

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 AGRICULTURE AND
INDUSTRIES; EUGENE A. SMITH, STATE GEOLOGIST.

SOIL SURVEY OF WILCOX COUNTY,
ALABAMA.

BY

R. A. WINSTON, OF THE U. S. DEPARTMENT OF AGRICULTURE,
IN CHARGE, AND N. ERIC BELL, OF THE ALABAMA DE-
PARTMENT OF AGRICULTURE AND INDUSTRIES.

W. EDWARD HEARN, INSPECTOR, SOUTHERN DIVISION.

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



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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., June 15, 1917.

SIR: I have the honor to transmit herewith the manuscript report and map covering the survey of Wilcox County, Ala., and to request that they be published as advance sheets of the field operations of the Bureau of Soils, 1916, 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, Wilcox County sheet, Alabama.

SOIL SURVEY OF WILCOX COUNTY, ALABAMA.

By R. A. WINSTON, of the U. S. Department of Agriculture, In Charge, and N. ERIC BELL, of the Alabama Department of Agriculture and Industries.—Area Inspected by W. EDWARD HEARN.

DESCRIPTION OF THE AREA.

Wilcox County, Ala., is about half way between the center and the southwestern corner of the State. It is about 40 miles southwest of Montgomery, 100 miles north of Pensacola, and 80 miles north of Mobile. It is bounded on the north by Marengo, Dallas, and Lowndes Counties, on the east by Lowndes and Butler Counties, on the south by Monroe and Clarke Counties, and on the west by Clarke and Marengo Counties.

The county is very irregular in shape; it has an area of 900 square miles, or 576,000 acres.

The county lies wholly within the drainage basin of the Alabama River. The broad valley of this stream crosses the central part of the county from north to south in a series of broad meanders. The valley floor, including the recent-alluvial belt and a number of level terraces, is from 6 to 12 miles in width and is flanked on both sides by gently rolling to rolling country characteristic of the Coastal Plain. This land has a slight slope toward the river and is marked by a number of relatively high, hilly watersheds that separate the drainage waters of tributary streams. Many of the streams, particularly Pine Barren, Cedar, Wolf, Prairie, Bear, and Turkey Creeks in the east and Cholatchee, Dixon, Red, Goose, Turkey, Bear, and Prairie Creeks in the west, have distinct valleys one-fourth to 1 mile in width and are small physiographic prototypes of the main river valley.

In general, the physiography of the county consists of a lowland belt extending across the whole northern part of the county and spurs of a highland projecting into the county from the south. These consist of small areas of the highland, whose northern steep



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

slope is known farther east as the Chunnenugga Ridge. The northern lowland is the product of erosion acting on the soft clays, sands, and calcareous rocks associated with the Selma Chalk, while the high upland in the southern part of the county is the fragment of an older surface formed on the sands and sandy clays extending over the southern part of the State. In Wilcox County one of these high areas lies in the southwestern part of the county and another in the south-central part, the latter area being locally known as the "Gram-pian Hills." Throughout the remainder of the county the hilly and ridgy topography is the result of recent erosion and stream action; the country originally was quite uniform in topographic features, being an almost level plain. The principal streams have cut rather deep, broad valleys. The sloping valley walls are seldom very steep, though they are intricately dissected by small tributary branches and washes.

The gently rolling land is most extensive in the southeastern section of the county and occurs in parts of the "prairies," as near Catherine and Furman, and in the northeastern corner of the county. There are some rather wide areas lying contiguous to the terraces of the Alabama River, particularly in the large oxbow bends, that have a gently rolling to undulating surface. These areas probably are the highest and oldest of the terrace formations. They lie at elevations of 150 to 250 feet above the present river level and have been above overflow for so long that they have lost their alluvial characteristics and the soils are essentially upland soils.

The elevations above sea level as shown by the survey of the Louisville & Nashville Railroad are 411 feet at the county line, 406 feet at McWilliams, and 315 feet at Pine Apple. Elevations along the Southern Railway, as reported by the United States Geological Survey, are 170 feet at Alberta, 95 feet at Arlington Station, 189 feet at Catherine, 223 feet at Gastonburg, 125 feet at Lamison, 110 feet at Pine Hill, and 166 feet at Sunny South. The elevation at Bellview is 164 feet.

Numerous streams ramify into all parts of the county, affording drainage outlets for all sections. Many of the smaller streams of the upland region are intermittent, flowing regularly in the spring and winter, but drying up in summer. Surface drainage is well established throughout the county except in the bottoms of the larger streams. The larger streams have cut deep, broad valleys and have almost reached base level. They meander sluggishly through low, flat bottoms, usually flanked by a marginal strip of second terraces.

Wilcox County was created in December, 1819. The first settlement in the county was probably made in 1815, the early settlers

coming from the States of Virginia, North and South Carolina, and Georgia.

The present population is chiefly native born, consisting mainly of descendants of the early settlers. The total population is reported in the census of 1910 as 33,810. There are no large towns in the county, the entire population being classed as rural. The distribution is general, the gently rolling areas where farming operations can be easily carried on being most thickly settled. The average density of population is reported as 37.7 per square mile. The lands are held in large tracts by white owners, who usually live in the towns. The farms are occupied and farmed by colored tenants.

Camden, in the central part of the county, is the county seat. It has a population of about 800. Snow Hill, Allenton, Pine Apple, and McWilliams, in the eastern part, and Gastonburg, Catherine, Flatwood, Lamison, Arlington, Kimbrough, and Pine Hill, in the western part of the county, are railroad points of local importance. Lower Peach Tree, in the southwest, Canton Bend, in the central part, and Ackerville, Oakhill, and Furman in the east, are rural trading points.

Three systems of railroads operate in the county, the Louisville & Nashville in the eastern part, running from Selma to Pensacola, with a branch line extending northward from Nadawah to Camden; the Southern Railway in the northern and western parts, running from Birmingham to Mobile; and the Gulf, Florida & Alabama Railroad in the southwest, running from Pensacola to Kimbrough, the present terminal. Two companies operate steamboats on the Alabama River between Montgomery and Mobile, giving passenger and freight service. Through the railway and waterway traffic service all parts of the county are well supplied with transportation.

A comprehensive system of main county highways is being rapidly developed. Modern methods of road building are employed, and the improvement is to be extended to all the public roads. Local and long distance telephone service is available in all parts of the county, with telegraph facilities in practically all the towns. Public schools are conveniently located throughout the county, and churches of various denominations are well distributed through all sections.

Camden is the principal market for the agricultural products of the county, although some cotton, cattle, and other products are sold at other local towns. Birmingham, Selma, Pensacola, Mobile, Montgomery, New Orleans, St. Louis, Nashville, and Louisville are the chief outside markets.

CLIMATE.

The climate of Wilcox County is temperate. The summers are long and warm, and the winters short and mild. Very cold weather

is rare. Occasionally the temperature remains below freezing for short periods, and zero weather has been recorded in late winter. The mean temperature for the winter months is about 47° F. The summer mean is 80°, and the mean for the spring and fall months about 65°. The mean annual temperature is reported by the Weather Bureau station at Pine Apple as 64.2° F.

The mean yearly precipitation is reported as 42.44 inches. The rainfall is well distributed throughout the year, being heaviest in the winter and lightest in the fall.

The following table is compiled from the records of the Weather Bureau station at Pine Apple:

Normal monthly, seasonal, and annual temperature and precipitation at Pine Apple.

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1899).	Total amount for the wettest year (1900).
	°F.	°F.	°F.	Inches.	Inches.	Inches.
December.....	48.1	75	7	4.58	4.09	4.95
January.....	47.1	81	8	4.13	3.00	7.50
February.....	44.9	80	— 4	4.91	2.47	7.00
Winter.....	46.7	81	— 4	13.62	9.56	19.45
March.....	57.0	91	20	5.02	4.40	8.33
April.....	66.3	98	28	3.11	.90	1.75
May.....	73.6	100	38	2.57	.80	10.60
Spring.....	65.6	100	20	10.70	6.10	20.68
June.....	79.7	105	52	4.22	2.54	6.90
July.....	80.7	105	57	3.90	5.77	.50
August.....	79.5	104	60	3.69	4.05	4.09
Summer.....	80.0	105	52	11.81	12.36	11.49
September.....	73.8	100	35	2.05	1.20	2.30
October.....	63.6	96	28	1.81	1.40	1.20
November.....	55.7	89	24	2.45	2.35	4.10
Fall.....	64.4	100	24	6.31	4.95	7.60
Year.....	64.2	105	— 4	42.44	32.97	59.22

The average date of the last killing frost in the spring, according to the records of the Weather Bureau station, is March 14, and of the first in the fall November 10, so that there is an average growing season of 241 days. The date of the latest recorded killing frost in the spring is April 11, and of the earliest in the fall October 22. The long growing season is favorable to widely diversified agriculture and the opportunities for the development

of stock raising and dairying are good. The grazing season extends over a period of 9 or 10 months, and there is a luxuriant growth of palatable and nutritious native grasses so that feeding during that time is unnecessary.

AGRICULTURE.

The agricultural history of Wilcox County dates from the early settlement of the region, about 1815. The early settlers selected desirable lands along the stream courses, building their houses on the adjacent terraces or upland and clearing the productive alluvial soils for farming. In time homesteads were distributed throughout all the more desirable parts of the county. The early settlers grew food crops, such as corn, wheat, oats, potatoes, and vegetables. A few head of stock were pastured on the open range. All the necessities of life were produced at home. Agricultural development in general was steady and gradual. The low price of land enabled many farmers to acquire large holdings, which resulted in the establishment of "plantations," each including thousands of acres.

Cotton was introduced at an early date, and soon became the principal money crop. It was hauled to river landings and shipped to outside markets, where it was exchanged for supplies or sold for cash. With the invention of the cotton gin a decided impetus was given to cotton culture and the area of cultivated land was greatly extended. No fertilizer was used, and the lighter soils under careless cultivation were soon reduced to a low state of productiveness. They were then abandoned and new lands brought into cultivation. The Civil War resulted in the discontinuance of the plantation system of farming. The changed conditions of labor made it impossible to cultivate the large tracts, and they were divided into small farms and operated by tenants. Few of the old plantations remain, although in recent years a number of farmers have greatly extended their holdings. With little change the tenant system predominates in the county at the present time, although the tendency is toward the small farm operated by the owner under a more intensive system of cultivation.

There has been no notable variation in the crops grown and the general use of the land since the settlement of the county became general. Cotton has continued the principal income crop and corn the principal subsistence crop. The 1910 census reports cotton on 107,480 acres, and corn on 35,173 acres. The recent advent of the boll weevil has resulted in a decrease in cotton production and marked changes in farm management, and the census figures of 1910 are not representative of present conditions.

The additional cost of cultivating the crop under boll-weevil conditions, the direct injury by the weevil, and the present prohibitive cost of fertilizers render the profits from cotton production very uncertain. In large areas the yields are so low as hardly to represent the cost of production. In an increasing number of cases cotton is no longer depended upon as the single important crop. A broad system of diversification in growing the subsistence crops is generally supplanting the one-crop methods of former times. In addition, the live-stock industry is being developed, in many instances in a large way. In general, there seems to be a tendency toward a system of cropping that emphasizes the production of subsistence crops for stock and home uses, with a small acreage of cotton as a cash crop.

Many difficulties are involved in the adjustment of farm methods to boll-weevil conditions. The negro tenants, who farm the large holdings, operate from one to four plows, each capable of caring for about 25 acres. Formerly cotton was the primary crop grown by these tenants, and subsistence was advanced to them by local merchants, who took a lien on the prospective cotton crop. Under present conditions the yield of cotton is so low or so uncertain that the tenants can not pay for food and clothing for their families by following the old system. The landowners, who direct the farm operations of their tenants, have forced the planting of food and forage crops to the front, restricting the cash crop, cotton, to a small acreage. The new system includes the raising of some live stock on each farm and a large number of tenants now have a cow or two, a few hogs, and chickens. A number of landowners are developing the live-stock industry as a profitable means of utilizing their extensive holdings. Even under present conditions, however, cotton retains its place as the chief cash crop of the county.

The acreage of corn has increased materially in recent years. The corn is used for feeding work stock and hogs, and is also ground at local mills to furnish meal for home use. In connection with the corn crop, velvet beans are being grown in small acreages as a forage for cattle and hogs in the late fall, and as a soil improver. Oats, and to a less extent rye, are grown in small patches for feed. Both oats and rye afford winter and spring grazing and are valuable green-manure crops. Peas and beans are grown on a small acreage, and are either harvested or pastured with hogs. The growing of cowpeas has a highly beneficial effect on the soil. The crop yields from 1 to 2 tons of forage per acre where sown broadcast and mowed. Johnson grass is the principal hay crop. It is cut chiefly from the limestone prairies and bottom lands. Alfalfa is grown in small patches over the limestone areas, and, to a less extent, vetches and

clovers. Patches of sugar cane, sweet potatoes, peas, and various vegetables are grown on almost every farm.

Tame or cultivated grasses are reported in the census of 1910 on nearly 3,000 acres. Oats, dry peas, and sweet potatoes each occupied nearly 2,000 acres, and vegetables and sugar cane somewhat more than 1,000 acres each. Some peanuts, potatoes, and sorghum are grown, with a variety of other crops in small patches and gardens. The census reports about 26,600 peach trees and over 3,000 apple trees, with a number of pecan trees and grapevines.

The live-stock industry is rapidly being developed in the county. The 1910 census credits the county with about 12,000 head of dairy cattle and about one-half as many other cattle, in addition to a large number of calves. There were somewhat less than 30,000 hogs in 1909. These numbers have increased materially in recent years. A few goats are raised in all sections of the county, and a few sheep are found on the prairie. Nearly 4,000 horses and a slightly smaller number of mules are reported. The stock is well distributed over the county, with a majority probably on the limestone prairie lands.

