norfolk, Ruston, Susquehanna, Orangeburg, Greenville, Guin, Sumter, Lauderdale, and Plummer series belong to the Coastal Plain province; the Kalmia, Myatt, Amite, Chatahoochee, Cahaba, and Leaf are terrace soils, and the Ochlockonee is a first-bottom soil. The Ochlockonee, together with Swamp and Muck, comprise the overflow bottoms.

The Norfolk soils have gray surface soils, grading downward through pale-yellow material into yellow, friable clay, except in the case of the sand type, which consists of sand, to a depth of 3 feet or more. The surface is generally undulating and rolling, with some hilly areas. The drainage, as a rule, is good, and in the sand type it is excessive. The material of these soils is derived from the unconsolidated Coastal Plain deposits, consisting of sands and sandy clays. The Norfolk series is represented in this county by three types—the sand, fine sand, and fine sandy loam.

The Ruston soils are gray to brownish at the surface, and grade through yellow material into reddish-yellow or dull-red, moderately friable sandy clay, except in case of the sandy type, which has no clay within the 3-foot section. The surface is mainly gently rolling, rolling, and hilly. The drainage is well established. The color of the subsoil is intermediate between that of the Norfolk and that of the Orangeburg subsoils. The material is derived from Coastal Plain beds of sand and sandy clay. Four types—the sand, fine sand, sandy loam, and fine sandy loam—are mapped in Washington County.

The Susquehanna soils are gray to reddish at the surface, grading into yellow or red below. They are characterized by a stiff, heavy, plastic, mottled clay subsoil, which is prevailingly gray, red or

yellow. Where the surface covering is shallow, particularly in the southern part of the county, the Susquehanna soils have a large content of ferruginous gravel; this is also the case in patches of this soil which are associated with the Norfolk soils in saddlelike situations on the narrower ridges, but are too small to be mapped separately. The topography is rolling to ridgy or broken. The surface drainage is good, but the subsoil is not favorable to good internal circulation of moisture and air. The material apparently is derived mainly from beds of heavy clay. Some of that associated with the limestone areas in the northern part of the county may be influenced in part by material from the limestone. Two types are mapped in this county—the fine sandy loam and the clay.

The surface soils of the Orangeburg series are gray to brownish, while the subsoil consists of bright-red, friable sandy clay. The surface is flat, gently rolling, and rolling. The drainage is good. The material appears to be from the same source as that of the Norfolk and Ruston, the bright-red color of the subsoil being due to oxidation. This series is represented by only one type, the fine sandy loam.

The Greenville series is characterized by the reddish-brown or dark-brown color of the surface soil and the deep-red and friable sandy clay subsoil. These soils are similar to the Orangeburg, except for the red or dark-brown surface. Only the sandy loam type is mapped in this county.

The Guin stony sandy loam consists of small areas of Ruston, Orangeburg, Norfolk, and Susquehanna soils, mainly stony sandy loam, occurring over badly dissected country in such intricate association that separation is impracticable.

The Sumter series is represented by the stony clay type. This consists of yellowish or brownish clay overlying yellow or greenish-yellow clay. Partially weathered rock fragments are abundant. The material is typically calcareous. It is derived from limestone.

The Lauderdale stony clay, the only member of the series mapped, consists of whitish to yellowish clay, with an abundance of rock fragments on the surface and throughout the soil section.

The soils of the Plummer series are gray, with some faint mottling of brownish and yellowish colors. The substratum, or the material lying beneath the grayish Plummer material, consists of stiff, impervious, heavy clay. This impervious clay has a marked influence upon the drainage. Throughout the winter and spring the Plummer soils remain in a saturated condition, from the surface downward, while in the summer they usually are very dry. The material is derived from Coastal Plain deposits. Only one type, the Plummer fine sandy loam, is mapped.

The soils of the Kalmia series are grayish in the surface section and yellowish in the subsoil, with some gray mottling in the lower part of the poorer drained areas. These soils occur on the stream terraces and appear to be composed of old alluvium, derived from the Coastal Plain uplands and deposited when the stream overflows reached higher levels than at present. The surface is characteristically level or nearly level. The drainage is mainly good, but in some of the flats it is poor. Two members of this series are recognized, the fine sand and fine sandy loam.

The Myatt series includes poorly drained stream-terrace soils, resembling the Plummer series of the uplands. The surface soils are gray and the subsoils light gray, frequently faintly mottled with yellowish. An impervious stratum of heavy clay, "pipe clay," occurs in the substratum at various depths. This heavy substratum is predominantly gray in color, mottled with red and yellow, and is practically the same as that underlying the Plummer, Susquehanna, and Leaf series. It retards internal drainage, and these soils, like the Plummer, are saturated during the wet seasons and are usually very dry in the summer. The fine sandy loam and very fine sandy loam are the only types mapped. They constitute the principal terrace soils of the county.

The Amite series occurs on well-drained stream terraces. The surface soils are dark brown to reddish brown, while the subsoils are red to dark red and friable. These soils resemble the Greenville soils. The surface is characteristically level. Only one type, the sandy loam, is mapped.

The Chattahoochee series occurs on well-drained stream terraces. The surface soils are grayish, while the subsoils are friable and red, like the subsoils of the Orangeburg. The surface is characteristically level. Only one member of the series, the fine sandy loam, is recognized in this county.

The Cahaba soils are predominantly grayish to light brownish at the surface, with yellowish subsurface material, and yellowish-red or dull-red subsoils. The subsoil consists of friable sandy clay, except in the sand type. The soils of this series are intermediate in color of subsoil between the Kalmia and Chattahoochee series and similar to the Ruston series on the uplands. The surface is characteristically level and the drainage is good. Two members of this series are mapped, the fine sand and fine sandy loam.

The soils of the Leaf series are grayish to brownish. The subsoils consist of stiff, plastic gray clay mottled with red, yellow, and brown. These soils occur on stream terraces. The surface is level or nearly level, and the drainage is fairly well established. Two types of this series are mapped, the fine sandy loam and loam.

The Ochlockonee series includes the darker colored soils of the first bottoms along the Coastal Plain streams. They have dark-gray to brown surface soils, with brownish or mottled brown and gray or drab subsoils. They are composed principally of wash from Coastal Plain soils. These soils are subject to overflow. Two types, the fine sandy loam and clay, are mapped in this county.

Muck consists of black or dark-brown organic matter in a state of partial decomposition mixed with varying quantities of soil material. This is underlain at depths of a few inches to 3 feet or more by a stiff, heavy clay. The areas are flat and depressed and are poorly drained. They are locally referred to as "made land."

The areas of Swamp occupy very poorly drained bottom lands that are subject to overflow. In winter they are wet and swampy, but in summer they are frequently dry. They vary widely in color and character of soil material. They can not be cultivated satisfactorily because of the poor drainage.

The following table gives the names and the actual and relative extent of the soils mapped in Washington County:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Plummer fine sandy loam.....	147,648	21.6	Cahaba fine sandy loam.....	7,488	1.1
Norfolk fine sandy loam.....	98,432	14.4	Susquehanna clay.....	6,976	1.0
Swamp.....	76,864	11.2	Leaf fine sandy loam.....	6,464	.9
Ruston fine sandy loam.....	46,848	6.9	Guin stony sandy loam.....	5,568	.8
Myatt fine sandy loam.....	44,032	6.4	Orangeburg fine sandy loam...	4,928	.7
Ochlockonee clay.....	42,048	6.2	Ochlockonee fine sandy loam..	4,928	.7
Susquehanna fine sandy loam..	41,984	6.2	Sunter stony clay.....	3,904	.6
Ruston sand.....	38,656	5.7	Cahaba fine sand.....	3,584	.5
Kalmia fine sandy loam.....	20,096	2.9	Leaf loam.....	3,008	.4
Ruston fine sand.....	19,968	2.9	Lauderdale stony clay.....	2,944	.4
Norfolk sand.....	11,904	1.7	Amite sandy loam.....	2,880	.4
Myatt very fine sandy loam...	11,776	1.7	Greenville sandy loam.....	2,112	.3
Norfolk fine sand.....	11,136	1.6	Chattahoochee fine sandy loam.	1,856	.3
Ruston sandy loam.....	8,128	1.2	Muck.....	1,088	.2
Kalmia fine sand.....	7,552	1.1			
			Total.....	684,800

NORFOLK SAND.

The Norfolk sand consists of a gray, loose sand which at 3 to 5 inches passes into pale-yellow or grayish-yellow, loose sand, extending to a depth of 3 feet or more without any perceptible change. Where this type occurs in Tps. 2 and 3 N., R. 2 W., the soil and subsoil are more compact, or loamy, and might properly be classed with the Norfolk loamy sand. It is more productive, being more retentive of fertilizer and moisture than the typical Norfolk sand. In Tps. 6 and 7 N., R. 1 E., the soil is deeply dissected by streams

and gullies, and scattered over the surface and throughout the soil and subsoil are varying quantities of rounded gravel. These gravelly areas are indicated by symbol on the soil map.

This type occurs in small, scattered areas throughout the county. Some of the largest developments are found west and northwest of Loper, west of Reynolds Store, and along Tauler Creek in the northern part, and west and northwest of Dwight and southwest of Summit in the southern part. The soil in the latter location largely represents the loamy variation.

The topography varies from gently undulating to hilly, and in some instances, as in Tps. 6 and 7 N., R. 1 E., it is precipitous. The drainage, except in the more nearly level areas, is good to excessive. The steeper slopes are subject to erosion.

The type at present has but little importance in the agriculture of the county, as only a very small total area is under cultivation. The larger part of the type is cut-over pine land or supports a second growth of pine. Originally it supported a valuable growth of long-leaf pine, which has largely been removed, its place being taken by shortleaf and old-field pine and blackjack, Spanish, and scrub oak. The cultivated areas are used almost exclusively for corn, which produces about 10 to 15 bushels per acre.

This type, in connection with its associated types, is valued at about \$10 an acre.

To improve this soil it is necessary to add organic matter, which can best be supplied by growing and turning under leguminous crops. The soil is easily cultivated. It leaches readily, and requires careful management to obtain the best returns from applications of fertilizer. With good transportation and market conditions the Norfolk sand, being an early soil, can be used successfully for trucking. For good yields all crops must be liberally fertilized.

NORFOLK FINE SAND.

The Norfolk fine sand consists of a gray fine sand to a depth of 3 or 4 inches, passing into a grayish-yellow or pale-yellow fine sand which extends to a depth of 3 feet or more. The type is fairly uniform throughout the county.

The Norfolk fine sand, although widely distributed, occurs in comparatively small areas. It occupies the slopes and crests of ridges, and varies in topography from slightly undulating to hilly or ridgy. The drainage is always adequate and in some cases excessive. The steeper slopes, where they are left unprotected, are susceptible to erosion. Crops frequently suffer from drought where the sand is deep and loose, allowing the moisture to sink rapidly through the soil. Under such conditions fertilizer also leaches readily, but the

type is more retentive of both moisture and fertilizer than the coarser textured Norfolk sand.

Much of the type, particularly in the northern part of the county, is in virgin forest, or is cut-over land, and is not utilized for any purpose other than grazing. Only a small acreage is under cultivation. Land of this type of soil is valued at \$8 to \$10 an acre.

The Norfolk fine sand under present conditions is best used for the production of corn and velvet beans for forage, utilizing the native pasturage for beef cattle and sheep.

Although the Norfolk fine sand is well suited to the production of early vegetables, it is mainly too remote from shipping points to be utilized commercially for such purposes.

NORFOLK FINE SANDY LOAM.

The surface soil of the Norfolk fine sandy loam to a depth of 3 to 5 inches is a grayish loamy fine sand underlain by a pale-yellow fine sandy loam. At 8 to 15 inches the subsoil, consisting of a friable fine sandy clay of a deeper or brighter yellow, is encountered. In some places the lower subsoil is a fine sandy loam or fine sandy clay loam. On the lower slopes and in flat areas where drainage is less well established, particularly near the Plummer fine sandy loam, the soil is darker and the subsoil is paler yellow and heavier in texture than in the better drained situations. Where the type occupies the drainage divides the surface is lighter colored, the soil deeper, and the subsoil less coherent, except in the narrow, saddlelike situations between stream heads, where there are included areas in which the surface covering is shallow and the soil is underlain by a stiff or plastic yellowish clay, with red, gray, and pinkish mottlings. These areas are distinguished by the presence on the surface and throughout the soil section of ferruginous sandstone fragments. Where they are large enough such areas are separated on the soil map as the Susquehanna fine sandy loam. Small spots covered with ferruginous concretions occurring throughout the type, particularly on the smaller knolls and narrow ridges, bear a close resemblance to the Tifton fine sandy loam, as mapped in other sections of the South.

The Norfolk fine sandy loam occurs most extensively in Tps. 6 and 7 N., Rs. 2, 3, and 4 W., as the main soil of the interstream divide between the headwater tributaries of Bassetts and Santa Bogue Creeks. It is found in large continuous areas, intersected by numerous deeply cut stream heads and gullies. The surface is rolling to hilly. The type is widely distributed through the county, except in the extreme northern and northeastern sections. Where it is associated with the Plummer fine sandy loam in the southern half of the county it is confined largely to small knolls and ridges. These

bodies seldom exceed 100 acres in extent, and are frequently as small as 1 to 3 acres, the average being from 10 to 40 acres. Comparatively few areas of level land more than 10 to 20 acres in extent occur. The steeper slopes and rougher areas of the type are found in the vicinity of Chatom and Loper.

Some of the Norfolk sandy loam is included with this type, differing only in the coarser texture. It occurs principally in the north-western part of the county, in T. 8 N., Rs. 4 and 5 W., and in secs. 19 and 31, T. 3 N., R. 4 W. On account of their small extent these areas are combined with the Norfolk fine sandy loam.

Only a small acreage of the Norfolk fine sandy loam is under cultivation, the remainder being mainly cut-over land, with a scattered growth of longleaf and shortleaf pine which was too small to be profitably marketed when the valuable timber was cut. This growth is now being "cropped" for turpentine. A tract of about 60,000 acres in the north-central part of the county is covered with virgin longleaf pine. (See Pl. II.)

The type is most intensively cultivated in the vicinity of Fruitdale, where it is largely devoted to the production of truck for northern markets. The acreage under cultivation is gradually being extended as new fields are cleared and fenced. Where the type is planted to corn, an average yield of 15 to 18 bushels to the acre is obtained. Oats yield 30 to 40 bushels. The type is used largely for grazing.

The greater part of the Norfolk fine sandy loam is valued at about \$3 to \$10 an acre. In the vicinity of railroads and near some of the towns it is held for \$40 to \$50 an acre. These higher priced areas include the 5, 10, and 20 acre plots usually cultivated to fruits and vegetables.

More of this type could be brought under cultivation with profit. It is adapted to a wide range of crops, but for the most part it is too remote from markets to warrant its use for any purpose other than general farming, to which it is well suited where the topography is favorable. Some parts of the type are too steep and hilly for extensive cultivation. At present the cut-over lands are used almost exclusively for grazing. The soil is deficient in organic matter, and can be improved by growing such crops as cowpeas and velvet beans.

RUSTON SAND.

The surface soil of the Ruston sand is a gray medium sand, grading at 2 or 3 inches into pale-yellow sand. This in turn passes into yellowish-red or dull-red loamy sand at 12 to 15 inches. Below 24 to 30 inches the subsoil is somewhat heavier in texture and more red-

dish. The heavy lower subsoil makes this type more retentive of moisture than the looser Norfolk sand. The type includes small patches of sandy loam and gravelly sandy loam.

The Ruston sand is widely distributed through the county, and is most extensively developed in the northwestern part, on the drainage divides on both sides of Red Creek. It is mapped in comparatively large areas in T. 2 N., Rs. 2 and 3 W., and in the southwestern part of the county near Exsho. A succession of hills or ridges of this type occurs along the outer boundary of the higher or older terraces of the Tombigbee River, from a point west of Sunflower south to the county line.

This type includes a wide range in topography. It varies from level to undulating and hilly. The hills and ridges usually have smooth, rounded slopes. Some of the steeper slopes are unsuited to cultivation, but for the most part the type can be utilized for this purpose. The drainage is good to excessive. Erosion has been of little importance, since most of the type has never been cleared.

Only a small area of the Ruston sand is under cultivation. It is devoted to general farming, the principal crops being cotton and corn. Its remoteness from markets precludes its use for trucking. Peaches and figs do better than other fruits. The lack of facilities for marketing the fruit has generally discouraged the planting of commercial orchards. Of the general farm crops corn gives the best yields, the average being estimated locally as about 20 bushels per acre. Cowpeas or velvet beans are usually planted with the corn. Where velvet beans are grown only a part of the crop is harvested, the remainder being "hogged off," or used as pasture for fattening other stock.

It is generally recognized that to obtain best results on this type it is necessary to follow some form of rotation, in the course of which organic matter may be added to the soil. The growing of velvet beans for this purpose is popular. Commercial fertilizers are used extensively, particularly those high in phosphate. They are applied at the rate of 200 to 300 pounds per acre.

The greater part of the type is held at \$5 to \$12 an acre, although much higher prices are asked for small tracts of 5 to 40 acres in some localities.

Peaches grown on this soil usually have a good flavor, are juicy and highly colored, and are well suited to canning. Watermelons and cantaloupes, cucumbers, tomatoes, beans, peas, and several other vegetables do well on this soil, but require liberal fertilization. At present they are grown almost exclusively for home use. This type does not produce as heavy yields as the sandy loam type, but its use for general farming could be extended with profit.



VIRGIN FOREST ON NORFOLK FINE SANDY LOAM ON CHATOM-FRANKVILLE ROAD.

This shows how Washington County was originally timbered.

RUSTON FINE SAND.

The Ruston fine sand consists of a grayish to brownish fine sand which quickly passes into a pale-yellow loamy fine sand, and this in turn at about 18 to 20 inches into yellowish-red or salmon-colored loamy fine sand. At 24 to 30 inches a fine sandy loam or light fine sandy clay is generally encountered, and at this depth the color is more reddish. Below this the material becomes sandier and looser and is of pale-red to yellowish color.

This type is found chiefly in the southwestern and northwestern parts of the county. It is widely distributed throughout the uplands in areas of not more than a few hundred acres, the average being about 40 to 80 acres. The largest single areas occur in Tps. 2, 3, 4, 6, 7, and 8 N., Rs. 3 and 4 W.

The topography of the Ruston fine sand varies from level or gently undulating to rolling. The type occupies high hills, ridge crests, and slopes adjoining streams and gullies. It is naturally well drained, as a rule, and on the steeper slopes the drainage frequently is excessive, but for the most part this has not resulted in erosion, owing to the protection afforded by the native growth of timber and other vegetation.

Only a small acreage of this soil is under cultivation. Corn and cotton are the most important crops. Cotton is still the money crop, but its importance has been diminished by the ravages of the boll weevil. Most of the type is used largely for pasture, the stock consisting mainly of cattle and hogs.

The soil is handled with light implements and teams. Fertilizers analyzing about 2 per cent nitrogen, 8 per cent phosphoric acid, and 2 per cent potash are applied at the rate of 200 to 300 pounds per acre for cotton and corn.

The value of this soil averages about \$10 an acre, although it is held for much higher prices where it is subdivided into tracts of 10 to 20 acres or more for trucking or fruit growing.

Where the topography permits, the Ruston fine sand is fairly well adapted to general farming and its use for this purpose should be extended. For best results the farms should be large enough to afford pasture for stock. The present market facilities do not warrant the use of this soil for the more intensive forms of agriculture. For good yields liberal fertilization is needed.

RUSTON SANDY LOAM.

The Ruston sandy loam consists of a gray to brownish loamy sand, abruptly passing into pale-yellow loamy sand, and this in turn into reddish-yellow sandy loam, underlain at 8 to 15 inches by a dull-red or salmon-colored, friable, sandy clay. The texture of the

soil is fairly uniform, except in places in the eastern part of the county, where gravel occurs on the surface and throughout the soil section.

The type is largely confined to the better drained sections of the county, particularly in T. 8 N., Rs. 4 and 5 W. It is not an extensive soil, but is widely distributed over the county, occurring in small, detached areas.

The topography varies from level or slightly undulating to rolling. The type is naturally well drained. In the more rolling areas drainage is sufficiently rapid to cause some erosion.

Although limited in area, the value of the Ruston sandy loam has been generally recognized. From 30 to 40 per cent of this soil is under cultivation, and the area farmed is rapidly being extended. This is one of the stronger soils of the county, and is suited to a wide range of crops, but, owing to the difficulty of marketing perishable products, its use is limited to the production of the general farm crops.