The raising of beef cattle is now the chief live-stock industry, although considerable quantities of dairy products are sold at local markets. The quality of cattle, particularly beef cattle, is being improved through the introduction of high-grade selected animals for breeding purposes. The Red Pole, Angus, Devon, and Hereford are popular breeds. The county was relieved of the cattle-tick fever quarantine in 1915, following the eradication of the tick.

The long growing season and the excellent growth of native grasses are favorable to stock raising. In the summer months the animals have restricted pasturage in fenced fields, but after harvest they are turned out on the open range for winter grazing. It is often necessary to feed some hay or cottonseed meal and hulls or ensilage in late winter, and this practice obtains with all the large herds of good breed, though large numbers of grade cattle go through the entire winter on the open range without additional feeding. Animals are prepared for spring market by winter feeding, cottonseed meal and hulls and ensilage being fed. Silos are becoming general over the county on the large plantations. The tendency is toward winter feeding rather than allowing the cattle to run at large. Both corn and sorghum are used for ensilage.

Hog raising also is increasing. There are a few head on every farm. The hogs are turned out after harvest for winter foraging, being fed some corn in late winter when necessary. Cowpeas, bur clover, lespedeza, vetch, soy beans, velvet beans, rye, oats, Bermuda grass, corn, peanuts, sorghum, sweet potatoes, chufas, etc., are valuable crops for feeding stock that grow well on most of the soils of the county.

All the farms practice the same system of cropping, with the exception of a few in the prairie region where the soil is used for special purposes. The prairie soils of limestone origin are well adapted to the growing of grasses, clovers, vetches, and alfalfa, and while these are not grown extensively as special crops, the adaptation is recognized. As the cattle-raising and hog-raising industries develop these lands will probably be extensively seeded to alfalfa.

In general, little thought is given to the adaptation of soils to crops, although nearly every farmer recognizes the superior value of certain soils for certain crops. Melons, sweet potatoes, and peanuts are grown on the deeper sandy soils, and sugar cane and corn on moist lands. Practically all crops, cotton in particular, have been grown so extensively on all the soils of the area with varying degrees of success that the matter of soil peculiarities has received little attention. Under boll-weevil conditions, where early maturity is desirable, it has been found that the wet lands, or clay lands, are not so well suited to cotton as the well-drained sandy soils. In this connection, the selection of early-maturing varieties of cotton also is recognized as important. The topography affects the fitness of lands for agricultural use, but has no influence on the distribution of crops.

The negro tenants give little attention to the maintenance of the productiveness of the soil or to soil improvement and crop yields are consequently low, though usually sufficient to pay living expenses and rents. Landowners who operate their own farms for the most part employ better methods. Many of the larger owner-operated farms are improved with modern houses and large barns and sheds for housing work stock and farm implements. On each plantation there are several cabins of one to four rooms for accommodation of farm laborers or tenants. Each cabin is provided with a garden and one or two other buildings for sheltering such work stock and farm implements as the tenant may have in charge.

The plantations usually have an adequate supply of farm machinery and implements, consisting of wagons, plows, harrows, mowers, feed cutters, hay presses, cane mills, and hand implements. Many have gas engines for pumping water, sawing wood, cutting feed, operating crushers, and for other uses. Both mules and horses are employed as work stock. Many good work animals are raised at home. Beef cattle, milch cows, hogs, goats, and poultry of all kinds are raised on practically all farms.

The colored tenants usually have poor farm equipment, except where the work stock and implements are furnished by the landowner. Ordinarily the "one-plow" tenant has a horse or mule, a wagon, a plow, and a few hand implements, all of inferior quality, with a larger but similar equipment on the "two-plow," "three-plow," or "four-plow" farm. The tenants generally have a few hogs and

chickens and occasionally a cow. The more industrious tenants have comfortable houses and good work stock, implements, beef cattle, milch cows, hogs, and poultry.

The cultivation of lands generally is inadequate. Fields frequently are allowed to remain untilled from one summer to the next. Fall plowing is rare. As a means of preventing wash from winter rains, of securing a well-pulverized seed bed for winter cover crops and improving seed-bed conditions for summer crops, counteracting boll-weevil infestation, and adding organic matter to the soil, fall plowing is highly beneficial. The heavy lands should be plowed with heavy implements.

The cultural methods employed in growing cotton and corn, the principal crops, have not changed materially from long-established practice. Under boll-weevil conditions additional attention is required in picking the insects from the young cotton plants and burning the infested squares that fall to the ground as often as possible, usually about once a week. Cultivation of the crop also is more frequent, in order to destroy insects and hasten the growth of the crop.

Land is prepared for summer cropping as early as possible in the spring. The first operation consists of broadcast plowing, a one-horse plow being used on light soils and a two-horse plow on heavy soils. The field is then bedded, and this operation is followed by planting. In some cases a seed distributor is used for planting, while in others a furrow is run in the center of the bed and the seed planted by hand and covered with a drag or harrow, or a two-shovel cultivator. In either case the seed bed is materially lowered. Often, however, land preparation is not thorough. No broadcast plowing is done, and the ridge, or seed bed, is thrown up over the old water furrow between the former rows, or the old seed bed is merely opened by a couple of furrows, into which the seed is immediately dropped.

Cultivation of the crop begins when the plants are 2 or 3 inches high. For cotton, the rows are barred off with a light plow, in some cases carrying a small moldboard, which is run close to the plants on each side, turning the soil from the plants and leaving them on a low narrow ridge. Chopping immediately follows. This is a thinning process, accomplished entirely with hand-hoes, that leaves one or two plants at intervals of 10 to 12 inches in the row, destroys grass and weeds, and reduces the narrow ridge to a comparative level. "Siding" soon follows. This consists of running shovels or sweeps along the plant rows to throw some soil to the plants. Hoeing between the plants to destroy grass and weeds is done two to four times in the season. Weeders, sweeps, and cultivators are used for killing weeds and grass between the rows and for cultivating the growing crop, the one-horse sweep being in general use. The crop is laid by in

late summer and harvested in the fall as the bolls mature, several pickings being necessary.

Corn land ordinarily is given much the same preparation as cotton land. Ridge cultivation is practiced on the flat lands of inadequate or slow drainage and nearly level cultivation on the well-drained uplands. The alluvial lands of the stream bottoms are largely devoted to corn, and are often plowed broadcast in the late spring just prior to bedding, or are simply bedded in the process of plowing. Later a furrow is run on the bed and the seed planted either by hand or with a planter. In level cultivation the seed is placed in the water furrow and cultivation gradually works the soil to the plants until, at laying-by time, the rows are on moderately high beds. Cultivation of the growing crop usually is accomplished with sweeps, harrows, and cultivators. In some cases one hoeing is given for killing grass between the stalks, and at the same time missing hills are replanted. Where the crop is to be used for ensilage it is sown in drills.

Oats are seeded in the fall or spring, either broadcast or in drills. The fall-sown crop is grazed in late winter and harvested in the spring, being fed to stock in the sheaf. Cowpeas are grown either alone or with the corn crop. When seeded broadcast they are often cut for hay, yields of 1 to 2 tons per acre being obtained. Where sown with the corn crop they are used as field forage after the corn harvest. Velvet beans are extensively grown with corn. They are used as field forage for cattle and hogs and are valued for their beneficial effect on the soil. Soy beans, vetch, and clover occasionally are grown in small patches. They are grown more extensively on the prairie soils.

Alfalfa is grown successfully on certain of the prairie soils and is recognized as an excellent pasturage and hay crop and as a soil improver. The most valuable hay crop in the county, however, is Johnson grass, which grows luxuriantly over the prairie lands and stream bottoms. It is also an important pasture crop. Bermuda grass, lespedeza, broom sedge, water grass, and carpet grass are thrifty wild grasses that furnish excellent pasturage in season.

Sorghum and sugar cane are grown on nearly every farm, in patches, for sirup. A good quality of sirup is obtained from sugar cane grown on the light sandy loams. Larger yields are obtained from the heavier and more productive types of soil, but the quality is not so good. Sorghum frequently is grown for ensilage.

Peanuts, Irish and sweet potatoes, melons, and vegetables are grown on the light soils in small patches for home use. Some fruit is grown, chiefly peaches, figs, grapes, apples, and pomegranates.

Pecan culture has been given considerable attention in recent years. Several small commercial orchards are producing nuts of the im-

proved paper-shell varieties. The trees are thrifty when properly cared for. The well-drained upland soils of the Orangeburg, Greenville, Houston, Oktibbeha, Ruston, and Norfolk series seem well adapted to the growing of pecans, as are the well-drained terrace soils along the Alabama River.

The greater diversification of crops resulting from the inability of the farmers to grow cotton successfully on extensive acreages under boll-weevil conditions affords a better opportunity for crop rotation. Some rather uncertain and indifferent rotation is practiced with small crops. Cotton and corn usually are grown continuously, although occasionally fields are changed from one crop to the other. Corn lands occasionally are seeded to winter oats, which are followed by cowpeas or soy beans, or by peanuts or sweet potatoes. Velvet beans and cowpeas are often seeded in the corn crop.

Fertilizers are commonly used on the upland soils, with the exception of the prairie lands. The bottom lands are seldom fertilized. In the census of 1910 about one-third of the farms reported the use of fertilizer, with a total expenditure of \$96,275, or \$44.43 per farm. The popular fertilizer formerly was a 10-2-2 mixture. Owing to the high cost of certain fertilizer ingredients, however, and the low yields of cotton obtained under boll-weevil conditions the use of commercial fertilizers has been reduced probably 80 to 90 per cent. Only in rare cases are commercial mixtures used for general farm crops. Practically no nitrate of soda or potash is now used in the county. The maintenance of soil productiveness under existing conditions depends mainly on the use of barnyard and compost manures, green manuring crops, diversification, and rotation with legume crops.

Most of the farm labor is colored and generally satisfactory under supervision. Laborers ordinarily are employed by the month. They are paid \$10 to \$15 with board. Labor is abundant and cheap. The average daily wage is about 50 cents. At harvest time the cotton crop is picked by wage hands or at a certain rate per hundred pounds, usually 50 to 75 cents. In the 1910 census about one-third of the farms reported the employment of labor, with a total expenditure of \$200,789, or \$90.61 per farm.

About 66 per cent of the area of the county is in farms, and according to the census this area is contained in 6,661 farms, with an average size of 56.8 acres. Of the land in farms about 57 per cent, or 32.3 acres per farm, is improved. The census classes each tenancy as a farm. The average tenant runs one or two plows, with 20 to 30 acres to the plow.

Of the farms in Wilcox County, 16.5 per cent are operated by owners and practically all the remainder by tenants. Leases are on either a cash or share basis. Cash rent ranges from 50 cents to \$2.50

per acre, according to the productiveness of the soil. Where leased on a share basis there are two forms of agreement of about equal popularity. Under the "half-share" plan the landlord furnishes the land, stock, and tools, and receives one-half of all crops; under the "renter" plan the tenant furnishes his own stock and tools and the landlord receives one-third of the corn and one-fourth of the cotton. Fertilizer expense is divided in the same proportion as the crops.

The census of 1910 gives the average value of farm land as \$8.94 an acre. Land values range from \$2 to \$75 an acre, depending on its desirability for farming and location with respect to towns. The lowest values obtain over the hilly, broken areas of cut-over timberlands some miles distant from towns and railroads, and the highest values over the more nearly level lands of desirable location. The black prairie lands, well suited to general heavy farming, range in value from \$15 to \$40 an acre, the bottom lands along the principal streams have about the same value, and the upland soils of wide occurrence average from \$8 to \$20.

SOILS.

Wilcox County lies wholly within that part of the United States known as the Gulf Coastal Plain. The soils of the county may be separated into two general groups, on the basis of origin and of manner of formation—the upland soils, or the "hill lands," and the alluvial soils, or "made lands," of the stream bottoms.

The upland soils are all derived from the weathering of marine deposits, consisting chiefly of unconsolidated sands, sandy clays, and clays, though there is a relatively small extent of black prairie soils, derived from soft chalky or partially indurated limestone.

The two important groups of calcareous rocks are the Rotten Limestone found in the northeastern corner of the county, which weathers into the Houston clay, and the Ripley group, found in the same general section, with outcrops at intervals across the northern part of the county. This latter group consists mainly of sands, with thin beds or ledges of limestone, and it forms a rather broken country, owing to the difference in weathering of the sands and the limestone. The soils, which belong mainly in the Houston, Susquehanna, Oktibbeha, and Crockett series, with small areas of Ruston and Norfolk, are largely sandy in character, though often stiff and heavy.

The Tertiary (Eocene) deposits are represented by groups of the Clayton, Lignitic, and Claiborne stages, and, in point of extent, have contributed more to the soils of the area than any other geological horizon. While the Tertiary groups are distinct in a geological sense, they do not differ enough in soil-forming features to impart any

marked characteristic to the soils derived from them, and the same type of soil may be derived from more than one of the groups. The Susquehanna soils predominate over the areas of this formation, with smaller areas of the Ruston, Norfolk, and Orangeburg types.

The Clayton stage is best evidenced in the eastern part of the county. It includes two varieties of limestone material—a ledge of rather pure limestone, often occurring in rounded, bowlderlike masses, and a sandy limestone occurring as thin ledges that break readily into blocks. This latter variety disintegrates into a loose, sandy limestone soil, recognized as the Houston fine sandy loam. The other variety of limestone is often associated with yellowish to brownish heavy clays that contribute to the Susquehanna and Oktibeha types, and occasionally fragments of this rock are encountered in the Orangeburg soils. Owing to the resistance to weathering of the harder ledges capping the hills and ridges and resting upon the Cretaceous sands, erosion has produced a broken surface configuration by cutting broad valleys through the less resistant sandy formations. The Lignitic stage includes formations of the Black Bluff, Naheola, Nanafalia, and Bells Landing groups, chiefly, all of which occur most extensively in the western and southern parts of the county, giving rise mainly to soils of the Susquehanna, Ruston, and Norfolk series. The Claiborne stage is conspicuous in the southern part of the county through the abundance of buhrstone fragments in the Susquehanna soils, which have a very rolling to hilly and broken topography. There are evidences of its occurrence in smaller areas in other parts of the county.