The type is largely used for cotton and corn. Cowpeas, peanuts, and velvet beans are rapidly being introduced in rotations with cotton and corn. According to local estimates, cotton yields about one-third to one-half bale per acre and corn ordinarily 15 or 20 bushels.

Well-improved Ruston sandy loam is valued at about \$10 to \$20 an acre.

RUSTON FINE SANDY LOAM.

The Ruston fine sandy loam is a gray to light-brown loamy fine sand to fine sandy loam, passing at 4 or 5 inches into yellowish to reddish fine sandy loam, which in turn is underlain at about 10 to 20 inches by dull-red to yellowish-red, friable fine sandy clay. Ironstone fragments in varying quantities are quite common on the narrower, sharper ridges and knolls. The depth of the soil is variable, depending on the position of the type on the ridges and the extent of erosion. The character of the subsoil in some areas is variable, owing to erosion. In places it is a heavy clay, similar to that of the Susquehanna fine sandy loam. These areas are too small to be indicated on the soil map.

The Ruston fine sandy loam is one of the more extensively developed upland types and is widely distributed over the county. Its most typical and extensive development is in the northeastern and southwestern sections, particularly in Tps. 6, 7, and 8 N., Rs. 1, 2, and 3 W., and in Tps. 2, 3, and 4 N., R. 4 W.

The topography varies from nearly level to undulating and rolling or ridgy. In secs. 3, 4, 15, and 16, T. 4 N., R. 4 W., the type is flat and has the general appearance of a high terrace of the Escatawpa River.

The type is well drained. The run-off on the steeper slopes causes erosion unless the areas are protected.

As in case of most of the other soils of the county, cultivation of this type has just begun. The area in use for crop production is very small, but is being extended. The land is devoted mainly to general farming. Corn is the principal crop. The type for the most part represents cut-over land on which there is some blackjack oak, scrub oak, white oak, post oak, sweet gum, dogwood, hickory, and haw left from the original forest. Second-growth pine occupies some of the area. These cut-over lands are used almost exclusively for grazing cattle, sheep, and hogs.

In the vicinity of Fruitdale the Ruston fine sandy loam and the Norfolk fine sandy loam are the principal soils used in growing truck crops, chiefly radishes, lettuce, mustard, kale, and sweet potatoes. Trucking is not sufficiently well established to give a definite idea of crop yields, but the business is for the most part satisfactory when favorable market conditions exist. The products from this section are sold largely in St. Louis. The crops are usually varied so as to insure the maturity of some crop practically every month in the year, particularly where cold frames are employed in growing early vegetables.

The usual work stock and domestic animals are kept, but commercial dairying and stock raising have received but little attention.

Much of this type can be bought from the original owners at \$10 to \$12 an acre in tracts of 40 to 160 acres or more. Where it lies near the railroads and is subdivided into 5, 10, and 20 acre plots for fruit and truck growing, \$30 to \$50 an acre is not infrequently asked.

SUSQUEHANNA FINE SANDY LOAM.

The Susquehanna fine sandy loam is a gray to brownish fine sandy loam, underlain at 3 to 5 inches by a yellowish fine sandy loam, which passes at about 8 to 15 inches into dull-red or yellowish-red, stiff, plastic clay. Below 18 to 20 inches the clay is mottled gray or drab, red, and yellow. Ironstone fragments are of common occurrence on this type, particularly where the surface covering is shallow, as on the sharper knolls and ridges. The larger of these gravelly areas are indicated on the soil map by gravel symbols. In similar situations where erosion is excessive the red clay is exposed at the surface, forming unproductive "gall spots." These are too small to be mapped separately. In the northern part of the county the subsoil in places is of a brighter red color than in the southern part, and it is possible that the soil may contain some material from limestone.

The Susquehanna fine sandy loam is probably the most widely distributed type in the county, though its total area is not so great

as that of several of the other soils. Some of the largest bodies are mapped about $1\frac{1}{2}$ miles northwest and west of Chatom, about 1 mile northwest of Millry, and in the northeastern part of the county. It is also extensively developed in a number of small areas in the vicinity of Summit in the south-central part of the county.

The type is generally rough and hilly, or occupies sharp, narrow ridges and knolls. A few small, level areas occur on the ridges, but for the most part the surface is gently sloping or steeply sloping. The surface drainage is rapid, and on the steeper slopes cultivated fields are subject to destructive erosion.

But little of the type is cultivated, and it is therefore of little importance in the agriculture of the county. The areas in cultivation are used largely for corn, the growing of cotton having declined very materially in the last few years, with the advent of the boll weevil. The greater part of the type consists of cut-over or reforested areas, with some areas of virgin timber in the central part of the county. The present growth consists mainly of longleaf and shortleaf pine, oak, dogwood, persimmon, hickory, beech, chestnut, poplar, sassafras, sweet gum, haw, and maple.

The Susquehanna fine sandy loam is valued at \$3 to \$25 or more an acre, according to improvements and location, the higher prices prevailing in those areas near the railroads and subdivided into small tracts to be used for trucking and fruit growing.

The type is fairly well suited to general farming, but is not so well adapted to fruit growing and trucking as the types with more friable subsoils. For its proper tillage this soil requires a heavier equipment than is found on the average farm. To conserve the moisture properly and to insure crops against drought, deeper plowing and more thorough cultivation than are generally practiced are required. No definite system of crop rotation is followed, and very little effort is made to increase the productiveness of the soil. A large part of the cultivated area is held by tenants.

SUSQUEHANNA CLAY.

The Susquehanna clay is a dull-red, stiff, plastic, heavy clay, mottled with gray or yellow or both in the lower subsoil. The clay usually is overlain by a thin covering of reddish-brown loam or fine to medium sandy loam, averaging 3 or 4 inches in depth. In the vicinity of Old St. Stephens there is a large area of very sticky, red, heavy clay, which shows little or no mottling and is underlain by a bed of limestone. The soil resembles the Decatur clay of northern Alabama in color, but is decidedly different in its sticky, plastic nature. In a few eroded places the soil is underlain by soft limestone, like that found beneath the Sumter stony clay.

The Susquehanna clay occurs largely in the northern part of the county, in the lime-hills section. The most typical development of the type is northwest of Koenton, in T. 8 N., Rs. 3 and 4 W. The topography is broken or hilly, with very little level land.

The run-off is sufficiently rapid to provide good drainage and in places to cause erosion. Owing to its heavy structure, the type absorbs moisture very slowly and crops are injured by drought.

Before the advent of the boll weevil cotton was an important crop, but at present the type is used mainly for corn, with an occasional field of oats. Corn averages about 10 bushels to the acre, and oats yield about 12 to 20 bushels per acre.

This type is known locally as "red prairies," "hog-wallow land," and "oak and hickory land," and much of it is covered with pine, gum, persimmon, oak, and hickory. In places melilotus makes a good growth. Bermuda grass and lespedeza do well.

The value of the Susquehanna clay ranges from less than \$5 to about \$10 an acre.

This soil can not be developed to its maximum capacity with the average farm equipment. It requires deeper tillage than can be given with the light implements and teams commonly used. It is necessary to protect the slopes by terracing and by growing soil-binding cover crops, or to maintain the forest growth in areas too steep to be profitably cultivated. Probably the best use of this type is for pasture and hay land.

ORANGEBURG FINE SANDY LOAM.

The Orangeburg fine sandy loam is a gray to dull reddish gray loamy fine sand to fine sandy loam, underlain at a depth of 6 to 10 inches by deep-red, friable sandy clay of uniform texture. In the northern part of the county the subsoil is more compact and of finer texture than typical. Where erosion has been active on some of the steeper slopes, the subsoil is frequently exposed at the surface, forming unproductive "gall spots" of red clay. Where this type joins the Susquehanna soils, the boundaries are more or less arbitrary.

The Orangeburg fine sandy loam is widely distributed over the county, but occurs chiefly in the northern part. It is typically developed 1 mile north of Koenton. The type is not extensive, being encountered in small areas.

The topography is undulating to hilly. The type usually has good drainage and occasionally the drainage is excessive.

Probably one-half the type is under cultivation, the remainder being largely cut-over land which has grown up in pine, with some oak, persimmon, and hickory. The type is used for cotton and corn. Cotton yields one-fourth to one-third bale and corn 10 to 20 bushels per

acre. Some cowpeas and velvet beans are grown, with good results. Peaches of good quality are grown on this soil, but there are no commercial orchards. The type is not sufficiently well situated with reference to markets to encourage commercial orcharding.

The Orangeburg fine sandy loam is valued at \$5 to \$20 an acre, depending upon the location, improvements, and topography.

GREENVILLE SANDY LOAM.

The Greenville sandy loam is a dark-brown to reddish-brown loamy sand to sandy loam, passing into reddish-brown sandy loam below 2 or 3 inches, and this, in turn, into deep-red, friable sandy clay at about 10 to 12 inches. The type includes small areas having similar surface soil and subsoil, but with only a small percentage of clay in the lower subsoil. These areas, if of sufficient extent to warrant separation, would be mapped as the Greenville loamy sand.

This soil is most typically developed in the vicinity of Exsho, in secs. 18 and 19, T. 2 N., R. 4 W. It is rather widely distributed over the county, but it does not occur in large areas and has a total area of only 3.3 square miles.

The topography is generally level to slightly undulating, and for the most part the type has adequate surface and internal drainage.

The Greenville sandy loam is one of the better soils in the county. It usually is rich in organic matter, and where properly handled gives good yields of the staple crops. It is particularly well adapted to cotton, and before the advent of the boll weevil a yield of one-half bale to the acre frequently was obtained with acreage applications of 150 to 200 pounds of fertilizer. Corn is the chief crop, and yields of 15 to 25 bushels to the acre are obtained. Only a small part of the type is under cultivation, but the cultivated area is being extended rather rapidly as the better grades of land are sought for farming.

The type is generally remote from the railroads, so that its principal use is for general farming. It is valued at \$10 to \$20 an acre.

GUIN STONY SANDY LOAM.

The Guin stony sandy loam comprises areas composed of a variety of soils so intricately associated that separation is impracticable. The included soils are chiefly the Ruston sandy loam and sand, carrying in many places large quantities of large and small fragments of rock, mainly ferruginous sandstone. Spots of Orangeburg and Susquehanna sandy loam occupying gravelly and stony knolls and sharp ridges supporting little or no timber are also included. There are also many reddish, yellowish, and mottled clay areas on the slopes, and in places patches of the whitish Lauderdale clay are encountered.

Typical areas occur in the vicinity of St. Stephens and in T. 6 N., R. 1 W. Other areas are scattered throughout the northern and eastern sections of the county.

The topography is generally rough and hilly, with steep slopes or escarpments. The drainage is naturally excessive, and destructive erosion occurs in many places.

The Guin stony sandy loam for the most part represents nonagricultural land. It is not under cultivation, and is used only for pasturage. A large part of it is in native forest or has been cut over, leaving a scattered growth of pine, blackjack, and Spanish oak.

The type is valued chiefly for its timber growth for turpentine and lumber. Cut-over areas are held at \$1 to \$3 an acre.

The best use of this land apparently is for forestry and pastures.

SUMTER STONY CLAY.

The Sumter stony clay, to an average depth of about 6 inches, is a light-brown to slightly reddish brown clay or clay loam. This is underlain by yellowish clay, which passes into a whitish, soft, chalky, calcareous rock at 15 to 30 inches, the depth depending upon the extent of erosion. Where severe erosion has taken place some of the sloping areas include rock outcrops. Small patches of about an acre in extent, in which the soil resembles the Houston clay or black clay of other sections of the State, occur at frequent intervals in the "prairie belt." These areas are very productive and are about the only areas in cultivation. They formerly were much larger, but the soil has largely been washed away, leaving the land rough and unproductive, the resultant soil being a gray, pulverulent clay, carrying fossil shells on the surface. At 4 to 8 inches it passes into a soft, yellowish, decomposed, chalky limestone. Owing to the large number of fossil shells present, this variation of the type is sometimes referred to locally as "shell land."

The Sumter stony clay occurs in the north-central and northeastern parts of the county and is of comparatively small extent.

The topography is undulating to hilly or steep. The drainage is generally good and in many places excessive.

This type is used largely for grazing, the area in cultivation being less than it was soon after the land was cleared. Hay and corn are the important crops. Corn yields 20 to 30 bushels per acre and hay 1½ to 2 tons. The type supports a growth of blackjack and white oak, sweet gum, ash, buckeye, shortleaf pine, red haw, and maple. This land is valued at about \$5 or \$6 an acre.

Terracing and other means of preventing erosion are needed on this type, as the value of the land is rapidly decreasing as the result of the severe washing.

LAUDERDALE STONY CLAY.

The soil of the Lauderdale stony clay to an average depth of about 6 inches is a grayish fine sand to loamy fine sand, containing from 50 to 80 per cent of stone fragments, which consist of rather soft, grayish, yellowish-gray or whitish, fine-grained siliceous rock. The depth of the soil is variable, owing to differences in the degree of erosion. In some locations but few stones are present and the surface has a peculiar whitish color, while in others the soil has been entirely removed by erosion. There is often no definite line of separation between the soil and subsoil, the latter being also quite variable, ranging from a gray sandy loam to a yellowish clay loam. The subsoil proper is often displaced by beds of disintegrated rock.

This type is found principally in the northeastern corner of the county. The largest area lies in the vicinity of Friendship Church, along the Choctaw County line.

The Lauderdale stony clay has the roughest topography of any type in the county. The hills represent remnants of former winding ridges, and the valley slopes are steep. The drainage is naturally excessive, and the streams are swift. The type is subject to severe erosion, and when tilled is quickly denuded of its scant soil covering.

Only a small part of the Lauderdale stony clay is under cultivation, the remainder being largely in second-growth longleaf and shortleaf pine, with some sweet gum, poplar, red oak, post oak, blackjack oak, and dogwood. The soil has a low agricultural value, and is used chiefly for pasture.

The value of this type depends largely upon the character of the standing timber for turpentine.

PLUMMER FINE SANDY LOAM.

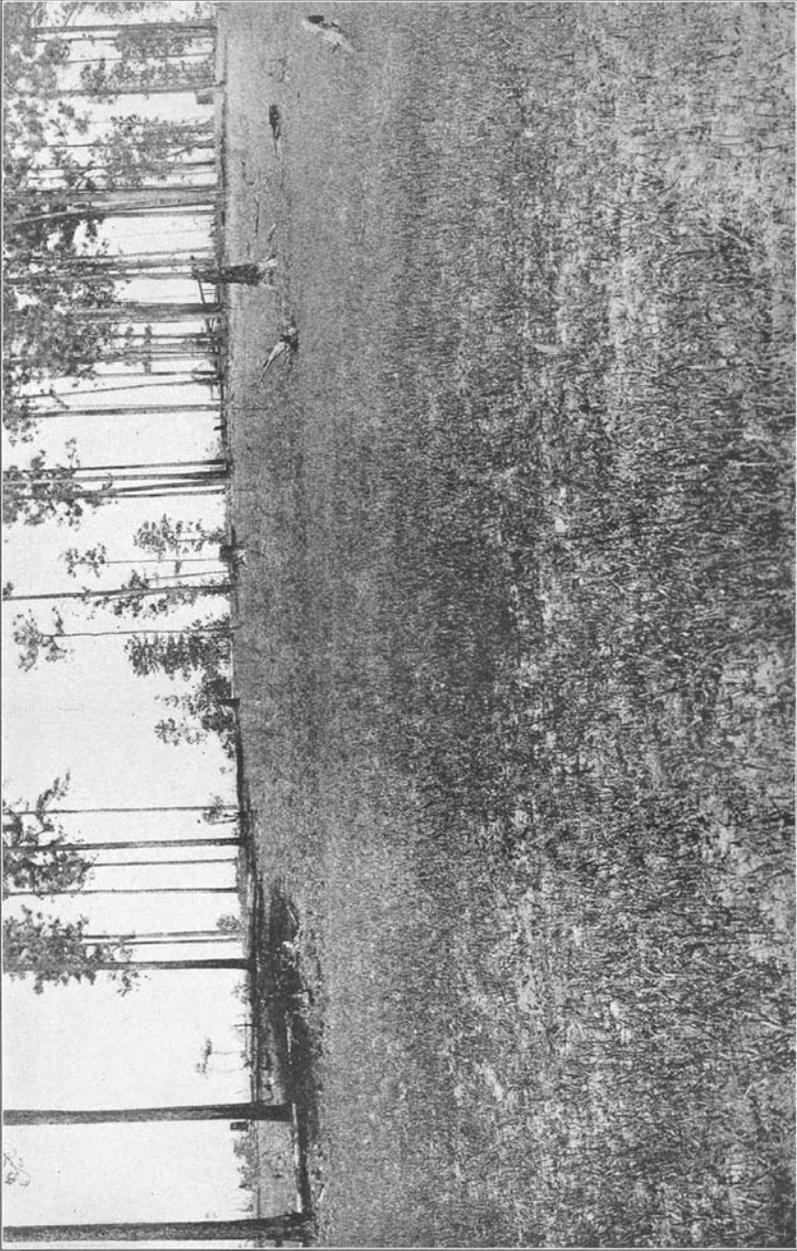
The Plummer fine sandy loam is a grayish or mottled grayish and dingy-brown fine sand to loamy fine sand, grading rather imperceptibly at about 8 to 12 inches into a lighter gray or mottled gray and pale-yellow loamy fine sand or light fine sandy loam. At about 3 to 4 feet the lighter sandy material rests upon mottled light-gray to drab, red, and yellow stiff, plastic, highly impervious clay called "pipe clay." In the higher areas and on slopes the soil is lighter gray in color and the subsoil more yellowish. The lighter color of the surface is due not only to the lack of accumulation of organic matter but also to the subsurface materials being brought to the surface by crawfish and used in the construction of the crawfish "chimneys," which are common to the type and from which it derives the local name of "crawfish flats." (See Pl. III.) The uneven or "upheaved" appearance of the surface, which is another characteristic feature of the type, is due to the destruction and



57785

NATIVE GRASSES AND CRAWFISH CHIMNEYS ON PLUMMER FINE SANDY LOAM, NEAR YELLOW PINE.

In the background is shown the sharp line of separation between the Plummer and the better drained soils.



58170

VIEW OF PLUMMER FINE SANDY LOAM EAST OF FRUITDALE.

Note the distinct boundary between the Plummer, in the foreground, and a slight ridge of better drained, more productive soil.

disintegration of the crawfish chimneys. In the flat or depressed situations and where the boundary with other types is marked by the peculiar low miniature escarpments, consisting of a sharp drop of a foot or two, the surface usually is darker in color, with inclusions of mucky spots. These occur where the seepage waters accumulate and form spring heads, and usually are boggy throughout the year. Following the general course of drainage or in the lower situations a heavier variation of the type frequently is encountered, consisting of a dark-brown to black very fine sandy loam to silty clay loam, grading at about 10 to 15 inches into a drab and rusty-brown heavy loam to clay loam or clay. This soil is sometimes called "black gallberry land," and is composed largely of colluvial wash and organic matter. It occurs usually in narrow strips along the more sluggish drainage courses throughout the crawfish flats. It occurs in too small and narrow areas to be shown satisfactorily on the soil map.

The Plummer fine sandy loam is the most extensive soil in the county, covering a total area of 230.7 square miles. Although widely distributed, it is confined largely to the southern half of the county. The headwaters of the Escatawpa River and Lewis and Bates Creeks have their origin in and flow through this type. There are no very large unbroken areas of the type, as numerous small knolls and narrow ridges of other types are scattered through it. Its most extensive development is east of the Escatawpa River, extending from a point northwest of Spring Bank Church south to the Mobile County line.

This soil occurs in swales and valleys, some of which have flat bottoms, and also on gentle slopes, in some places extending up to the crests of ridges. The areas often lie about spring heads and finger out through narrow swales from the principal watersheds, extending down the drainage lines, and spreading out into the comparatively broad bottomed areas known as "flats," which are broken only by small, narrow, irregular ridges and knolls. The type not infrequently extends up the gentler slopes of these ridges, and occupies the level to flat situations. Where the type occurs on gently sloping hillsides, the soil boundaries, though distinct, are not marked by topographic differences, but where the surface is comparatively level the boundary usually is marked by a low escarpment (see Pl. IV). No other types in the county, except the Myatt fine sandy loam and very fine sandy loam, show such sharply defined boundaries.