The Greenville and Orangeburg soils are derived largely from sands, sandy clays, and gravelly sands on the ridge tops in the eastern part of the county.

The alluvial soils, including the first and second bottoms, are of recent age. This group includes the Congaree, Ochlockonee, Trinity, Catalpa, and Thompson series in the first bottom and the Amite, Chattahoochee, Cahaba, Leaf, and Kalmia series on the second bottoms or terraces.

The soils are grouped in series, on the basis of color, origin, method of formation, topography, and drainage, etc., and each series is further divided into individual soil types, the unit of mapping, on the basis of texture. Some of the types have variations sufficiently marked to justify the mapping of type phases.

Thirty-five soil types, representing 19 series, are mapped in Wilcox County. The soils range from loose, incoherent sands to heavy, sticky clays.

The upland soils are classed with the Ruston, Orangeburg, Norfolk, Susquehanna, Greenville, Houston, Sumter, Oktibbeha, and Crockett series.

The Ruston soils occur in relatively small areas over the rolling uplands, mainly in the southeastern and central parts of the county. Two types are mapped, the sandy loam and fine sandy loam. The series is characterized by gray to grayish-brown surface soils of sandy character, underlain by a reddish-yellow to yellowish-red or reddish-brown sandy clay subsoil, which is usually friable in structure, though occasionally stiff and somewhat plastic.

The Orangeburg series is represented by two types, the sandy loam and fine sandy loam. These soils occur in small patches and narrow strips capping some of the higher, well-rounded and flat-topped hills and ridges and in small bodies scattered over the level elevations in the wide river bends. The series includes gray to grayish-brown, sandy surface soils, underlain by a bright-red to brick-red, friable sandy clay subsoil.

The Norfolk series is encountered in small bodies on the lower stream slopes of smooth topography and over the level areas adjoining the Alabama River. The series has gray to pale-yellowish, sandy soils, with yellow, friable sandy clay subsoils, which are occasionally quite plastic at lower depths and frequently mottled with gray or brown. Two members of the Norfolk series are encountered in Wilcox County, the sand and fine sandy loam.

The surface soil of the sandy loam types of the Susquehanna series is gray to grayish-brown; that of the clay type is red to brown. The subsoils consist of red to reddish-brown, heavy, plastic, impervious clay mottled with gray, yellow, brown, and red at lower depths. These soils are extensive in Wilcox County, and occupy a large part of the upland areas. Five types are mapped.

The Greenville series is represented by a single type, the sandy loam. This soil occurs chiefly over the high, level elevations adjacent to the Alabama River. The Greenville soils are characterized by red to brown surface soils, underlain by a deep-red, friable sandy clay subsoil, which may be quite sticky and plastic when wet.

The Houston soils occur in the black limestone prairie region. They have dark-gray to black surface soils, and drab to yellowish or whitish clay subsoils, resting upon partially rotted limestone, which is generally encountered at depths varying from 24 to 48 inches. Two types are mapped in this county, the fine sandy loam and the clay.

The Sumter series comprises the light-colored limestone prairie soils and is closely associated with the Houston. The surface soils

are light gray, yellowish-gray, or whitish. The subsoil is yellow to white and rests at varying depths, usually between 10 and 30 inches, upon the white rotten limestone. Outcrops of this limestone are frequent. Only one type, the clay, is mapped. It occurs in the eastern part and near the northwestern corner of the county.

The Oktibbeha series is characterized by gray to reddish-brown or brown surface soils, underlain by a mottled gray, yellow, brown, and red, heavy, plastic, impervious clay subsoil. Two members of this series are mapped, the sandy loam and clay. These soils are closely associated with the limestone soils, although they are non-calcareous. They have been influenced by limestone, particularly where the limestone occurs at depths of 15 to 30 inches and in places outcrops. They are locally known as "red prairie land." The sandy loam type has a brownish-yellow, stiff, heavy sandy clay subsoil, which is quite sticky and tenacious when wet.

The Crockett series is represented by one type, the clay. This soil occurs in the northwestern corner of the county, in close association with the Houston and Oktibbeha soils. It has a dark-gray to black clay loam to clay surface soil, similar to the soil of the Houston clay, underlain by a mottled gray, brown, yellow, and red, heavy, plastic, impervious clay subsoil, like that of the broad areas of the Oktibbeha clay.

The alluvial soils are included in the Leaf, Kalmia, Cahaba, Chattahoochee, Amite, Trinity, Catalpa, Ochlockonee, Congaree, and Thompson series.

The members of the Leaf series, the fine sandy loam and silt loam, are the predominating soils of the second bottoms, or terraces, along the larger streams. They have gray surface soils, underlain by mottled gray, yellow, brown, and red, heavy, plastic clay subsoils.

The Kalmia series includes important terrace soils found generally in small bodies along the main streams. Three types are mapped, the fine sand, fine sandy loam, and very fine sandy loam. The series is characterized by gray soils and yellowish to mottled yellow and gray, friable sandy clay subsoils.

Three members of the Cahaba series are encountered on the terraces along the Alabama River, the sand, fine sandy loam, and silt loam. These types have gray to brown surface soils. The subsoil is reddish-brown to brown. It is friable but compact, and is sticky when wet.

The Chattahoochee series is represented by one type, the fine sandy loam. It is rather extensive over the terraces along the Alabama River in the southern part of the county. The Chattahoochee series typically has gray to brown surface soils, underlain by red

to reddish-brown, compact, friable sandy clay subsoils, which are often very sticky when wet.

The Amite series is represented by a single type, the fine sandy loam, which occurs on the Alabama River terraces in the southern part of the county. The series is characterized by red to reddish-brown soils and red to reddish-brown, friable sandy clay subsoils.

The Trinity soils are composed of reworked material from the Houston soils. In this county this series is represented by one type, the clay. It is found along the first bottoms of the streams flowing through or issuing from the limestone region. The soils characteristically are black, of heavy texture, and underlain by a black to light-drab subsoil which is often mottled with gray and brown at lower depths.

The Catalpa series also is represented only by the clay type. This series is characterized by grayish-brown to reddish-brown surface soils and lighter brown subsoils. It consists of dark-colored, brown to dark-brown poorly drained first-bottom material. The surface soil is calcareous, owing to the fact that it is composed of wash from limestone soils. As a rule the Catalpa soils are most typically developed along the outer edges of the valleys near the slopes of the Houston soils. The soil in Wilcox County occurs in small bodies along Wolf, Cedar, and Indian Creeks, in the eastern section.

The Ochlockonee series consists of first-bottom alluvial soils of sedimentary origin having brown surface soils and lighter brown subsoils, occasionally mottled with gray and shades of yellow and brown. Two members of this series, the fine sandy loam and the silty clay loam, are encountered in Wilcox County. These soils occur generally as narrow marginal strips of overflow land along practically all the smaller streams of the county.

The Congaree series consists of brown to slightly reddish brown surface soils, underlain by a lighter brown subsoil, often mottled with gray, drab, and shades of brown at lower depths. These soils occur on the first bottoms along the Alabama River, and are composed in a large measure of wash from the residual soils of the Piedmont region. Two types are recognized in Wilcox County, the fine sandy loam and silt loam.

The Thompson series is characterized by grayish-brown soils and yellow subsoils, which usually are mottled with gray and shades of brown and yellow. One member of this series is mapped, the silt loam. It occurs along McCalls Creek in the southwestern part of the county.

The following table gives the name and the actual and relative extent of each soil mapped in Wilcox County:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Susquehanna clay.....	13,056	15.6	Houston clay.....	3,008	1.5
Hilly phase.....	62,720		Stony phase.....	5,696	
Stony phase.....	13,824		Orangeburg fine sandy loam..	8,704	1.5
Susquehanna fine sandy loam.	63,232	14.3	Kalmia very fine sandy loam.	8,320	1.4
Hilly phase.....	19,200		Norfolk fine sandy loam.....	7,680	1.3
Susquehanna gravelly fine sandy loam.....	41,792	7.2	Susquehanna sandy loam.....	7,296	1.3
Leaf fine sandy loam.....	37,760	6.5	Greenville sandy loam.....	6,400	1.3
Oktibbeha clay.....	28,800	5.5	Heavy phase.....	832	
Mixed phase.....	2,688		Crockett clay.....	6,336	1.1
Congaree silt loam.....	31,040	5.4	Trinity clay.....	6,272	1.1
Ochlockonee silty clay loam...	23,808	5.1	Catalpa clay.....	6,080	1.1
Poorly drained phase.....	5,376		Cahaba silt loam.....	5,184	.9
Ochlockonee fine sandy loam..	19,904	3.4	Thompson silt loam.....	5,184	.9
Cahaba fine sandy loam.....	17,152	3.0	Chattahoochee fine sandy loam.....	4,992	.9
Ruston fine sandy loam.....	16,640	2.9	Cahaba sand.....	4,928	.9
Sumter clay.....	16,000	2.8	Houston fine sandy loam.....	4,288	.7
Leaf silt loam.....	12,160	2.1	Oktibbeha sandy loam.....	4,096	.7
Susquehanna very fine sandy loam.....	11,136	1.9	Kalmia fine sand.....	2,112	.4
Ruston sandy loam.....	10,880	1.9	Congaree fine sandy loam.....	1,920	.3
Norfolk sand.....	9,920	1.7	Amite fine sandy loam.....	1,536	.3
Orangeburg sandy loam.....	9,280	1.6			
Kalmia fine sandy loam.....	8,768	1.5	Total.....	576,000

RUSTON SANDY LOAM.

The Ruston sandy loam consists of a gray to grayish-brown, rather light sandy loam, underlain by a dull brownish red to yellowish-red, compact, friable sandy clay. The surface soil varies in depth from 5 to 15 inches; the deeper areas have a gray color and the shallower areas are brownish with small spots of the subsoil exposed in places on the steeper slopes. The sand content varies from coarse to fine with the medium texture predominating. Occasionally a few rounded pebbles are encountered on the surface with a scattering of small, brown iron concretions in places. Slight local variations occur in the color and structure of the subsoil. Quite often there is a subsurface stratum of yellow heavy sandy loam forming the upper subsoil, but this quickly passes into the typical subsoil material. Also the subsoil may be markedly stiff and compact, and in places very plastic, with considerable gray, brown, and yellow mottling at lower depths.

A gravelly variation of this type, shown on the soil map by gravel symbols, is encountered where the content of rounded quartz gravel on the surface and in the soil ranges from 10 to 25 per cent of the soil mass. The aggregate acreage of this soil is small, and it is of

little agricultural importance. It occurs usually on slopes and on some low, well-rounded hills and knolls. Often the admixture of gravel extends to 3 feet, though the depth of the surface soil is about the same as that of the main type. The steeper slopes are not cultivated, but otherwise the variation is farmed in connection with the typical soil. It receives similar treatment, and similar methods of cropping are employed. The productiveness is about the same as that of the typical soil.

The Ruston sandy loam is mapped in small areas well distributed throughout the county, the largest area occurring at Arlington. The type is encountered usually on the higher elevations, lying above the Susquehanna soils, or in smooth areas in close association with the Norfolk and Orangeburg soils. The topography is prevaillingly undulating to gently rolling or sloping, and drainage is well established. Erosion is seldom excessive.

Owing to the small extent of the type, it is not very important in the agriculture of the county, although it is generally recognized as a very desirable soil for light general farming. Its structure and surface relief are favorable to its permanent improvement. It has a wide adaptation for crops, is rather easily handled with fairly light farm equipment, and can be made very productive. Approximately 85 per cent of the type is under cultivation.

Cotton and corn are the principal crops. Cowpeas and velvet beans usually are planted in a part of the corn crop as late forage for stock. Oats, sweet potatoes, peanuts, sugar cane, and vegetables generally are grown in patches. Average yields of most all crops are good. Cotton yields are low owing to the ravages of the boll weevil and the discontinuance of the use of commercial fertilizers, one-eighth to one-fourth bale per acre being obtained, where normal yields would range from one-third to three-fourths bale. Corn yields from 15 to 35 bushels, with an average of about 20 bushels per acre.

The practices common to the county in growing cotton and corn are followed on this type. Small areas may be seeded to winter oats; otherwise the land lies idle until the succeeding spring, when it is again prepared for cotton and corn. No commercial fertilizers are used at present. In places barnyard and compost manures are applied, and occasionally green-manure crops are grown.

The Ruston sandy loam is valued at \$5 to \$25 an acre, depending on improvements and location with respect to towns and transportation facilities.

To increase its productiveness this soil should be supplied with large quantities of vegetable matter, either in the form of barnyard manure or green crops plowed under. There is a general need for more thorough preparation of the seed bed, seed selection, systematic

crop rotation with winter cover crops, liming, and frequent shallow cultivation during the growing season. Oats, rye, cowpeas, velvet beans, soy beans, clover, vetch, peanuts, sugar cane, watermelons, cantaloupes, cucumbers, potatoes, small fruits and berries, and various garden vegetables are successfully grown on this soil in many sections of the South. Pecans and certain varieties of tobacco would probably do well.

RUSTON FINE SANDY LOAM.

The Ruston fine sandy loam consists of a gray light fine sandy loam 6 to 12 inches deep. The subsoil is a reddish-brown to reddish-yellow, friable fine sandy clay, often mottled at lower depths with shades of dull brown. The surface of the uncultivated areas to a depth of a few inches has a darker gray color, owing to a relatively high content of organic matter. A scant sprinkling of rounded quartz gravel is often encountered in local areas. The subsoil occasionally shows a marked compactness and a tendency to stickiness and plasticity on lower slopes and in low-lying areas.