The natural drainage of the Plummer fine sandy loam generally is deficient and must be improved by artificial means if the land is to be cultivated. Throughout the winter and early summer this soil is in a saturated condition, owing to seepage from the slopes, the im-

pervious nature of the underlying clay, and the lack of drainage outlets. In long periods of drought the soil and subsoil become dry and loose or incoherent, in which condition it has the characteristics of a deep, loamy fine sand. In its natural condition the type is very wet during the winter and correspondingly dry in the summer.

To drain this soil properly it is necessary first to construct ditches to intercept the seepage from the hillsides, and then to run lateral ditches through the areas. This treatment is not applicable to the entire type. The deepening and straightening of the natural drainage courses also is necessary. As long as naturally well-drained land is available in the county it is doubtful whether the expense involved in draining this land on any large scale will be justifiable.

The conditions of drainage largely determine the character of the native vegetation on this type. The pitcher plant, or "trumpet flower," which blooms in the early spring, probably is the most characteristic growth in the low-lying, wet areas, with some cypress, black gum, bay, gallberry, and switch cane. The type is readily distinguished also by its characteristic growth of fine and coarse sedges and grasses. A growth of *Eriocaulon decangulare*, or "white button top," is conspicuous in summer and fall. The native pine growth, usually consisting of longleaf pine, is sparse, and usually is inferior to that on the ridges and knolls. A distinctive feature of the type in connection with the timber growth is the absence of black-jack, scrub, and Spanish oak, which is common to all the types with which this soil is associated. This feature permits the identification, even at long range, of other soil types occurring as knolls and ridges within the areas of this soil.

The Plummer fine sandy loam is used almost exclusively for grazing sheep, goats, cattle, and hogs, which run at large throughout the greater part of the year. The native grasses furnish fairly good grazing in the spring, but during the hot, dry summer months they become tough and generally unfit for grazing, and the stock moves to the higher lands, where the so-called "wire grasses," which are more tender and nutritious, are found. Some efforts have been made to utilize the sedges and other grasses for hay, but the practice has never become general, the hay being considered tough and lacking in nutrition.

In the last few years lumber companies have removed the greater part of the merchantable timber. The heavy canebrakes which formerly occupied much of this type and furnished abundant winter grazing have largely been destroyed by fires which are started each spring to destroy the tough, dead sedges and grasses and to improve the early spring pasture. These fires are very destructive to the standing as well as the fallen timber, particularly where the former

has been turpented. The fires also have reduced the organic-matter content of the soil.

In the vicinity of Toinette, Calvert, Deer Park, Fruitdale, and Yellow Pine some efforts have been made to utilize this soil in trucking and growing Satsuma oranges, grapefruit, pecans, and peaches. Of the crops thus far grown sugar cane and upland rice give most promising results. Sweet potatoes yield fairly well in favorable seasons, as do corn and oats. If the weather at the time of harvesting potatoes is unfavorable, a large proportion of the crop rots in the fields. With grain crops some difficulty is experienced in getting a stand where the soil is not well drained, it is said, because the crawfish eat the seed and young shoots. Experiments with peaches thus far have been unsuccessful. The growing of grapefruit and Satsuma oranges in the vicinity of Calvert and Toinette is in an experimental stage. The land is prepared by constructing high ridges upon which the trees are planted. A large number of the trees were killed or injured by freezing in the winter of 1914-15.

The animals grazed upon this soil are of rather scrubby appearance. They receive but little attention, being rounded up once or twice a year, when the marketable animals are withdrawn and the lambs, calves, and pigs branded and returned to the range for another season. Animals are raised with very little expense, but a large number die from exposure or are killed by dogs. The early spring grazing, particularly in the southern half of the county, is mainly on the Plummer fine sandy loam. No dairying is practiced on this type.

Only a very small acreage of the type is under cultivation either in this county or in other sections of the South, so that no definite information with respect to crop yields or proper methods of handling the soil are available. It is generally held in large tracts by lumber, investment, and development companies and is unfenced. It is used chiefly as free range.

This type in large holdings with associated types is generally held at \$2.50 to \$10 an acre, according to its location with reference to railroads and markets. In the vicinity of Toinette, Slade, Calvert, Deer Park, Fruitdale, and Yellow Pine some of this land has been subdivided into 10, 20, and 40 acre tracts and is offered to settlers at \$30 to \$50 an acre, without improvement, to be developed for trucking and fruit growing.

Before the possibilities of this soil are fully realized it will be necessary to determine through experiment the best methods of draining the soil, the amount and kind of fertilizer needed, the effect of liming, and the crops best suited to the type. The soil, wherever

mapped, has been used largely for native pasture, and little or no effort has been made to cultivate it, so that no definite data are available to show the possibilities of its development. Many of the experiments with fruit growing have thus far been unsuccessful, and many orchards and fields have been abandoned. This condition may, however, be attributable in part to the inexperience of the settlers and to the lack of capital.

KALMIA FINE SAND.

The Kalmia fine sand is a grayish fine sand, abruptly passing into a yellowish loose fine sand. The color in places has a lighter yellow or grayish color below 24 to 30 inches, but no perceptible change of texture or structure occurs within the 3-foot section.

No large areas of this type are mapped. Ordinarily they range from 40 to 80 acres in extent. These are found mostly along the larger streams tributary to the Tombigbee River. A few small detached bodies occur near the Escatawpa River and along Red Creek. Some areas of Kalmia sand are included with this type. They occur in the vicinity of Prestwick, $1\frac{1}{2}$ miles southeast of Slade, and 2 miles east and northeast of Cortelyou. They differ from the Kalmia fine sand only in having a coarser texture. The topography varies from level to slightly undulating. The type is naturally well drained.

The Kalmia fine sand, which has a small total area, is not extensively farmed. It is mainly cut-over land and has an average value of about \$10 an acre. Where cultivated it is used almost exclusively for general farming, corn being the chief crop.

This soil, though generally deficient in organic matter, is well suited to light trucking. It warms up quickly, enabling early planting and consequent early maturity of crops. To supply the needed organic matter velvet beans, cowpeas, and other legumes can be grown to advantage along with other crops. The addition of manure or commercial fertilizer in liberal quantities is necessary for good yields.

KALMIA FINE SANDY LOAM.

The surface soil of the Kalmia fine sandy loam, to a depth of 3 to 5 inches, is a gray to brownish loamy fine sand or fine sand to sand. This is underlain by a pale-yellow fine sandy loam to sandy loam, which extends to a depth of 8 to 10 inches. The subsoil is a dull-yellow, friable sandy clay, frequently stiff and mottled with grayish and brownish colors below 30 inches, particularly in the poorer drained situations. Where this soil occurs in association with the Myatt very fine sandy loam the surface soil generally is a very fine sandy loam, and the subsoil is heavier and more highly mottled, including streaks of red, as well as gray and brown. Small

areas of the Kalmia sandy loam which occur in the vicinity of Leroy are included with this type as mapped.

The Kalmia fine sandy loam for the most part occupies the higher terraces of the Tombigbee River. The largest single area is mapped east and southeast of Leroy. It is also quite extensively developed in the vicinity of Malcolm and Calvert, near the junction of Bilbo and Bates Creeks and Poll Bayou. Small areas occur along other streams in the county.

The surface of the type is level or depressed to slightly undulating, the latter topography being developed on the more eroded higher terraces. The type frequently is associated with the Myatt soils, occupying the better drained situations within the Myatt areas.

The natural drainage is good in the undulating areas and in the level areas on the higher terraces, but where the type is low lying or flat, as it generally is on the lower or first terraces, the drainage is imperfect. Open ditches are used exclusively for draining this soil, tile being considered too expensive.

Only a small part of the Kalmia fine sandy loam is under cultivation, the remainder being largely cut-over land. It is used most extensively for pasture, but it is recognized as a good general-farming soil, and in the vicinity of Leroy it is being rapidly brought under cultivation for this purpose. In the vicinity of Calvert it is used to some extent for trucking. Here some grapefruit and Satsuma oranges are being set out. Sugar cane not only yields well but produces a light-colored, mild-flavored sirup. Corn is the principal crop grown. The yield of corn, according to the estimates of farmers, varies from 15 to 30 bushels per acre, the former being considered a fair yield on the tenanted farms, and the latter frequently being obtained where better cultural methods are practiced. In the vicinity of Toinette some hay and feed crops are grown for dairy cattle, but for the most part the type is used only for pasturing the native beef cattle and hogs.

The productiveness of this type is maintained largely through the use of commercial fertilizers, which are applied at the rate of about 250 to 300 pounds per acre. The more progressive farmers, however, appreciate the value of cowpeas, velvet beans, and other legumes as a means of improving the soil, and their use is rapidly being extended.

The Kalmia fine sandy loam is valued at \$10 to \$35, and in a few places as much as \$50 an acre, the higher prices prevailing where trucking and fruit growing are being promoted. In the vicinity of Leroy the farms on this type are valued at \$25 to \$30 an acre.

MYATT FINE SANDY LOAM.

The Myatt fine sandy loam to a depth of about 8 inches is a grayish fine sand. This is underlain by a pale-yellow and gray, faintly mottled loamy fine sand to fine sandy loam. The subsoil is slightly

pasty in the lower part when moist. In summer the native soil section is usually very dry and loose. At a depth of 4 to 5 feet a light-gray, heavy, plastic, impervious clay, commonly known as "pipe clay," mottled with red and yellow, is encountered. This substratum of clay is very similar to that underlying the Leaf, Susquehanna, and Plummer soils, and has the same mottling.

The Myatt fine sandy loam is the most extensive and widely distributed terrace soil in the county. It is most typically developed northeast of Sunflower and throughout the terraces along the Escatawpa River, particularly in the lower part of its course, where the channel is deeper and the terraces better defined.

The type occupies level to slightly depressed "flats" in the poorer drained situations on stream terraces. Where it occurs along the smaller creeks the terrace is not everywhere well defined, but the other characteristics of the type are present, and although it occupies a position similar to first-bottom land, it is not generally subject to overflow. In these situations definite boundaries could not everywhere be drawn between the Myatt fine sandy loam and the first bottoms.

The possibilities for drainage are usually better on this type than on the Plummer soil, owing to its nearness to stream courses and its elevated position above the streams. However, little or no effort has been made to drain this land, as such improvement would be expensive, and in view of the present low price of other better drained lands such expenditure does not seem warranted.