This type occurs rather extensively in the vicinity of Camden and in Gees Bend. Small areas are well scattered over the county, occurring on the upper elevations of low, well-rounded or flat-topped hills and ridges and on gentle slopes. The type has a rather smooth topography. Natural drainage is well established as a rule, though spots at lower elevations are subject to the accumulation of seepage waters and have poor drainage. This soil has a relatively large area, and is well suited to crop production, so that it is important in the agriculture of the county. Probably 60 to 75 per cent of the type is under cultivation. The forested areas support a growth of oak, pine, and hickory, chiefly, with a scattering of other native trees.

Cotton and corn are the principal crops. Some attention is given to oats, cowpeas, soy and velvet beans, peanuts, sweet potatoes, sugar cane, and garden vegetables, which are grown in patches in all parts of the type. Normal yields of cotton before the fields became infested with the boll weevil and before the use of fertilizers was discontinued ranged from one-fourth to three-fourths bale to the acre, but under present conditions the yields range from one-eighth to one-fourth bale. Corn yields from 15 to 35 bushels, with a probable average of 25 bushels. Oats do well, yielding from 20 to 35 bushels, though they are usually cut and fed in the sheaf. Other minor crops give average returns.

This soil is handled according to the prevailing practices in the county, which take into small account any matter of permanent improvement. It usually is plowed broadcast in the spring and later bedded for cotton. Corn is more generally planted level. Often

crops are planted without any broadcast plowing of the land, a water furrow being run on the old seed bed, in which the seed is planted either by machine or by hand. Small quantities of barnyard manure occasionally are distributed over a part of the cotton or corn lands. Velvet beans, soy beans, or cowpeas are planted in a part of the corn crop both for winter field forage and for soil improvement. Usually nothing is done to the land following the maturity of summer crops until the succeeding spring. Small fields of winter oats may be seeded on corn land. No commercial fertilizers are used on account of the high cost.

This type has a value of \$5 to \$25 an acre, depending on improvements and nearness to towns and transportation lines.

The Ruston fine sandy loam is a light soil and is easily cultivated with ordinarily light farm implements under a reasonably wide range of moisture conditions. It responds readily to good treatment and is considered a very desirable soil for light general farming. Continual cropping to cotton and corn reduces its productiveness. The incorporation of organic matter, preferably in the form of barnyard and compost manures, is needed. In the absence of sufficient quantities of these manures green cover crops, preferably some legume, like cowpeas or bur clover, may be plowed under to advantage. Lands should be handled with a view to the conservation of soil moisture. Winter cover crops should be seeded and frequent shallow cultivation practiced during the summer months. A carefully planned rotation of crops should be followed. Liming would be beneficial. Oats, rye, soy beans, velvet beans, bur clover, vetch, peanuts, cowpeas, sugar cane, berries, and certain varieties of tobacco are grown successfully in many sections of the South on this type of soil.

ORANGEBURG SANDY LOAM.

The soil of the Orangeburg sandy loam consists of a light-gray to slightly brownish light sandy loam. The sand grains vary in size from fine to coarse, with the medium texture predominating. In places a low percentage of small, rounded quartz gravel is scattered over the surface and through the soil. The subsoil is a red, friable sandy clay, which extends to a depth of 3 feet or more.

The depth of the surface soil is variable, ranging from 6 to 20 inches with an average of 6 to 12 inches. The deeper phases invariably have a very light surface soil, often consisting of a loamy sand. In the vicinities of Pine Apple, Oakhill, and Snow Hill, where the topography is hilly to rolling, the type occupies the crests of the flat-topped and well-rounded hills and ridges of intricate occurrence, and the surface soil is often deep enough in small areas to warrant the separation of a deep phase of the type, but the area of such soil is

so small and the individual areas so difficult to outline that they can not well be indicated on the map. It is not unusual to find on these hills and ridges a small patch, an acre or less in size, of Norfolk or Ruston sand on the crest, surrounded by the Orangeburg sandy loam which extends to the edge of the slopes where the impervious, plastic clays of the Susquehanna soils occur. These small areas of sand can not be mapped separately, and are included with the Orangeburg sandy loam type. In the vicinity of the sand areas there is a tendency toward a coarser texture than is typical.

An appreciable variation occurs also in the character of the subsoil over the rolling to hilly areas. The type has a superficial mantle of sands and friable sandy clays, of varying thickness, over a deposit of impervious, plastic, mottled clays, and the subsoil of the shallower variations of the type is often rather sticky. There is a distinctive variation of the subsoil in the eastern part of the county, where the type occupies only the higher elevations, and the soils of the surrounding slopes and lower lying country are derived from limestone and stiff clays and are classed with the Houston, Oktibbeha, and Susquehanna series. This variation consists of a subsoil having a red to reddish-brown color, a rather close, sticky structure, and a high content of mica reduced to minute flakes. The material is decidedly friable. This material differs in origin from the typical, being closely associated with the formations that weather into the Susquehanna soil.

The gravelly areas of the Orangeburg sandy loam shown on the map by gravel symbols are very unimportant in the agriculture of the area. They occur in only a few patches, usually on gentle slopes or on small well-rounded knolls. The gravel constitutes from 10 to 35 per cent of the soil mass and consists of rounded quartz pebbles, varying in size from very fine to an inch or two in diameter.

The level to gently sloping areas are used the same as the typical areas, and where the content is low the gravel does not affect tillage. The more sloping gravelly areas are seldom cultivated. Occasionally small patches occur where the red friable sandy clay is overlain by 3 feet or more of a mixture of sand, gravel, and small quantities of clay. These places usually are referred to as "gravel pits."

The Orangeburg sandy loam is mapped in small bodies scattered throughout the county. It occupies level to gently sloping areas on the higher elevations. The aggregate acreage is small. Little of this soil is found in the western and northwestern parts of the county, where extensive areas of the Susquehanna, Houston, and Oktibbeha soils occur. The type is of sedimentary origin, derived from the weathering of a number of geological formations that consist of

sands and sandy clays, principally from the so-called "Lafayette mantle" of Pleistocene time and from deposits of Eocene-Tertiary age. The exact origin of the type is often confusing, as it is difficult to identify different geological formations that include essentially similar materials. However, the type represents materials of a sandy character that have undergone sufficient weathering to produce definite characteristics typical of the Orangeburg series.

The surface features of the type range from level to rolling. There are no very extensive areas; the soil usually is confined to the crests of flat-topped or well-rounded hills and ridges, and occurs in patches or narrow strips. The type shows evidences of advanced oxidation. Drainage is well established. The open, porous character of the surface soil permits a ready absorption of rainfall and the porous, friable subsoil is favorable to subdrainage. The more rolling areas are subject to erosion.

The Orangeburg sandy loam is highly esteemed for light general farming, although, owing to its small area, it is not of great importance in the county's agriculture. A large part of the type, probably 80 per cent, is under cultivation. The native timber growth consists of red oak, white oak, post oak, water oak, and yellow pine, principally, with a scattering of hickory, gum, elm, and cedar.

The type is planted to cotton and corn as the chief crops, with oats, cowpeas, soy and velvet beans, peanuts, potatoes, and vegetables as minor subsistence crops. Cotton yields averaged about two-fifths bale, with a range of one-fourth to 1 bale to the acre, prior to the advent of the boll weevil. At present the yields range from one-tenth to one-fourth bale. Corn yields from 15 to 30 bushels per acre, oats from 12 to 30 bushels, peanuts from 15 to 25 bushels, potatoes 50 to 75 bushels, and sweet potatoes 60 to 85 bushels. The average yields of other crops are good.

The methods of handling this soil are similar to those generally practiced throughout the county. The land is indifferently prepared in the spring for the summer crop of cotton or corn. In some instances broadcast plowing precedes bedding. Little commercial fertilizer is used. Mixtures low in potash and nitrogen, or without these ingredients, are used sparingly, usually at the rate of about 100 pounds to the acre. Velvet beans or cowpeas are seeded quite generally in the corn fields, and small patches of winter oats may be seeded in the fall. Oats usually are followed by cowpeas.

The type has a value of \$10 to \$25 an acre, depending on improvement and nearness to towns and railroads.

The efficiency of this type can be increased by the addition of organic matter, preferably in the form of barnyard or compost manure, by the rotation of crops, including legumes, by liming, and by frequent tillage during the growing season. The type should give

heavy yields of oats, peanuts, bur clover, cowpeas, soy and velvet beans, onions, tomatoes, sugar cane, strawberries, cucumbers, melons, and other medium-early truck crops. Pecans seem to do well.

ORANGEBURG FINE SANDY LOAM.

The surface soil of the Orangeburg fine sandy loam is a gray to slightly brownish light fine sandy loam, having an average depth of 8 to 10 inches. The subsoil is a bright-red to brick-red, friable sandy clay, which usually extends to a depth of 3 feet or more. The surface soil varies in depth from 5 to 18 inches, and occasionally carries a light sprinkling of small rounded gravel, less often a few iron concretions, and very rarely fragments of iron sandstones. The deeper areas of the type have a very light surface soil, often consisting of a fine sand or loamy fine sand.

There are some variations in the character of the subsoil, principally in the rolling areas of the type in the eastern part of the county. The soil-forming material seems to overlie the heavy, plastic clays of the Susquehanna types, and where the underlying clays lie within a few feet of the surface they impart a very appreciable stickiness to the overlying Orangeburg subsoil. Also, there is a very noticeable quantity of finely divided mica in the red, friable subsoil.

The Orangeburg fine sandy loam is similar in occurrence to the sandy loam type of the series, being encountered in small areas in high positions, and scattered throughout the uplands of the county. Little of the type is found in the western and northwestern sections.

The topography of the Orangeburg fine sandy loam varies from level to rolling or sloping. The type occurs in patches or narrow strips, usually on the crests of well-rounded or flat-topped hills and ridges. The natural drainage is well established. The open character of the surface material permits a ready absorption of rainfall, and the porous, friable nature of the subsoil gives good subdrainage. The sloping areas are inclined to wash and gully.

The type is not extensive in this county and it has no great agricultural importance. It is a very desirable soil, however, and a very large percentage of it is under cultivation. The forested areas support a growth of white oak, post oak, water oak, and yellow pine principally, with a scattering of hickory, gum, elm, and cedar.

Cotton and corn are the principal crops grown, with patches of oats, cowpeas, velvet beans, peanuts, potatoes, sugar cane, and vegetables as minor crops for home use. Cotton ordinarily yields one-third to three-fourths bale per acre, though under boll-weevil conditions for the last two years yields have been only one-tenth to one-

fourth bale per acre. Corn yields 15 to 30 bushels, oats 12 to 30 bushels, though the crop is seldom thrashed, and sweet potatoes 60 to 85 bushels per acre. Other crops give fairly good yields. Practically no fertilizers are used at present, except that some manure is applied in very small areas.

There is little, if any, difference between this soil and the Orangeburg sandy loam in the matter of utilization, methods of handling the soil, selection of crops, adaptation, yields, and value.

The soil is light and is easily handled with a light farm equipment. It responds readily to good treatment, and is capable of being made highly productive for light general-farm crops or special crops. Indifferent methods of treatment result in low yields. The soil is easily affected by drought, and attention should be given to the storing of moisture in the soil and the prevention of excessive evaporation. This can be accomplished by adding large quantities of organic matter, with frequent shallow tillage during the growing season. Barnyard and compost manures are preferable as a source of organic matter, but in their absence green manuring should be practiced. Legumes, such as cowpeas, velvet beans, and soy beans, should be grown frequently in some system of rotation. In order to maintain heavy yields of staple or special crops, the use of high-grade commercial fertilizers in liberal quantities is necessary.

This is a light, warm, early soil, and is admirably adapted to berries, sweet potatoes, cowpeas, peanuts, oats, and various truck crops. A good quality of Cuban tobacco is grown on this type of soil in other parts of the State and of the South.

NORFOLK SAND.

The Norfolk sand consists of a gray, loose, and incoherent medium quartz sand, about 8 inches deep, underlain by a light-gray to slightly yellowish material of similar texture which extends to a depth of 3 feet or more without appreciable change. The surface few inches carries a small percentage of organic matter, and in forested areas this is sufficiently high to give a dark-gray color. Some small gravel generally is present.

Variations of small extent occur in this type, the principal one being that in which the lower part of the 3-foot section is decidedly loamy. Below 24 to 30 inches the sand gives way to a light sandy loam of yellow, brown, or reddish color, depending on the color of the underlying sandy clays.

On the lower slopes of some of the small stream valleys in the central and southeastern parts of the county patches of a gray fine sand, underlain by a yellowish fine sand are encountered. Such areas, if of sufficient extent would be mapped as the Norfolk fine

sand. The type includes also local patches of a gray to brownish medium sand resting upon a yellowish-red to reddish-brown sand. These areas belong to the Ruston series, but are not of sufficient importance to be shown separately on the soil map.

The Norfolk sand occurs in small areas over the uplands of the county, being more conspicuous in the eastern and southeastern sections. The aggregate acreage is relatively small. The type occurs usually on the crests of well-rounded or flat-topped hills and ridges, or on the lower slopes.

The topography varies from level to rolling or sloping. The level areas are of small extent, and the surface is predominantly rolling. Areas at the base of slopes often represent accumulations of sand washed down by surface waters from adjacent slopes. Drainage is at all times well established. The steeper slopes are inclined to wash and gully rather badly. The underdrainage is good, except where the sand rests upon beds of impervious clays, in which case the land is wet for long periods after rains.

The Norfolk sand is not a very important type in this county. Probably 60 per cent of it is under cultivation. The forested part supports a growth of post oak, blackjack, water oak, red oak, and yellow pine, chiefly, with a scattering of elm, hickory, and gum.

Cotton is the important income crop and corn the principal grain crop. Oats, cowpeas, soy and velvet beans, sweet potatoes, sugar cane, peanuts, and vegetables are grown in small fields or patches. Cotton yields are low under boll-weevil conditions and with the light fertilization given, averaging from one-tenth to one-fifth bale to the acre. Corn yields from 10 to 20 bushels. Other crops give fair returns.

As on most of the soils of the county, the land is bedded for cotton two or three weeks prior to planting. The seed is distributed either in drills by machinery or by hand on the tops of the beds. The planting operation reduces the height of the bed, but not sufficiently to prevent excessive evaporation of soil moisture. Level cultivation apparently is a better method of handling the soil for cotton. Corn usually is planted level.

A light equipment is adequate for handling this light soil. It can be cultivated under a very wide range of moisture. Practically no fertilizers are used at present.

The value of this type varies from \$4 to \$20 an acre, depending upon its improvement and location with respect to towns.

The Norfolk sand is better adapted to special uses than to general farming. It is a light, warm soil of low producing capacity in its unimproved state. Its structure is loose and open, and leaching is very rapid. The addition of large quantities of organic matter is needed as a source of plant food and to make the soil more retentive of

moisture. To obtain large yields on this soil, heavy applications of barnyard manures, frequent shallow cultivation to conserve moisture, and the use of liberal quantities of high-grade fertilizers are required. The type is well suited to the production of cowpeas, velvet and soy beans, peanuts, and melons and various other truck crops.

NORFOLK FINE SANDY LOAM.

The soil of the Norfolk fine sandy loam consists of a gray to slightly brownish loamy fine sand to light fine sandy loam 8 to 15 inches deep. Below this depth there is a heavy fine sandy loam of a yellowish color that quickly passes into a yellow, friable fine sandy clay. This extends to a depth of 36 inches or more and occasionally is mottled with gray and drab at lower depths. In the surface few inches the soil has a slightly dark gray color by reason of the presence of some decayed organic matter. This is particularly noticeable in the uncleared areas. The surface soil below 4 to 6 inches is often very compact. The sand grains are mostly of fine texture. Occasional small areas have a medium texture, but these can not be separated satisfactorily on the soil map. In places there is appreciable mottling in the lower part of the 3-foot section, particularly on slopes and in low-lying areas. In the northeastern corner of the county the type shows reddish and brown mottling at lower depths. Also in a few instances the soil has a tendency to decided stickiness and plasticity, which characteristic is due evidently to its association with the heavy Susquehanna and Houston clays.

This type occurs in small bodies well scattered throughout the county, with the most notable occurrences in the vicinities of Camden, Sunny South, Bellview, and north of Clifton Ferry.

The topography ranges from level to gently rolling or sloping. The soil usually occurs on level uplands, on lower slopes, or in smooth, low-lying areas near streams. The surface drainage usually is well established, though occasional areas are wet where the subdrainage is poor or where the soil receives seepage waters from higher slopes.

The type is not very important agriculturally on account of its small extent, although it is recognized as a very desirable soil for light general farming. Probably 60 to 75 per cent of it is under cultivation, the remainder supporting a growth of oak, pine, and gum.

Cotton and corn are the principal crops. Cotton yields from one-tenth to one-fourth bale to the acre under present conditions. Formerly the yields ranged from one-fourth to two-thirds bale. Corn produces from 12 to 25 bushels, with an average of about 18 bushels to the acre. Oats, cowpeas, velvet beans, sweet potatoes, sugar cane,

peanuts, and vegetables are grown in a patchy way with good average yields.

The prevailing practices in farming are followed on this type. Lands are plowed in the spring and later bedded for summer planting to cotton or corn. Light cultivation is carried on at reasonable intervals until the crops are laid by, after which the soil receives no further attention until the following spring. Velvet beans or peas may be seeded in a part of the corn crop as field forage for cattle and hogs in the late fall and winter. Very little commercial fertilizer is used on account of the prevailing high prices. Barnyard and compost manures are applied in small quantities, and green manuring crops are occasionally plowed under.

The type has a value of \$5 to \$25 an acre, depending on improvements and nearness to towns.

The Norfolk fine sandy loam is easily tilled and is responsive to good treatment, has a wide crop adaptation, and is a desirable soil for light general farming. It is in need of vegetable matter, which should be applied either in the form of barnyard or compost manures or by plowing under green cover crops such as cowpeas and clover. Liming is beneficial. Careful seed selection, level cultures, except in low wet areas, crop rotations to include legumes, and frequent shallow cultivation of summer crops are required for best results with crops on this soil. The type is used in many sections of the South for the successful production of garden vegetables, sweet potatoes, watermelons, cantaloupes, cucumbers, sugar cane, and certain varieties of Cuban tobacco.

SUSQUEHANNA GRAVELLY FINE SANDY LOAM.

The soil of the Susquehanna gravelly fine sandy loam is a gray fine sandy loam or medium sandy loam, prevailing from 5 to 10 inches deep. Varying quantities of rounded quartz gravel are scattered over the surface and mixed with the soil. The subsoil is a dull-red to brownish-red, stiff, plastic, tenacious clay, extending to a depth of 36 inches or more, and almost invariably mottled at lower depths with shades of red, gray, yellow, and brown. The surface few inches of soil, especially over the deeper parts of the type, is ordinarily a gray fine sand or loamy fine sand which grades into a yellowish to reddish-brown fine sandy loam overlying the heavy red clay subsoil.

The depth of the surface soil varies from 2 to 24 inches, with numerous small spots where the light sandy covering has been entirely removed exposing the red clay, and deeper areas on some of the lower slopes where the light sandy material carrying gravel is 36 inches or more in depth. The rolling to hilly areas include

many small patches of gravelly sand, gravelly loam, and gravelly clay loam. The texture of the soil varies from fine to medium, with the finer grade largely predominating. The subsoil usually carries noticeable quantities of finely divided mica flakes. These very frequently impart a greasy feel and a crumbly, friable structure to the material when moderately dry.

This type is found generally over the uplands in the central part of the county. It occurs largely along stream slopes and is most extensive south of Camden, in the "Grampian Hills," where it is found in broad, uniform areas associated with other types of the series. The soil is of sedimentary origin, derived from the weathering of a number of geological formations of Eocene-Tertiary and Cretaceous ages, consisting chiefly of interbedded clays, sandy clays, and sands.

The topography ranges from rolling to hilly or sloping, and the natural drainage is well established. The more steeply sloping areas are excessively drained and are subject to considerable erosion. The run-off is large, because of the impervious character of the underlying clays, which prevents the ready absorption of rainfall.

The type is extensive. It has a low agricultural value. A large part has a surface unsuited to farming. Probably 15 to 20 per cent is under cultivation. The untilled areas are used for forestry or as pasture for cattle and hogs. Shortleaf and longleaf pine, oak, hickory, gum, and poplar are the principal trees. A large part of the forest growth has been cut.

Cotton and corn are the important crops. The usual supplementary crops are grown in a small way. Cattle raising and hog raising are industries that are being generally developed. Yields of all crops are about the same as on the fine sandy loam type.

The soil is handled in cultivation according to the prevailing practice and little attention is given to soil improvement.

This type has a value of \$4 to \$20 an acre, depending on the quality of the standing timber, nearness to towns, and character of the improvements.

In general, this type of soil is in need of the same treatment as the Susquehanna fine sandy loam.

SUSQUEHANNA SANDY LOAM.

The Susquehanna sandy loam consists of a gray to brownish sandy loam 6 to 10 inches deep, underlain by a red to brownish-red, heavy, stiff, plastic, and tenacious clay subsoil, extending to a depth of 36 inches or more and mottled at lower depths with gray, yellow, and brown.

This soil is found principally along the slopes of Turkey Creek in the southeastern part of the county, and to the east of Camden, with

a few scattered patches elsewhere in the southern part of the county. The surface is gently rolling to rolling or sloping, and surface drainage is well established. The impervious character of the subsoil prevents any ready movement of soil water, and underdrainage is poor. Normal rainfall sinks into the porous surface soil very readily, but heavy rains result in a rapid run-off with considerable erosion. Low-lying areas at the base of slopes often remain wet or moist for long seasons on account of the accumulation of seepage waters from higher lying areas. The soil is droughty in summer.

The Susquehanna sandy loam is inextensive and of little agricultural importance in this county. Probably 40 to 60 per cent is under cultivation. The remainder supports a growth of yellow pine, with a sprinkling of oak, hickory, and gum. Cotton and corn are the chief crops grown, and cattle raising is carried on in a small way by nearly every farmer, so that much of the uncultivated part of the type is used as pasture land. The usual minor crops of oats, cowpeas, velvet beans, peanuts, sweet potatoes, sugar cane, and vegetables are grown in small fields and patches. Cotton yields under existing conditions are about one-tenth to one-fourth bale per acre. Normal yields prior to the advent of the boll weevil ranged from one-fourth to two-thirds bale per acre. Corn produces from 12 to 25 bushels per acre.

This type is handled like the other upland soils of the county. No commercial fertilizers are used.

The type has a value of \$5 to \$20 an acre, depending on the quality of standing timber, local conditions of improvement, and nearness to towns. This soil has essentially the same crop adaptations as the Orangeburg sandy loam and Ruston sandy loam, though it is generally somewhat less productive than these types, and it requires similar treatment.

SUSQUEHANNA FINE SANDY LOAM.

The soil of the Susquehanna fine sandy loam is a gray to brownish light fine sandy loam 6 to 10 inches deep. The subsoil is a dull-red to brownish-red, stiff, plastic, tenacious clay, which extends to a depth of 36 inches or more, the lower part being characteristically mottled with red, gray, yellow, and brown. The first few inches of soil, particularly in the deeper areas, usually is a gray fine sand or loamy fine sand, which grades through a yellowish to reddish-brown fine sandy loam into the red clay subsoil. Textural variations may occur over small areas, and quartz gravel commonly is scattered over the surface. The subsoil usually carries varying quantities of finely divided mica flakes, sufficient at times to impart a slick, greasy feel and a crumbly, friable structure to the material when dry.

The Susquehanna fine sandy loam occurs rather extensively throughout the county in both large and small areas. It is sedimentary in origin, being derived from the weathering of a number of geological formations of Eocene-Tertiary and Cretaceous ages, consisting chiefly of clays, sandy clays, and sands.

The topography ranges from gently rolling to rolling or sloping, and natural surface drainage is well established. The movement of soil water through the subsoil and the underlying formations is very slow, and the subdrainage is poor. The low-lying, level areas and many of the lower slopes are wet or moist for long seasons, owing to the accumulation of seepage water. The porous surface soil readily absorbs rainfall, but where the impervious subsoil is near the surface a rapid run-off results in considerable surface washing. In many places the mantle of fine sandy loam has been entirely removed, and gullies have been formed.

The type covers a large area and is widely distributed. It is very important in the agriculture of the county. Probably 50 per cent of it is under cultivation, and the remainder is used largely as pasture for cattle and hogs. The native forest growth consists mainly of shortleaf and longleaf yellow pine, oak, hickory, gum, and poplar. These trees are cut for lumber.

Cotton and corn are the chief crops. Cattle raising and hog raising are important industries on both the small farms and the large plantations. Oats, cowpeas, velvet beans, sugar cane, peanuts, sweet potatoes, melons, figs, and various garden vegetables are grown in small patches. Cotton yields from one-tenth to one-fourth bale per acre under present conditions. Before the advent of the boll weevil and with the use of commercial fertilizers, yields of one-fourth to two-thirds bale per acre were obtained. Corn yields from 12 to 25 bushels per acre. Other crops give fair to good returns.

This soil is handled in cultivation according to prevailing methods, which do not take into account any definite plan of soil improvement. Broadcast spring plowing is often practiced, though a large part of the cotton and corn crops is planted in a seed bed prepared by merely plowing a furrow in the old seed bed. Cotton is planted on a ridge, and corn is dropped in a water furrow, except in the low-lying areas that are inclined to be wet, where bedding is the rule. Velvet beans and cowpeas may be planted in a part of the corn crop as late forage for cattle and hogs, and a small acreage may be seeded to oats or bur clover in the fall, but ordinarily no attention is given to the soil from the time the summer crops are laid by until the following spring. No commercial fertilizers are used at present, except some low-grade brands by a few farmers. A scant supply of barnyard manure is applied to some fields. The type has a value of

\$4 to \$20 an acre, with a probable average of \$8 to \$10, the price depending on the quality of standing timber, improvement, and nearness to towns and transportation lines.

The Susquehanna fine sandy loam is a light soil, easily handled with light equipment. It responds readily to good treatment and is capable of being made very productive. Under the continuous cultivation of cotton and corn the surface soil is soon exhausted of organic matter and becomes very light and sandy. The addition of barnyard manure and the plowing under of green cover crops, such as cowpeas, velvet beans, and bur clover, is needed. This increases the water-holding capacity of the soil, which is important in view of the droughty tendency of the type. Crop rotation, to include legumes, and frequent shallow tillage in the summer months are beneficial.

Susquehanna fine sandy loam, hilly phase.—The hilly phase of the Susquehanna fine sandy loam is indicated on the soil map by cross lines on Susquehanna fine sandy loam color. It occurs chiefly in the western part of the county, and is closely related to the hilly phase of the Susquehanna clay, the two phases occupying the same character of country. The essential difference between the two soils is that this phase has a mantle of gray fine sandy loam from 4 to 10 inches deep, while the hilly phase of the Susquehanna clay has had the fine sandy loam covering removed entirely or in large part by erosion. On the steeper slopes of the hilly phase of the fine sandy loam erosion has removed much of the surface covering, or all of it in spots, and this phase includes many patches of the hilly phase of the clay.

This phase has a lower agricultural value than the main type, because of the unfavorable surface features. Cultivation is more difficult, erosion is more active, and yields are lower. In addition to the treatment needed by the main type, the phase must be handled in such a way as to prevent erosion. This may be accomplished by terracing and the growing of winter cover crops.

SUSQUEHANNA VERY FINE SANDY LOAM.