With the exception of a few small patches, the Myatt fine sandy loam is unimproved. Some of it is in virgin forest, and a part in second-growth forest, but for the most part it consists of cut-over land, which is used almost exclusively for grazing cattle and sheep (see Pl. I, fig. 2).

The price of land of this type ranges from about \$5 to \$50 an acre, the higher values applying to the subdivided tracts of 5, 10, and 20 acres, being placed on the market in attempts to develop trucking and fruit growing.

This type requires the same treatment and improvement as the Plummer fine sandy loam. In general, however, the Myatt fine sandy loam probably is better adapted to general farming. Its level surface is favorable for the use of labor-saving machinery.

MYATT VERY FINE SANDY LOAM.

The Myatt very fine sandy loam is a gray to dark-gray very fine sand, which quickly passes into a lighter gray very fine sandy loam, faintly mottled with brown or yellow. This, in turn, grades into a pale-yellowish very fine sandy loam or loose, friable silty clay loam

to very fine sandy clay loam, the texture becoming gradually heavier to a depth of 30 or 36 inches, where a highly mottled, stiff, plastic, impervious clay is encountered. The latter is almost identical in color and mottling with the heavy substratum which underlies the Myatt and Plummer fine sandy loams as well as the Leaf and Susquehanna soils. This type, like the Myatt fine sandy loam, is locally referred to as "crawfish flats." The two soils are quite similar except in texture.

The Myatt very fine sandy loam is confined almost exclusively to the higher, level terraces of the Tombigbee River, south of Bassetts Creek. It is most typically and extensively developed along the Southern Railway, in the vicinity of McIntosh, Slade, and Sunflower.

The surface of the type is level or flat, with poor natural drainage, and where it occurs in large areas the draining of these "flats" is difficult and expensive. With the present low prices of better drained lands the improvement of this type is not generally considered profitable or necessary, since in its present condition it can be used for pasture. In the winter season or in seasons of maximum rainfall the surface frequently is covered with water and the soil remains saturated, so that it is generally unsafe to attempt to cross it with heavily loaded vehicles. During the summer, however, the soil is dry and firm.

This type, like the Myatt fine sandy loam, supports a scattered, stunted growth of pine, with some water oak, gum, and cypress in the lower situations. Practically all the original timber growth has been removed.

Only a few scattered patches of the Myatt very fine sandy loam were under cultivation at the time of this survey. Experiments with upland rice were generally accepted as successful, though no definite estimates of crop yields can be made. Attempts are being made to use rice in conjunction with cowpeas as forage for stock. Where the soil is so situated that it can be properly drained, corn, oats, and sweet potatoes give fair yields, corn averaging about 15 bushels and oats about 30 bushels per acre. In dry seasons sweet potatoes are successfully harvested, but when the harvest season is wet the potatoes rot in the field. In the vicinity of Calvert some Satsuma oranges have been set out on the higher parts of the type. The growing of this fruit, however, is in an experimental stage. The type is used almost exclusively for grazing cattle and sheep, mainly in the spring and summer, when the sedges are tender.

This type, in connection with its associated types, is valued at \$10 to \$50 an acre. The higher prices apply to the smaller subdivisions of 5, 10, and 20 acres along the railroad and in the vicinity of towns.

Comprehensive drainage is necessary to the full use of this land. It may be advisable to apply lime, and probably liberal additions of manure or fertilizer will be required for good yields.

AMITE SANDY LOAM.

The Amite sandy loam is a dark-brown to reddish-brown sandy loam, underlain at a depth of 5 to 10 inches by a deep-red, friable sandy clay. The reddish-brown color of the soil is due in part to the proximity of the red clay, which is frequently brought to the surface in breaking the land. The high content of organic matter in the surface soil has much to do with its loamy character, as well as its dark color. In an area about $1\frac{1}{2}$ miles southwest of Leroy, in the vicinity of Johnson School, the soil varies from the typical in that the surface soil has a somewhat darker color and consists of a medium to fine sandy loam.

This type occurs on the higher or third terraces of the Tombigbee River, largely in the vicinity of Leroy.

The surface of the main areas of the type is level to flat, except where they slope gently to a sink or near the outer margins of the areas where drainage outlets have cut back into them.

The drainage is generally adequate for farm crops, artificial drains being required only in small depressions. After a heavy rainfall water frequently stands on the surface, but it is quickly absorbed. Crops are seldom damaged by excessive moisture, especially where the seed bed has been properly prepared by deep breaking.

The Amite sandy loam, although not very extensive, is locally important, as it is one of the strongest types in the county. Its level topography favors the use of improved machinery, such as riding cultivators, which considerably reduces the cost of production of corn and cotton. This is the only type in the county on which riding cultivators are used at the present time. Their use permits more rapid and consequently more frequent cultivation, which is particularly beneficial on soils of such texture.

Although the Amite sandy loam has always been considered one of the best cotton soils in the county, its use for this crop has been discouraged by the ravages of the boll weevil. Corn is now the chief crop, and through the improved methods employed by many of the better farmers the yields have been increased from about 10 bushels to 30 and 50 bushels per acre. The success with corn is due not only to better cultural methods but also to the growing of such crops as velvet beans, peanuts, cowpeas, and oats, all of which are becoming important. On many of the plantations the growing of corn in conjunction with these crops has entirely displaced the production of

cotton. Hog raising in many cases is taking the place of cotton production.

This soil requires more frequent cultivation than some of the less loamy soils, as the surface material has a tendency to run together and bake, so that evaporation takes place more rapidly and the soil has a tendency to be droughty, unless a mulch is maintained. The growing of winter cover crops and the turning under of large quantities of vegetable matter are effective means of correcting this unfavorable structural condition.

At least 50 per cent of this type is under cultivation, and the cultivated area is rapidly being extended. The improvements are among the best in the county. In the vicinity of Leroy land of this type of soil is valued at \$35 to \$50 an acre, and little of it is for sale.

CHATTAHOOCHEE FINE SANDY LOAM.

The Chattahoochee fine sandy loam is a gray to brownish-gray fine sandy loam underlain at a depth of 8 to 10 inches by a red, friable, fine sandy clay.

This type is encountered chiefly in the vicinity of Slade, Sunflower, and Prestwick in small detached areas of 40 to 100 acres. It is confined largely to the higher terraces along the Tombigbee River, with a few scattered areas along some of the larger creeks.

The surface is generally level, but the drainage, as a rule, is good. There are a few small seepage basins, usually less than an acre in extent, that require artificial draining.

Although of small extent, the type is locally important and probably 50 per cent or more of it is under cultivation. The early settlers recognized it as one of the best cotton soils in the region and used it largely for that crop. Since the advent of the boll weevil corn, cowpeas, velvet beans, and vegetables have become the chief crops, and where the areas are favorably located with respect to markets or transportation facilities, trucking and fruit growing apparently offer attractive opportunities. In more remote areas the use of the type is at present restricted to general farming.

Before the boll weevil appeared the average yield of cotton was about one-half bale per acre, but this was reduced to one-fourth bale or less. The yields of corn, however, have gradually increased from 10 to 15 or 20 bushels per acre, owing to better methods of plowing, more liberal use of fertilizers, and the rotation of crops, including cowpeas and velvet beans.

The Chattahoochee fine sandy loam, where unimproved, is valued at \$10 to \$50 an acre, according to location. In the vicinity of Slade this soil is being cleared for planting to Satsuma oranges, grapefruit, and pecans, and it is proposed to sell the land in 5 and 10 acre tracts.

Where proper methods are employed this soil probably is one of the most productive in the county, being especially well suited to tomatoes, beans, peas, and other truck crops, as well as the general farm crops, including oats, corn, cowpeas, and velvet beans. Deep plowing is very beneficial.

CAHABA FINE SAND.

The Cahaba fine sand consists of a grayish to brownish fine sand which passes below through a pale-yellow into a yellowish-red fine sand, rather loamy in the lower part of the 3-foot profile.

The largest areas of this type occur in Tps. 5 and 6 N., R. 1 E. It is widely distributed over the stream terraces, particularly the higher terraces of the Tombigbee River. The type is not extensive and occurs in small detached areas of 10 to 100 acres.

Several small bodies of the Cahaba sand are included with this type, the largest area being found in sec. 12, T. 6 N., R. 1 W. They differ from the Cahaba fine sand only in the coarser texture.

The surface of the Cahaba fine sand is level to billowy, with sufficient relief for adequate surface drainage. The open, porous nature of the soil permits the rapid downward movement of moisture.

Only a small part of the type is under cultivation, the area farmed being restricted to a few small bodies, principally in the vicinity of Prestwick.

It is used principally for corn, which yields an average of 12 to 15 bushels per acre. The type is easily cultivated, has good circulation of air and moisture, and is fairly retentive of fertilizers. It is adapted to a wide range of crops, but for the most part it is not available for trucking, owing to the distance from shipping points.

The Cahaba fine sand is valued at \$10 to \$15 an acre.

With proper methods to maintain the organic matter supply in this soil good yields may be obtained. The growing of legumes is the chief dependence for increasing the organic constituents of the soil. Where corn is preceded by a crop of velvet beans the yields are said to be materially increased.

CAHABA FINE SANDY LOAM.

The Cahaba fine sandy loam is a grayish to brownish loamy fine sand which quickly passes into a pale-yellow, and this into a pale-red or yellowish-red fine sandy loam. This is underlain at 8 to 15 inches by a yellowish-red or dull-red, moderately friable fine sandy clay. Only in a few included patches is the clay near enough to the surface to impart a reddish color to the soil. The type is quite similar to the Chattahoochee fine sandy loam, except for the deeper red color of the subsoil of the latter.

The largest areas of the Cahaba fine sandy loam are those near McIntosh, Toinette, Sunflower, Cortelyou, and Carson. The type is quite widely distributed over the river and larger stream terraces. It occupies some of the higher situations on these terraces and has a gently undulating to level surface. The drainage is good.

Several small areas of the Cahaba sandy loam, occurring in the vicinity of Leroy, are included with the type. They usually border areas of the Amite sandy loam and differ from the typical Cahaba fine sandy loam only in having a coarser texture.

The Cahaba fine sandy loam, like the Chattahoochee fine sandy loam, is one of the stronger soils of the county. It is generally recognized as a good cotton soil and was devoted to cotton largely to the exclusion of other crops before the advent of the boll weevil. The change from cotton to corn and such crops as cowpeas and velvet beans has in many cases greatly improved the condition of this soil. Probably 50 per cent of the type is under cultivation, the remainder being cut-over or reforested land.