The Susquehanna very fine sandy loam is a gray very fine sandy loam 5 to 9 inches deep, underlain by a red to reddish-brown, heavy, stiff, tenacious clay subsoil, mottled with gray, yellow, brown, and red at lower depths.

The type is rather extensive in the south-central part of the county. It is mapped on both sides of the Louisville & Nashville Railroad in the vicinity of Watson and McWilliams. It occurs in association with other types of the Susquehanna series, chiefly the clay

and the fine sandy loam. The topography ranges from level to gently rolling, with a few areas rather steeply sloping. Surface drainage is well established except in the lower, level areas. The subdrainage is poor by reason of the impervious character of the subsoil. The movement of water through the subsoil is slow, and the type, like the other members of this series, is droughty in the summer unless properly handled in cultivation.

Because of its favorable surface features and its productiveness this is the most desirable type of the series in this county. The extent of the soil gives it some importance, although probably 40 to 60 per cent of it is uncleared. The standing timber consists of shortleaf and longleaf pine, loblolly pine, oak, and hickory, with a scattering of gum, elm, and poplar in most cases.

The principal crops are cotton and corn. Native grasses, lespedeza, Bermuda, sedge, etc., grow well and furnish excellent summer pasturage. A large part of the cleared land is used for pasture, cattle raising in connection with general farming being the principal industry. Oats, cowpeas, velvet beans, peanuts, sugar cane, and potatoes, peppers, tomatoes, and various other vegetables are minor crops. Cotton produces from one-eighth to one-fourth bale per acre. Normal yields before the advent of the boll weevil ranged from one-third to three-fourths bale per acre, with a probable average of one-half bale. Corn produces from 15 to 35 bushels. Other crops give good average yields.

There is no marked difference between the cultural operations on the Susquehanna very fine sandy loam and those on the other upland types of the county. The land is used as open range for cattle during the winter season. The principal form of fertilization is the application of barnyard manure to selected small areas. Cowpeas and velvet or soy beans are occasionally grown with a view to soil improvement, when they may be plowed under. No definite system of crop rotation is practiced.

This type has an average value of \$8 to \$12 an acre, depending on the character of timber or improvement and nearness to towns.

This soil requires a fairly heavy farm equipment. It responds readily to good treatment and can be built up to a state of high productiveness. Large quantities of organic matter should be incorporated with the soil and the land should be plowed deep in the fall, particularly in the case of the shallow areas. The addition of vegetable matter increases the water-holding capacity of the soil, which is highly desirable. The rotation of crops to include the legumes, and the occasional plowing under of a cover crop are highly beneficial. Oats, bur clover, crimson clover, and lespedeza are good winter cover crops.

SUSQUEHANNA CLAY.

The Susquehanna clay is a bright-red to dull-red heavy clay, 6 to 10 inches deep, underlain by a stiff, heavy, plastic, tenacious red clay subsoil, mottled with gray, red, brown, and yellow at lower depths. The surface few inches frequently is loamy, owing to the presence of decayed organic matter or a shallow covering of sandy material. In places rounded quartz gravel is scattered over the surface, and occasionally angular fragments of white siliceous rock may be found. Iron crusts and iron concretions often occur in local areas. Minute mica flakes are present in both soil and subsoil.

This type occurs extensively over the uplands of the county, particularly in the western and southern sections, where it occurs in broad, uniform areas. In the eastern and southeastern parts of the county the type is patchy, though it has a large total area.

The topography in general varies from gently rolling to very rolling or hilly, but there are many small level areas. Drainage is well established, except in the low-lying, level areas. The soil is not readily absorptive of rainfall, and the rapid run-off often causes considerable erosion.

The Susquehanna clay is important because of its extent, although only a small part, probably 25 to 35 per cent, is cleared, and much of this is used as pasture. The intractable character of the soil and its surface slope are unfavorable to its use for crop production. The forested areas support a growth of yellow pine, oak, hickory, gum, and poplar.

The principal crops are cotton and corn; the minor crops are oats, cowpeas, velvet beans, and hay. Stock raising is the most important industry. The soil supports a good growth of native grasses. Lespedeza and bur clover do well, affording good summer and winter grazing. Cotton yields are low, ranging from one-tenth to one-fourth bale per acre. Under favorable moisture conditions, when the crop was not affected by the boll weevil and was fertilized, yields of one-fourth to two-thirds bale per acre were obtained. Corn produces from 15 to 35 bushels, depending on the rainfall during the growing season.

The soil is handled with little attention to its permanent improvement. The usual farm crops are grown with rather indifferent preparation of the land in the early spring. Little fall plowing is done, and the land remains idle through the winter season, and usually is subject to severe erosion.

This type has a value of about \$2.50 to \$15 an acre, depending on the quality of the standing timber, local conditions of improvement, and location with respect to markets.

The soil is heavy and difficult to handle. On account of the close, impervious structure of the subsoil water moves through it very slowly, most of the rainfall being lost as run-off, and the type is droughty in summer. The small streams invariably go dry during the hot season.

In handling this type of soil the first consideration should be the conservation of soil moisture and the prevention of erosion. Deep fall plowing, liming, the addition of organic matter, and frequent shallow cultivation during the growing season are needed to improve the type. Clover, especially bur and Japan clover, grasses, and vetches do well and should be seeded extensively. For best results crops should be rotated and winter cover crops grown. The yields of all crops are increased by the proper use of fertilizers.

Susquehanna clay, hilly phase.—The Susquehanna clay, hilly phase, is shown on the soil map by cross lines on the color representing the Susquehanna clay. It is distinguished from the main type by the surface relief, which ranges from very rolling to hilly. Both the soil and subsoil are similar to the typical, with perhaps a more frequent occurrence of iron crusts and iron concretions. Erosion is more active. In the southwestern part of the county, where the phase occurs in broad, uniform areas, the subsoil is not so plastic as in other sections. This is also true of other Susquehanna soils in the county. The subsoil is rather brittle and crumbly, though very compact and heavy, particularly when dry or only slightly moist. When wet it is more plastic, though not very tenacious. The variation in structure seems to be due to a difference in the original material. Other areas of the phase occur in the southern part of the county, chiefly over the "Grampian Hills" and in places in the eastern part, with a notable occurrence near Allenton.

The agricultural value of this phase is slightly lower than that of the typical soil because of its less favorable surface and the more active erosion. In many areas the slopes are so gullied that agricultural operations of any kind are impossible. About the same proportion of the phase is under cultivation as of the typical soil.

Susquehanna clay, stony phase.—The Susquehanna clay, stony phase, is indicated on the soil map by stone symbols over the Susquehanna clay color. It includes all the areas of Susquehanna soils that carry any large quantity of rock fragments on the surface. The soil material may consist of a very fine sandy loam, fine sandy loam, sandy loam, clay loam, or clay, though the clay texture probably predominates. There is often a sprinkling of rounded quartz gravel, some iron crusts, and a few iron concretions. The fragments consist chiefly of a white siliceous rock, often carrying shell casts. According to tests with acid it is noncalcareous.

The phase occurs in relatively large areas, chiefly in the south-central part of the county in the region known as the Grampian Hills. The topography varies from rolling to hilly or steeply sloping. This land is largely unsuited to any form of tillage and is valuable chiefly as timber and as grazing land. The principal forest growth consists of oak, hickory, and pine. Some areas of the phase can be cultivated after the stones are removed, in which case it would have about the same value as the main type.

GREENVILLE SANDY LOAM.

The soil of the Greenville sandy loam consists of a brown to reddish-brown sandy loam 6 to 10 inches deep. The subsoil is a deep-red to reddish-brown, friable sandy clay, rather dense and compact, and inclined to be sticky and plastic when wet. The surface few inches of this type usually is quite loose, approaching a loamy sand. Occasionally a sprinkling of rounded gravel is encountered, with a few small, brown iron concretions in spots. Included in this type are small bodies of the Greenville fine sandy loam.

The type is found principally in two localities, near Canton Bend and southwest of Rock West Church, with a few scattered areas in the extreme eastern part of the county. The large areas are near the Alabama River terraces, and no doubt the soil was at one time influenced by river action. The small areas in the east cap the high elevations. The surface of the type ranges from level to undulating or gently sloping. Natural surface drainage is slow, but owing to the good subdrainage and the friable, porous structure of the soil all normal rainfall finds a ready outlet to drainage ways.

Owing to its limited extent the type has no great agricultural importance, although it is highly esteemed for general farming and practically all of it is under cultivation. Cotton and corn are the principal crops. The raising of cattle and hogs is becoming an important industry. The usual minor crops are successfully grown in small fields and patches. Before the boll weevil came cotton produced from one-half to 1 bale per acre, but at present yields vary from one-fifth to one-half bale. Corn yields from 20 to 40 bushels per acre, with an average of about 25 to 30 bushels. Other crops give good yields, though not as high as might be obtained with proper fertilization. Very little fertilizer is applied, and only low-grade mixtures are used. Barnyard and green manures are used where available.

The type has favorable surface features, is naturally productive, and is usually cultivated more carefully than less desirable land. It is invariably plowed broadcast, and some areas are plowed in the fall and seeded to cover crops of oats, vetch, or clover. Velvet

beans, soy beans, and cowpeas are often planted in the corn crop for winter field forage for cattle and hogs. Peanuts are grown in a small way for hog pasturage. Oats and clover afford some winter grazing for milch cows.

The type has a value of \$20 to \$35 an acre, depending on its improvement and location.

This is a fairly light soil and is easily handled with a light farm equipment. For improvement it requires about the same treatment as the other upland soils of similar texture.

Greenville sandy loam, heavy phase.—The Greenville sandy loam, heavy phase, is found in a few scattered areas in the southeastern part of the county. It varies from a heavy sandy loam to a light clay loam. The soil prevailingly is a reddish-brown heavy sandy loam 2 to 5 inches deep, grading into a sandy clay loam of similar color, which extends to a depth of 6 to 8 inches. The subsoil is a deep-red to reddish-brown, friable sandy clay, becoming heavier with increasing depth. When wet the soil is sticky and plastic.

The topography is gently rolling to rolling, and drainage is well established.

Under favorable moisture conditions the soil works up into an excellent tilth, but it should not be plowed when wet or dry, as it works into clods that are reduced only with considerable difficulty.

The phase has about the same agricultural importance and produces the same yields of crops as the typical soil. The methods of handling the soil, fertilization, and land values are similar, and it requires the same treatment as the typical soil to increase and maintain its productiveness.

HOUSTON FINE SANDY LOAM.

The soil of the Houston fine sandy loam consists of a rather heavy, sticky fine sandy loam 4 to 8 inches in depth, varying in color from light gray or drab to black. The subsoil usually consists of a few inches of a rather heavy, sticky clay of light-gray to whitish color, quickly grading into whitish, chalky material consisting of partially decomposed limestone. This material lies at shallower depths in areas of this type in Wilcox County than is typical. It becomes harder with increasing depth, and the depth to which the soil auger can penetrate varies from 6 to 24 inches, with a probable average of 10 to 14 inches. The shallow areas of the type represent exposures of rotten limestone on which a few inches of soil is held in place by native grasses. Many spots are entirely bare of vegetation and have a whitish appearance, very similar to exposures of Selma chalk. The deeper variations have a dark-gray to black color and usually occur at the heads of draws, in low-lying, gently sloping positions

or in level areas where there is relatively little erosion. The subsoil of the deeper parts of the type is a whitish to a very light yellowish, plastic clay to a depth of 12 to 15 inches, with splotches of the white, powdery limestone in the lower depths. When dry the subsoil is very brittle. The partially weathered limestone has a soft, powdery feel when dry, and is decidedly sticky when wet.

Varying quantities of angular, hard, unweathered limestone are scattered over the surface in places, particularly on the crests of low knolls and ridges, and in many cases these materially hinder cultivation. Such areas are shown on the soil map by stone symbols. Rock outcrop is often encountered on the steeper parts of the stream slopes.

The Houston fine sandy loam occurs in one large area and a number of small areas a few miles south of Furman. The topography varies from level to gently rolling or sloping and in places hilly, and the drainage is usually well established, though on account of the slow movement of soil moisture the low-lying areas may remain wet for several days following a rain.

The type is not very important agriculturally on account of its small extent and remoteness from markets. Probably one-third of it is under cultivation, the remaining area supporting a young growth of red cedar. The stony areas are used for pasture.

Cotton and corn are the principal cultivated crops, and Johnson grass the chief hay crop. The minor crops common to the region are all grown in small patches. Cattle raising receives considerable attention, and much of the type is in fenced pastures. Hogs, goats, and sheep also are raised in small numbers. While the soil is generally shallow, the type as a whole is well adapted to grasses, and for the most part supports a good growth of native varieties. It seems better suited to stock raising than to general farming.

The former yield of one-half to three-fourths bale of cotton per acre has been reduced by the boll weevil and one-eighth to one-fourth bale is all that can now be expected. Corn yields from 20 to 35 bushels per acre. The minor crops do well. The methods of farming this land do not differ in any essential particular from those in use on other upland soils.

The Houston fine sandy loam has a value of \$5 to \$10 an acre, depending on its improvement.

The soil is naturally very productive, and where deep enough for cultivation is desirable for general farming, though as a whole better adapted to stock raising. Deep fall plowing, the addition of organic matter, the growing of winter cover crops, systematic crop rotation, and the conservation of soil moisture are needed for its improvement. Alfalfa should do well in certain areas.

HOUSTON CLAY.

The soil of the Houston clay consists of a heavy clay 6 to 8 inches deep, varying in color from dark gray to black. The subsoil is a black to dark-gray or drab, waxy clay, which grades with depth into lighter gray material, usually showing a dull-yellowish tinge and passing at 30 to 36 inches into a very light colored chalky material of friable, granular structure, representing decomposed limestone. Small lime accretions and fragments of limestone in many places are encountered on the surface and throughout the soil profile.

There are some rather distinct variations in the type in local areas that are too small to show on the map. Shallow areas may occur on low knolls or slopes where there are some exposures of limestone. Small patches of the Oktibbeha clay are included, where a reddish-brown clay rests directly on the limestone. The deeper areas of the type always show the black coloring in both soil and subsoil, and the shallower variations are gray to dark gray at the surface and yellowish gray in the subsoil.

The most extensive areas of this soil are in the vicinity of Catherine and south of Ackerville. The type is distributed in detached areas, some of large extent, throughout the prairie region of the county.

The topography varies from undulating to gently rolling, and while the surface slope is generally sufficient to insure good surface drainage, the movement of water through the soil is very slow, and tile drainage is often necessary for the best results.

The extensive use and productiveness of this type, including its stony phase, described below, make it one of the more important soils of the county. A very large part, probably 60 to 75 per cent, of the typical soil is under cultivation.

The important crops are cotton, corn, and hay. Johnson grass is the principal hay crop. Cattle raising and hog raising are being developed as primary industries in connection with general farming. Some plantations are almost exclusively devoted to stock raising, with such general farming as is needed to support this main industry. Alfalfa is grown successfully on this type, as are melilotus and other clovers and vetch. Cotton, before the advent of the boll weevil, produced from one-half to 1 bale to the acre without fertilizers, but the present yields range from one-eighth to one-third bale per acre. Corn yields are good under favorable moisture conditions. They range ordinarily from 25 to 40 bushels and yields as high as 75 bushels have been obtained. Johnson grass produces from $1\frac{1}{2}$ to 3 tons of hay per acre, in three cuttings each season. Alfalfa produces from 2 to 3 tons per acre per season, two to four cuttings being made. The growing of this crop for hay and grazing is being ex-

tended in connection with the raising of cattle and hogs. It is a valuable crop to combine with other general farm crops in planning rotation. Oats, cowpeas, velvet beans, sugar cane, and vegetables do well.

Little attention is given to the improvement of this type except by a few progressive farmers. It is naturally a strong soil of lasting productiveness and fair to good yields are invariably obtained. The fields are plowed broadcast with a two-horse plow as early in the spring as possible, and are later bedded for both cotton and corn. Cultivation is performed with the ordinary equipment of sweeps, shovels, harrows, and cultivators. Velvet beans and cowpeas are often planted in a part of the corn crop, and a small acreage of corn land may be seeded to winter oats. Little fall plowing is practiced. Areas to be seeded to alfalfa usually receive fair preparation; thorough preparation is needed for a good stand. The land should be free from weeds and grasses and deeply and thoroughly pulverized, with heavy applications of well-rotted barnyard manure thoroughly worked into the soil. Inoculation and liming are beneficial. Vetch and bur clover can be seeded successfully by merely scattering the seed on any of the grass land. No commercial fertilizers are used on this soil. Barnyard and compost manures are applied and green-manure crops are grown over parts of the type.

The value of the Houston clay averages about \$25 an acre, ranging from \$12 to \$35, according to improvements and nearness to towns and transportation lines.

For improving and maintaining its productiveness the type requires deep fall plowing, the growing of winter cover crops, the addition of large quantities of organic matter, thorough seed-bed preparation, systematic crop rotation, and frequent shallow tillage during the summer months, mainly to conserve soil moisture. The type is well suited to heavy general farming and cattle and hog raising. It is well adapted to cotton, grain, and grass.

Houston clay, stony phase.—The Houston clay, stony phase, is characterized by limestone fragments and limestone outcrops, and if of sufficient extent and importance would have been mapped as the Houston stony clay and shown on the map by distinct color rather than by symbol. Small areas with no appreciable stone content are necessarily included with the phase, though the rock content usually is high enough to interfere with, and in many instances prevent, cultivation. However, the fragments of rock can generally be removed and the land cultivated. The shallower areas on the steeper slopes, where erosion is very active and outcrops frequent, are nonarable.

This phase occurs in the eastern part of the county. The topography is undulating to gently rolling generally, with low ridges and knolls. There are some rather steep and broken areas along the

principal stream courses. A small part of the phase is under cultivation; the greater part is used as pasture for cattle, horses, and hogs.

SUMTER CLAY.

The soil of the Sumter clay consists of a light-gray or drab to dark-gray or black heavy clay loam or clay, 3 to 8 inches deep. This is underlain by a whitish to dull-yellowish clay, which extends to depths ranging from 6 to 24 inches where it passes into partially decomposed limestone. A large percentage of the type has very shallow depth, less than 18 inches, and there are frequent exposures of white limestone. The deeper soil occurs in the level areas or on the low, gentle slopes, and the color is invariably dark gray to black. Very small patches of the Oktibbeha clay are found occasionally capping some of the knolls or low ridges.

This type occurs extensively in the eastern part of the county in rather broad and uniform areas. The soil is derived from the weathering of Cretaceous limestone, apparently the same kind of material that gives rise to the Houston soils.

The surface ranges from gently rolling to rolling, with occasional hilly areas. Natural drainage is well established. The more rolling and hilly sections are subject to erosion. Water moves through the soil mass very slowly, and the deeper areas of the type would be benefited by underdrainage, preferably by the use of tile. The shallow depth of soil generally is due to the rapid run-off of surface waters with attendant erosion.

The type is locally important. A very small part of the type is under cultivation, though several large farms are operated on the type with a marked degree of success. Cattle raising is the principal industry, and most of the type is utilized as grazing land. It affords excellent pasturage in the summer. The areas of deeper soil, where properly managed are probably as valuable for general farming as the Houston clay.

Where the type is not subject to severe erosion and farm operations can be carried on, it requires the same treatment as the Houston clay, and has very largely the same crop adaptations. Alfalfa, melilotus, vetch, bur clover, grass, velvet beans, cowpeas, corn, and oats do well.

The Sumter clay has an average value of about \$15 an acre, with a range of \$10 to \$35, depending on improvements and nearness to towns.

This type is mainly in need of protection against erosion, the addition of organic matter, thorough seed-bed preparation, crop rotation, the growing of winter cover crops, and frequent shallow cultivation during the summer months to conserve moisture. The type is suitable for stock raising.

OKTIBBEHA SANDY LOAM.

The Oktibbeha sandy loam is a gray to brownish sandy loam, 8 to 15 inches deep, underlain by a brownish-yellow to yellowish-brown, stiff, heavy sandy clay subsoil, which is very dense and compact at lower depths. The areas showing the greatest depth of surface soil always have a gray color, while the shallower areas are brownish. There is a high content of rock fragments in small, scattered patches, such spots being indicated on the map by stone symbols. These areas have no value except for grazing.

This type is found chiefly in the northwestern part of the county, and in a number of smaller areas scattered over the prairie region. It appears to be a late deposit of sands and sandy clays over the limestone formation, although the limestone has in a measure influenced the overlying material.

The topography varies from undulating to gently rolling, and the surface drainage is well established. Rainfall is readily absorbed by the surface soil, but the compact subsoil and underlying material make subdrainage sluggish.

The type is not important agriculturally on account of its small extent. Most of it, however, is under cultivation. Cotton and corn are the chief crops. Cattle and hogs are raised to about the same extent as on adjoining soils. Cowpeas, velvet beans, sugar cane, sorghum, peanuts, sweet potatoes, and peppers, tomatoes, okra, and other vegetables are grown successfully. Pecans and certain fruits apparently do well.

Since the arrival of the boll weevil the yield of cotton has been low, ranging from one-eighth to one-fourth bale per acre; formerly yields ranged from one-third to two-thirds bale. Corn yields from 15 to 35 bushels. Other crops do well.

Land of this type is prepared in late spring for summer seeding and allowed to stand without protection through the winter season. A small acreage is seeded to winter oats. Velvet beans, soy beans, and cowpeas are seeded on a part of the corn land at the last cultivation and used as forage for cattle and hogs. Peanuts and sweet potatoes are grown as pasturage for hogs. The small acreage given to special crops is carefully handled to increase and maintain productiveness. In general, however, commercial fertilizers are not used.

This type has a value of \$5 to \$25 per acre, depending on improvement and location with respect to markets.

The soil can be handled easily with light farm equipment, and responds readily to good treatment. The addition of organic matter, the growing of winter cover crops, thorough preparation of the seed bed, rotation of crops, including legumes, and frequent shallow

tillage to conserve moisture are needed for the improvement of this type.

The results of mechanical analyses of samples of the soil and subsoil of the Oktibbeha sandy loam are shown in the following table:

Mechanical analyses of Oktibbeha sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
415205.....	Soil, 0 to 12 inches.....	0.3	15.7	16.4	39.6	6.5	14.7	6.5
415206.....	Subsoil, 12 to 36 inches....	.3	10.6	9.7	23.8	3.9	15.7	35.4

OKTIBBEHA CLAY.

The Oktibbeha clay consists of a reddish-brown to dark reddish brown clay 6 to 8 inches deep, underlain by a mottled gray, yellow, brown, and red heavy clay subsoil, which is very plastic, sticky, and impervious. The line of separation between the soil and subsoil is not well defined. The mottling becomes more intense with depth, and the gray color increases. The surface few inches of soil often has a dark-gray to grayish-brown color, particularly in the more nearly level areas where there is little erosion. The type is underlain by limestone, usually at depths greater than 3 feet.

This type occurs in all sections of the limestone area, but more extensively in the northwestern part of the county near Catherine, where it is known as "red prairie land." It is found principally along the outer edge of the prairie region and is invariably associated with the limestone formation. While it does not appear to be derived directly from limestone, it rests upon it and has been fundamentally influenced by it. The soil is noncalcareous and resembles closely the clay member of the Susquehanna series, particularly in subsoil characteristics.

The topography varies from flat to rolling, and natural surface drainage is well established over the rolling areas, but poorly established in the flat areas locally known as "flatwoods." Internal drainage is poor owing to the compact subsoil.

The type is fairly extensive and is rather important in this county. A relatively small acreage is under cultivation, but a fair percentage of the type is used as pasture. The flat areas are difficult to drain and remain in a wet condition for long periods. These are largely forested with oak, hickory, gum, and a scattering of pine.

Cotton, corn, and hay are the principal crops. Cattle raising is an important industry generally and some large holdings are devoted

almost exclusively to that purpose. Pecans seem to do well, though there are no extensive orchards.

The soil of this type is fairly productive when well drained and well tilled. Cotton ordinarily yields from one-third to two-thirds bale under favorable conditions, but the ravages of the boll weevil during the last few years have reduced the yields to one-fourth bale or less per acre. Corn produces 20 to 40 bushels per acre and Johnson grass 2 to 3 tons of hay. Oats, cowpeas, velvet and soy beans, and vegetables give good returns. Peppers, okra, and tomatoes are grown successfully near Catherine.

The type is handled like the Houston clay, little attention being given to permanent improvement. No fertilizers are used and only small applications of barnyard and compost manures. Green cover crops are plowed under occasionally on the better managed farms.

The land sells for \$5 to \$25 an acre.

The Oktibbeha clay is a heavy, intractable soil which can be tilled only within a narrow range of moisture conditions. It requires a heavy farm equipment. It should be plowed deep in the fall and large quantities of vegetable matter added. Liming would be beneficial. Winter cover crops should be seeded and a thoroughly pulverized seed bed prepared for summer planting.

Oktibbeha clay, mixed phase.—The mixed phase of the Oktibbeha clay includes those areas in which the underlying limestone is encountered within the 3-foot section and in which there are many spots of Sumter or Houston clay too small to be separated on the soil map. The soil is a red to brown heavy clay 5 to 8 inches deep, underlain by a reddish-brown, plastic, sticky, heavy clay subsoil, often mottled with gray and yellow, and resting upon decomposed limestone at depths varying from 12 to 30 inches. The phase also includes small areas of light-gray to dark-gray clay underlain by a yellow or white, calcareous clay or rotten limestone.

There is a distinct line of separation between the reddish clays and the limestone formation, with a correspondingly definite line between the calcareous and noncalcareous materials. The reddish surficial clays are not calcareous.

This phase is found generally in small, detached bodies along the outer edge of the limestone area and on the crests of knolls and hills within the limestone soils. It represents a thin mantle of material deposited over the Cretaceous limestone, outcrops of which occur. The origin of the surface material is not definitely known.

The topography usually is rolling or sloping, and surface drainage is well established. The subdrainage is poor.

The principal forest growth is pine, with some oak, hickory, and gum.

CROCKETT CLAY.

The soil of the Crockett clay consists of a very dark gray to black heavy clay loam to clay, 3 to 5 inches deep, passing rather abruptly into a brown to reddish-brown clay which extends to a depth of 6 to 8 inches. The subsoil is a mottled gray, yellow, brown, and red clay, which is very heavy, plastic, and sticky. It is impervious and extends to a depth of 36 inches or more, with the gray mottling usually more intense at lower depths.

This type occurs in the northwestern part of the county near Catherine, where it occupies a number of areas associated with the soils of the limestone prairies. The surface soil appears to be derived from limestone origin, while the subsoil is similar to that of the Oktibbeha clay. In general appearance the type resembles the Houston clay.

The topography varies from flat or undulating to very gently rolling. Surface drainage is well established except in a few low, flat areas. Subdrainage is poor on account of the impervious character of the underlying material.

The type is not very important on account of its small extent, although it is largely utilized as pasture for cattle and hogs and for growing the usual crops of cotton, corn, and hay. In methods of management, utilization, fertilization, adaptation to crops, except to alfalfa, and land values, the type is similar to Houston clay. Crop yields are somewhat lower than on that type. It requires the same treatment as the Houston clay for its improvement.

In the following table are shown the results of the mechanical analyses of samples of the soil and subsoil of the Crockett clay:

Mechanical analyses of Crockett clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
415201....	Soil, 0 to 7 inches.....	0.0	0.5	1.2	8.0	4.0	32.0	54.0
415202....	Subsoil, 7 to 36 inches.....	.0	.3	.4	2.7	2.7	17.7	76.1

LEAF FINE SANDY LOAM.