This type is generally valued at \$10 to \$20 an acre, but where it is subdivided into 5 and 10 acre tracts it is held for \$40 to \$50 an acre.

This soil is well suited to general farming, and where market facilities are available it can be used for trucking.

LEAF FINE SANDY LOAM.

The Leaf fine sandy loam at the surface is a grayish fine sandy loam. This quickly passes into a pale-yellow fine sandy loam. The subsoil, beginning at about 6 to 15 inches, is a stiff, plastic clay ranging in color from bright red to dark red or yellow, and mottled below a depth of 20 to 24 inches with gray, red, and yellow. The gray color usually predominates at lower depths. The deeper red coloring in the subsoil occurs in the better drained situations, while in the more poorly drained areas the subsoil is lighter in color, with more intense mottling.

The type is most extensively and typically developed south of McIntosh Landing and northeast of Malcolm. It is widely distributed throughout a number of the stream terraces, particularly along the larger creeks, where they have cut through the higher terraces of the Tombigbee River.

The surface varies from comparatively level to gently undulating. The latter topography, which is largely due to erosion usually, is encountered near the first bottoms. In the vicinity of Toinette the surface has been modified considerably by erosion.

The drainage usually is adequate for general farming, but owing to the highly impervious structure of the substratum the internal movement of moisture is likely to be retarded, making the soil too

wet in the rainy season and droughty during prolonged periods of dry weather.

Only a small part of the type is under cultivation, but its use for general farming or pasture is gradually being extended. At present it is used mainly for grazing, and most of it is cut-over land.

Before the boll weevil became destructive in this section, cotton was the principal crop on the Leaf fine sandy loam, and yields of about one-fourth bale per acre were obtained. At present corn is the chief crop. The ordinary yield is about 10 to 15 bushels per acre.

The value of this type ranges from about \$8 to \$50 an acre, with an average of about \$10 an acre. The higher prices prevail where the land is subdivided into 5 and 10 acre plots.

This soil is used with fairly good results for cotton and corn in various parts of the South.

LEAF LOAM.

The surface soil of the Leaf loam is a gray to light-brown loam to very fine sandy loam which quickly passes into pale-yellow material of similar texture. This in turn is underlain at about 6 to 10 inches by pale-yellow silty clay to very fine sandy clay, grading at 15 to 18 inches into a red or yellowish-red, heavy, stiff, plastic clay, mottled with gray, red, and yellow in the lower depths. Where the surface soil is shallow and the type is well drained a bright-red clay is encountered at 6 to 8 inches. This type is very similar to the Leaf fine sandy loam, particularly the flat areas of that type, differing mainly in having a finer texture. It includes small areas of the Leaf clay.

The largest continuous area of this type is that bordering the overflow bottoms of the Tombigbee River near Carson. Another area is mapped north of this, and the type occurs also in fairly large areas east of Sunflower, east and southeast of Slade, and northeast and southeast of Malcolm.

The surface is generally flat, and in places it is depressed. Where the type occurs along streams and gullies it is undulating, and where erosion has been particularly active the slopes to the streams are rather steep, with frequent exposures of the subsurface materials.

The drainage usually is poorly developed, particularly in the low-lying or flat areas, and in wet seasons, after a heavy rainfall the surface is covered with water which sinks very slowly into the soil. The impervious nature of the underlying clays makes artificial drainage difficult.

Only a small part of this type is under cultivation. It is generally rated as a poor soil, and is difficult to work with the average light farm equipment used in this region. There are a few fields which

were cultivated before the Civil War, but which are now grown up in shortleaf pine.

The value of this land in second-growth forest is about \$8 to \$10 an acre.

The Leaf loam requires a heavy farm equipment. To obtain satisfactory results with crops it has been found necessary to plow deeply and to turn under large quantities of vegetable matter. In the other sections of the South fair yields of cotton and corn have been obtained from better drained areas of this soil.

OCHLOCKONEE FINE SANDY LOAM.

The surface soil of the Ochlockonee fine sandy loam is predominantly a brown to dark-brown fine sand to fine sandy loam. This is underlain at variable depths by similar-textured material, which usually is mottled with drab and gray. The type is quite variable and in places is made up of successive deposits of different textured alluvium, including sands and silt. In the vicinity of Jackson Ferry and at other points near the river bank there are included swells or dunelike areas of grayish to brownish loose fine sand. Also there are some included small areas of Ochlockonee silty clay loam. Micaceous particles are commonly present in this soil.

The Ochlockonee fine sandy loam is largely confined to the first bottoms of the Tombigbee River, where it occurs in strips from a few yards to nearly one-half mile in width. The largest single areas are mapped in the vicinity of Sunflower and Whistlers Landings and north and south of Princes Lower Landing. The soil is well drained between periods of overflow. It is covered only by very high overflows.

This type comprises the area under cultivation in the bottoms. It is of only local importance in agriculture.

The Ochlockonee fine sandy loam is used for the production of corn, sweet potatoes, hay, and sugar cane. Some cotton is grown, but the growing of this crop has largely been discontinued since the boll weevil came into this region. The corn yields are high, as compared with those obtained in the piny-woods section, sometimes running as high as 50 to 60 bushels or more per acre. Occasionally crops are injured by overflow.

This type usually is held in conjunction with the Ochlockonee clay in large plantations. The low cost of producing crops is one of the main reasons for the occupation of these lands, good yields being obtained without fertilizers.

OCHLOCKONEE CLAY.

The Ochlockonee clay consists of a dark-brown, heavy, silty clay loam to clay, grading at about 8 to 10 inches into grayish-brown

stiff clay mottled with drab. This extends to a depth of 3 feet or more. Near the river and across the sharper bends, in line with the swifter currents, there are included strips of Ochlockonee fine sandy loam which are not mapped separately because of their small size. At each overflow silty and clayey material is deposited over the surface. Fine particles of mica are present in both soil and subsoil. The Ochlockonee clay and fine sandy loam are frequently called "isinglass land" for this reason.

This type occurs as a continuous, irregular belt of first-bottom land along the Tombigbee River, from the county line east of Calvert to the high bluffs near Princes Landing, about 2 miles north-east of Leroy. It varies in width from about one-quarter mile to more than 6 miles, the largest belt being that directly east of Toinette. It occurs also along the upper courses of Santa Bogue Creek and some of its tributaries.

In the northern part of the county there are some included strips of the Trinity clay too small to be indicated on the map. They consist of dark-colored alluvium containing some wash from adjoining areas of calcareous soils. The strips occur along the outer edges of the stream bottoms and as colluvial accumulations along Santa Bogue Creek. The soil is a black clay loam to clay, underlain at a depth of 6 to 10 inches by mottled yellow and brown clay. This is a very productive soil. Yields of 30 to 60 barrels of corn per acre have been obtained without fertilization. No other crop is grown, although some areas are used as Johnson grass and lespedeza pastures or for hay production.

The surface of the type is nearly level, but it is dissected by abandoned stream channels and "ox bows," which form shallow lakes and bayous. Although subject to overflow, it is comparatively dry throughout the summer and fall, during which seasons overflows do not ordinarily occur. In low, depressed situations the soil is swampy or semiswampy throughout the year.

The Ochlockonee clay is naturally one of the most productive soils in the county, but it is of very little importance in its present condition. It is forested largely with a heavy growth of hardwoods, including oak, ironwood, sycamore, tupelo, cypress, and sweet gum. Only a small part of the type is under cultivation, and this is used almost entirely for corn, in which pumpkins and squash are grown. The yields of corn are generally large, as much as 40 to 60 bushels per acre being obtained, but as the crop sometimes fails to mature or is destroyed by high water, the returns are uncertain. The river plantations produce the greater part of the corn that is marketed outside the county.

Owing to the occurrence of overflows, little preparation is given the land. Plowing is very shallow.

With improvement in the drainage conditions, by constructing levees or by other means, this type should prove a highly productive and important soil. There seems to be no reason why it could not be cleared and used without drainage for hay and pasturage. Some stock, principally hogs, is now pastured on the forested areas.

MUCK.

Muck, as mapped in Washington County, includes swamplike areas occupied by a black or dark-brown soil composed of partly decomposed organic matter and varying quantities of mineral material. These areas are generally referred to locally as "made land." The depth of these deposits is quite variable, ranging from a few inches near the edge, to 3 feet or more in the center of the areas. The underlying material is for the most part a black to bluish-black, stiff, heavy clay. In places the decomposing vegetable matter is fibrous and contains little soil material, thus having the characteristics of Peat.

The largest and most typical areas of Muck are mapped in sec. 24, T. 5 N., R. 1 W., in sec. 21, T. 2 N., R. 4 W., and in secs. 19 and 30, T. 3 N., R. 1 W. The surface is flat and depressed and the drainage poor.

Muck at present is in an undeveloped state, but at one time a part of the area in sec. 24, T. 5 N., R. 1 W., was cleared and cultivated to corn and rice. The yields at first are said to have been heavy, but they decreased and the project was abandoned. This area now supports a second growth of pine and gum trees and underbrush.

The Muck areas in general have a low value locally for agriculture. Where they are near markets or shipping points profitable returns might be had by draining and using the areas for such crops as celery, onions, and cabbage. Muck generally is classed with the swamp lands, as small patches occur throughout all the swampy areas along the creeks and branches.

SWAMP.

Swamp consists of very poorly drained bottom land subject to overflow. The soil varies widely in color and texture within small areas. It includes gray, brownish, and black fine sandy loam, loam, and clay loam, and many patches of Muck. The materials belong largely to the Bibb and Thompson series where the surface is light colored, and to the Johnson series, where the soil is dark as in the lower situations. Near the outer margins and in the wider expanses of the area mapped as Swamp along the Escatawpa River, the surface averages a loamy fine sand or fine sandy loam, grading into a mottled light-gray and yellowish fine sandy clay or fine sandy loam.

In places the Swamp grades into low areas of the Plummer and Myatt fine sandy loams so imperceptibly that it is difficult to establish definite boundaries.

The most extensive development of Swamp occurs along the Escatawpa River and its tributaries in the western part of the county, and along Armstrong, Bassetts, Lewis, Bilbo, and Bates Creeks, and Poll Bayou in the eastern part.

This land is saturated and generally inundated during the winter and in wet seasons, but in the summer it frequently becomes sufficiently dry to be cultivated. However, the danger of overflow is too great to justify the clearing of these bottom lands without first establishing better drainage conditions. Much of the virgin timber has been removed, leaving a growth of water oak, sweet gum, swamp maple, magnolia, bay, and pine.

The Swamp is not cultivated, its principal use being for pasture. The value of the standing timber for lumber and turpentine largely determines the value of the land, which ranges from about \$3 to \$10 an acre.

Under present conditions the areas of Swamp are best used for pasture and forest land.

SUMMARY.

Washington County, Ala., lies in the southwestern part of the State. It averages about 38 miles in length and ranges from 22 to 32 miles in width, and comprises an area of 1,070 square miles, or 684,800 acres.

The topography varies from low, flat, first-bottom lands and level terraces to undulating uplands and eroded hills. The elevations range from sea level to 300 or 400 feet above. The roughest topography is in the Hatchetigbee Hills in the northeastern part.

The Tombigbee River forms the main drainage outlet for the eastern part of the county, and the Escatawpa River receives the drainage of the western part. Owing to the low gradient, the streams of the southern part of the county are tortuous and sluggish, with low banks. The streams in the northern part have better defined channels.

Old St. Stephens, a Spanish settlement and fort on the Tombigbee River was the first settlement. The county was established in 1800.

The population increased from 3,912 in 1870 to 14,454 in 1910. The entire population is classed as rural. Vinegar Bend is the largest town. Chatom, near the center of the county, is the county seat.

Good transportation facilities are furnished by four railroad lines, with one branch line, and the Tombigbee River. Mobile is the

principal outside market for farm products. Some truck is shipped to St. Louis and other northern markets.

The climate of Washington County is typical of the southern tiers of counties bordering the Gulf of Mexico. It is favorable to intensive agriculture and stock raising. The summers are long and hot and the winters short and mild. The growing season averages 256 days. The mean annual temperature is about 64° F., and the mean annual precipitation about 58 inches.

The agricultural development of the county has been slow, the efforts of the settlers having been centered mainly on lumbering and turpentine. At present only a very small part of the county is devoted to agriculture. Large areas of cut-over land and forested land are used only for pasture.

The 1910 census reports 49.5 per cent of the area of the county in farms, and of the area in farms 12.5 per cent is reported improved. The average assessed value of farm land is given by the census as \$4.81 an acre. About one-third of the farms are operated by tenants.

Cotton and corn have always been the chief staples, the former being largely displaced by the latter in importance since the advent of the boll weevil, about 1912. Trucking is important in places along the railroads, mainly in sections where land companies are subdividing large areas of cut-over land. Citrus fruits are being set out, but attempts to grow them are in a purely experimental stage. Cattle, hogs, sheep, and goats, mainly of scrub stock, are raised on the open range. Dairying is of no importance.

The soils of Washington County are derived from sediments washed from crystalline, limestone, and sandstone and shale areas of the Appalachian, Piedmont, and Limestone Valley regions. They occur both as sedimentary and as alluvial soils. A total of 27 types, exclusive of Muck and Swamp, are mapped, and these represent 16 series.

The Norfolk series has gray sandy surface soils, with yellow, friable subsoils. The series is represented in this county by three types—the sand, fine sand, and fine sandy loam. The loamy soils are more retentive of fertilizer and moisture and generally more productive than the lighter structured, deep sandy soils.

The Orangeburg soils have similar gray surface soils, but dark-red, friable sandy clay subsoils. Only the fine sandy loam type is mapped in this county.

The Ruston soils are gray at the surface, with friable, yellowish-red subsoils. Four types, the sand, fine sand, sandy loam, and fine sandy loam, are mapped. The sandy loam and fine sandy loam are

the most productive, and are suited to a wide range of crops. These soils are widely distributed over the county, and are quite extensively developed to agriculture.

Of the Greenville series only the sandy loam type is mapped. It is distinguished from the Orangeburg sandy loam by the dark-brown or reddish-brown surface. It is a strong soil, and where properly handled is usually very productive.

The Susquehanna soils are gray at the surface, grading into yellow, and are characterized by stiff, heavy, plastic, mottled subsoils. The fine sandy loam and clay are mapped. The soils differ somewhat in origin and other characteristics in the northern and southern parts of the county. They usually occur in small areas, and are widely distributed. They require a heavy farm equipment for proper cultivation. The proportion of cultivated land on these soils is small.

The Plummer fine sandy loam is the only representative of this series in the county. The soil is predominantly gray, with a mottled lower substratum, which usually consists of a heavy, stiff, plastic clay, similar to the subsoil of the Susquehanna series. This, the most extensive type in the county, is confined largely to the southern part. It has had little development anywhere in the South, and only a very small acreage is under cultivation in this area. It has been used so far almost exclusively for grazing, which is good in the spring, but less valuable during the summer and fall.

Of the Sumter series only the stony clay is mapped. Owing to its topography and stony character this soil has little agricultural value, except for grazing. Small patches can be successfully farmed.

The Lauderdale stony clay also has little importance agriculturally, owing to its rough topography.

The Guin stony sandy loam consists of a wide variety of soil materials, and is largely nonagricultural.

The Kalmia soils, on the terraces, correspond to the Norfolk soils of the uplands. They are similar in color and character of soil material, but are not naturally so well drained. The fine sand and fine sandy loam are mapped. The topography is level to slightly undulating. The latter is the more productive type, but the sandy soils of this series generally are more productive than the corresponding Norfolk soils.

The Cahaba soils correspond to the Ruston soils of the upland. Two types, the fine sand and fine sandy loam, are mapped. The fine sandy loam is the more productive. These are among the better terrace soils.

The Chattahoochee fine sandy loam is the only member of this series mapped. It is well situated and quite productive, but is of small extent.

The Amite sandy loam is one of the most productive terrace soils in the county, and some of the best farms are located on it. It is the only member of this series in the county.

The Myatt series is represented in the county by two types, the fine sandy loam and very fine sandy loam. These soils are very similar to the Plummer fine sandy loam on the uplands, but occupy level to flat situations, while the Plummer is more undulating or is found upon slopes. The Myatt soils are similar to the Plummer, too, in that they are saturated throughout the winter season or seasons of heavy rainfall. They are the most extensive terrace soils in the county, but they are used mainly for pasture and only a very small total area is under cultivation.

The fine sandy loam and loam types are the only members of the Leaf series mapped. These soils have a large total area but are largely undeveloped. Aside from their level to slightly undulating surface, generally characteristic of terrace soils, they are very similar to the Susquehanna soils.

The Ochlockonee series includes the dark-brown soils of the first bottoms. In Washington County two types are mapped—the fine sandy loam and clay. They are among the most productive soils in the county, but are subject to frequent and irregular inundations. The fine sandy loam includes most of the river-bottom lands under cultivation.

Muck represents accumulations of organic matter in various stages of decomposition, usually underlain at variable depths by a black to blue-black, heavy, stiff clay, which may be gray in the lower part.

Swamp includes the first-bottom lands that are more or less swampy, and consists of different soils so intricately mingled that they can not be definitely classified.



[PUBLIC RESOLUTION—No. 9.]

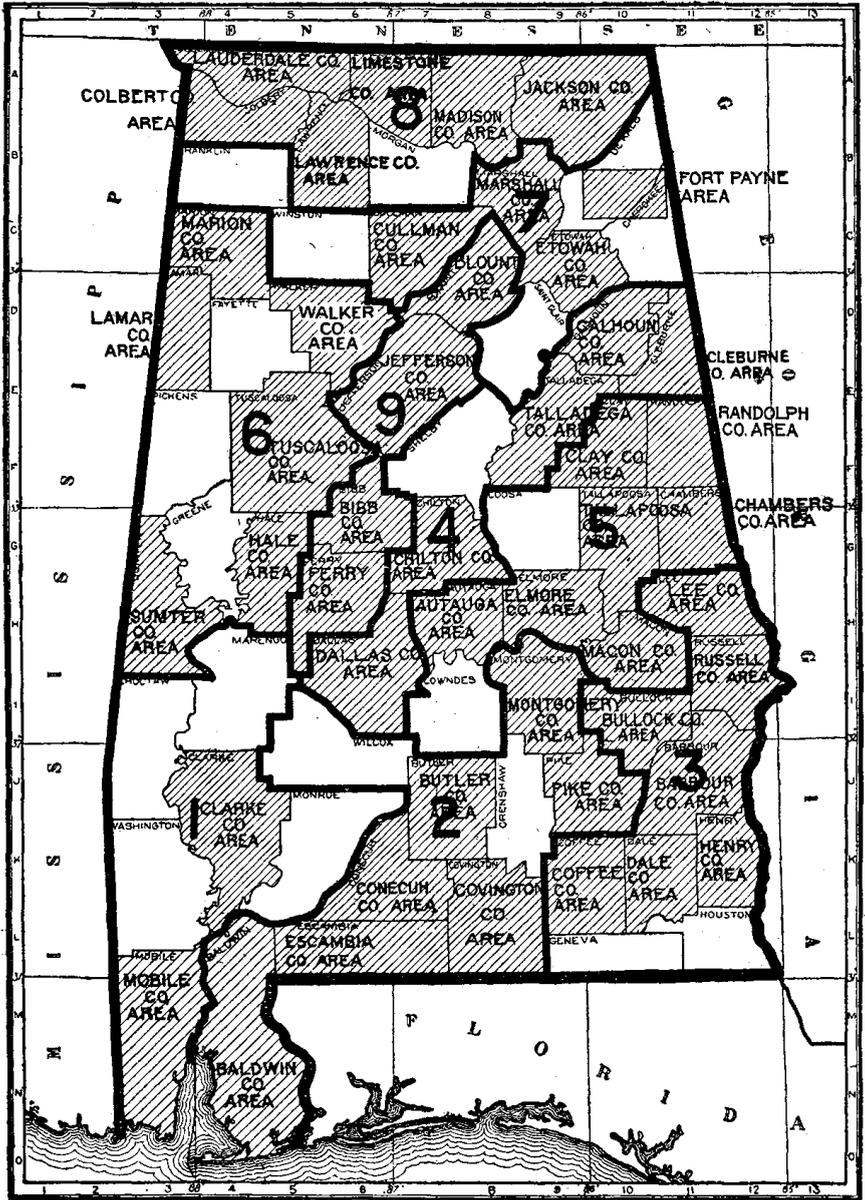
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

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.]



Areas surveyed in Alabama.

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