The soil of the Leaf fine sandy loam consists of a gray fine sandy loam about 6 to 9 inches deep. The subsoil is a dull-red to reddish-brown heavy sandy clay which quickly grades into a stiff, plastic, tenacious clay, invariably showing red, brown, yellow, and gray mottling at lower depths. This type is the second-bottom equivalent of the Susquehanna fine sandy loam. The surface soil varies in depth and in color, the shallower areas usually approaching a brown or

reddish-brown color, while the deeper areas are always gray. There are slight variations in local areas in the character of the subsoil. The higher and better drained areas of the type have a deeper reddish color, a more brittle, compact structure, and less mottling, while the more poorly drained areas are plastic, sticky, and impervious, with increased mottling, in which the red color is often absent and the gray predominates. Occasionally a few small, rounded gravel particles are encountered. This type includes spots and narrow strips of a medium to coarse sandy loam. Such areas are found in the central part of the county on the Alabama River terraces.

The Leaf fine sandy loam is found on the terraces of practically all the larger streams of the county, either in small, detached bodies or in extensive areas occupying the entire terrace on both sides of the stream. It is more extensive in the western part of the county than elsewhere. The soil is of alluvial origin, and composed of wash from the deposits covering the uplands. Parts of the type are subject to frequent overflow, while some areas are inundated only at exceptionally high flood stages.

The topography varies from undulating to flat, and natural drainage usually is deficient. The higher positions are the better drained, the lower areas remaining in a wet or moist condition for long periods. Ditching is necessary in some places before the land can be cultivated.

The Leaf fine sandy loam is extensively developed, and is a soil of considerable agricultural importance. While much of it is uncultivated, it is easily tilled. The topography renders it desirable for farming, and it is being used to an increasing extent. Probably 50 per cent is in use at present, either for pasture or for cultivated crops. The native forest growth consists of pine, oak, beech, and gum.

Cotton and corn are the principal crops. Stock raising is an important industry, and much of the type is devoted to pasturage for cattle and hogs. Cotton yields from one-tenth to one-fourth bale to the acre under present conditions. Normal yields, before the advent of the boll weevil and with the use of fertilizers, averaged one-fourth to two-thirds bale per acre. Corn produces from 15 to 35 bushels. Johnson grass and crab grass grow well on parts of the type and considerable hay is cut, yields averaging about 1 ton to the acre. Other crops do fairly well.

Little attention is given to the permanent improvement of the type. Shallow spring plowing with light equipment is customary. After harvest of the summer crops the land usually lies idle until the following spring, except where small patches of winter oats are seeded on the corn land.

The type sells for \$5 to \$20 an acre, depending on location and improvements.

The Leaf fine sandy loam is a light soil, easily tilled under favorable moisture conditions, and responsive to good treatment. Thorough drainage, the addition of organic matter, crop rotation, the judicious use of fertilizers, and frequent shallow cultivation in the summer are needed to increase its productiveness. Where well drained it has practically the same crop adaptations as the Norfolk fine sandy loam and the Susquehanna fine sandy loam.

LEAF SILT LOAM.

The surface soil of the Leaf silt loam usually is dark gray, but it may be either gray or brownish. It consists of a silty loam, which passes abruptly, at an average depth of about 7 inches, into a stiff plastic clay subsoil of yellowish or reddish color, invariably mottled with gray, drab, and shades of yellow and brown. In some areas the subsoil does not have the characteristic plasticity of the Leaf series, although it is very stiff and compact. Such areas approach the nature of the Cahaba silt loam, being very similar to the heavier variations of that type.

This type is mapped on the second bottoms of the Alabama River, mainly where creeks emerge from regions of heavy upland soils, and in smaller bodies elsewhere along the river. The largest areas of the type are found along James and Goose Creeks. The surface usually is level and often basinlike. Drainage is poor on account of the flat surface and the impervious subsoil. The soil remains in a wet condition for long periods following rainfall, and crops are sometimes drowned out in long rainy seasons. Notwithstanding this the type is very droughty in dry weather. Canals and open ditches are needed to provide good drainage, and frequent tillage is necessary to conserve soil moisture. A large part of the type is overflowed during flood seasons. Owing to its small extent the Leaf silt loam is unimportant. Approximately 50 per cent is under cultivation. The forested areas support a growth of shortleaf pine, beech, sweet and black gum, tulip, magnolia, oak, swamp pine, and some hickory. Corn and Johnson-grass hay are the principal crops, with a small acreage of cotton. The latter matures too late on this soil to be profitable where the boll weevil is plentiful. Some cattle are grazed on the type and where the pastures are cared for the natural grasses make a luxuriant growth, Japan clover being conspicuous.

Corn yields an average of about 20 bushels per acre. Several cuttings of Johnson grass hay are made, with a total yield of 2 to 3 tons to the acre.

In handling this type much depends on the condition of the soil at the time of breaking. It should be plowed when just moist enough to pulverize readily, otherwise it clods badly. Preparation of the seed bed should begin as early as possible in the spring. Corn is planted either on the ridge or in the furrow. Later cultivation is of the usual character, mainly with the one-horse plow.

This type of soil sells at \$5 to \$20 an acre, depending on improvements and location.

The Leaf silt loam is a heavy soil, requiring the use of heavy farm equipment. It works into a good tilth when handled seasonably. Good drainage must be provided. This may be accomplished by ditching. Deep fall plowing and the incorporation of vegetable matter aid greatly in improving the physical condition and increasing the productiveness of the type. Liming and subsoiling also are highly beneficial. The type is well suited to the growing of grains and grass.

KALMIA FINE SAND.

The Kalmia fine sand has a surface soil of gray to yellowish fine sand, averaging about 8 inches in depth. The subsoil is a yellow fine sand to loamy fine sand. Areas of the type occurring near the base of gravelly upland slopes contain varying quantities of small gravel, but seldom enough to interfere in any way with cultivation. In places a fine sandy hardpan is encountered within the 3-foot section, the cementing material being both silica and iron.

The type lies above overflow on terraces along the Alabama River and some of the creeks, principally through the center of the county. The material is of comparatively recent origin. The surface is level to undulating. Both surface drainage and subdrainage are well established, and are excessive over the higher and more sloping areas. The soil is porous, and is droughty during the summer months.

The Kalmia fine sand is of small extent and of little agricultural importance in the county. Approximately 75 per cent is under cultivation or cleared for pasture. The tree growth consists of scrub oak and pine, with some water oak, dogwood, and sweet gum.

Corn and cotton are the principal crops. A part of the type is in pasture. Corn and cotton both give relatively low yields. Corn produces between 5 and 15 bushels, with an average of about 8 bushels per acre. The growing of cotton has largely been discontinued recently on account of the boll weevil. Normally, however, yields were so low that the crop was not profitable. The soil is handled much the same as the other light types of the area. Corn is planted in deep water furrows. Little commercial fertilizer is used, but some compost manure is applied.

The type is valued at \$3 to \$10 an acre, but usually is held in connection with adjoining higher priced land.

In order to farm this type successfully, it will be necessary to increase the supply of organic matter by incorporating compost and other plant residues.

Watermelons, cantaloupes, berries, chufas, cowpeas, velvet beans, and fruits do well on this type, but with the present poor marketing facilities its best use seems to be for Bermuda-grass pasture.

KALMIA FINE SANDY LOAM.

The Kalmia fine sandy loam consists of a gray to yellowish fine sand to loamy fine sand 5 to 7 inches deep, grading into a yellowish fine sandy loam, which passes at 8 to 10 inches into a yellow fine sandy clay subsoil. In poorly drained areas the subsoil is mottled with gray and shades of brown at lower depths.

This type occurs on both the river and the smaller stream terraces, the largest single area being in the vicinity of Bellview.

The surface is for the most part level, but is undulating next to the uplands. Both surface and subdrainage is poor. In many instances small depressions or sinks occur, which hold water in the winter but are dry in the summer. Locally the wet parts of the type are known as "crawfish land."

The type is not agriculturally important. Only about 30 per cent of it is under cultivation. A large part is cut-over timber land with small areas still in standing timber, consisting principally of pine, scattering blackjack oak, sweet gum, and persimmon.

Corn and cotton are the chief crops. The usual minor crops are grown on a small scale by nearly every farmer. Raising stock, consisting of cattle and hogs, is carried on in an incidental way. Corn yields 12 to 30 bushels to the acre, with an average of about 17 bushels. Cotton before the advent of the boll weevil yielded about one-third bale to the acre. Oats yield about 15 to 30 bushels per acre, though most of the crop is cut and fed to stock in the sheaf.

This type is handled about like the upland soils, but considerably more attention is given to ditching. Practically no fertilizers are used. Small quantities of barnyard and compost manures produced on the farm are applied. Some lime has been applied to small areas.

This type has a market value of \$5 to \$20 an acre, depending upon improvements and nearness to towns and shipping points.

Poor drainage conditions are largely responsible for the relatively low value of this land. Good drainage and the liberal use of air-slaked lime or of ground limestone greatly facilitate the reclaiming of this low, wet soil, bringing it into good condition for profitable

cultivation. The plowing under of green crops, such as cowpeas, velvet beans, and clover, and the rotation of crops are advantageous. The wetter areas of the type seem well suited to grass, Japan clover, and sugar cane. The sirup from the cane grown on this soil has good color and flavor. Pecans apparently thrive on the higher, well-drained areas. Truck crops and tobacco do well, and similar soil is extensively used for these crops in other sections of the South.

KALMIA VERY FINE SANDY LOAM.

The surface soil of the Kalmia very fine sandy loam has an average depth of about 7 inches, and consists of a gray to pale yellowish gray very fine sandy loam. Usually the surface has a very dark appearance, due to the accumulation of vegetable matter. The subsoil is a yellow very fine sandy clay having usually considerable mottling of gray or gray and brown. In places the surface soil is quite silty and has a smooth, floury feel.

In the southern part of the county there are areas of the type in which the drainage is very poor and the subsoil is very similar to that of the Leaf soils, being rather plastic and mottled with red, gray, and brown at lower depths. These areas are small and of such irregular outline that they can not satisfactorily be indicated on the soil map.

The type occurs for the most part in the central and south-central parts of the county. Some areas occur along the river and some of the creek terraces in other parts of the county.

The surface is level to undulating. In the level areas the drainage is poor, but where the surface is undulating drainage is better. Very little of the type is subject to overflow.

This is not considered one of the important types of the area, though it has some local importance. Approximately 30 per cent of it is under cultivation. A large part of the remainder is cut-over land. Forested areas support a growth of yellow pine, mainly, with a scattering of oak, dogwood, persimmon, gum, and poplar.

Corn and cotton are the principal crops. The minor crops are oats, sugar cane, Irish and sweet potatoes, cowpeas, peanuts, and velvet beans. Corn yields from 12 to 30 bushels per acre, with an average of about 17 bushels. Cotton, before the boll-weevil infestation, yielded an average of one-third bale to the acre, but the present yield is less than one-fourth bale. Oats yield an average of 17 to 22 bushels per acre.

In farming this land ditches are maintained to improve the drainage. Otherwise it is given the same general treatment as related types. Fertilizers have been used in varying quantities and mix-

tures, mainly a 9-2-2 formula at the rate of 200 to 400 pounds per acre. At present, however, no commercial fertilizers are used.

Land of this type is valued at \$5 to \$20 an acre, depending upon improvements and nearness to markets.

Like the Kalmia fine sandy loam, the agricultural development of this type is largely dependent upon adequate systems of drainage. Lime is valuable in counteracting the sourness of the land and bringing about a favorable physical condition. The use of barnyard manure and the plowing under of green cover crops, preferably the legumes, to supply organic matter are beneficial. The type is well suited to the growing of truck crops, watermelons, cantaloupes, peanuts, and fruits, as well as the usual farm staples. The more nearly level areas, where the land remains moist for long periods, are well suited to the growing of sugar cane. Grasses, especially Japan clover, do well. In the well-drained areas pecan trees appear to do well.

CAHABA SAND.

The surface soil of the Cahaba sand is a gray to reddish loose sand about 8 inches deep. Below this depth the color is yellowish red or brownish, and the material frequently a little more loamy. In Canton Bend and in other places along the Alabama River the type includes areas, locally known as "the islands," in which the material is little more than Riverwash, the sand being very light in color and supporting a scant growth of scrubby brush. This material is water-laid and of recent age. Included with the Cahaba sand also are several bodies of the Cahaba fine sand or loamy fine sand. The material of these areas was deposited apparently by the high flood waters over heavier soils.

The topography of this type is level to undulating, with hummocky ridges like those of the Cahaba fine sand. Drainage is largely effected through percolation, both the surface soil and subsoil being very porous. The type is not subject to overflow.

Agriculturally the type is unimportant, probably only about 15 per cent of its relatively small area being in cultivation. The natural forest growth consists principally of pine and scrub oak, with a scattering of dogwood, persimmon, hackberry, and water oak. There is a scattered growth of cactus. The small amount of farming done on the type consists in growing cotton and corn, together with some sugar cane and vegetables. The land is largely in pasture. Near Millers Ferry Post Office a small area of the poorer soil occurs, which only a few years ago supported a thick growth of prickly-pear cactus. Since that time Bermuda grass has been propagated, and this grass now completely covers the sand.

Corn yields an average of 7 bushels per acre. Cotton under normal conditions gave low yields, averaging about one-eighth bale per acre. Farming on this soil follows the practices prevailing in the county. Corn is planted in a deep water furrow. Little or no commercial fertilizer is used, though some barnyard and compost manures are applied.

This type is valued at \$1 to \$5 an acre.

Sodding to Bermuda grass apparently constitutes the best use of this land, especially the lighter areas of the type where wild grasses are not common. A small part of the type may be used for growing watermelons, cantaloupes, chufas, peanuts, and truck crops, but it is doubtful whether cotton or corn can be grown profitably under present conditions.

CAHABA FINE SANDY LOAM.

The surface soil of the Cahaba fine sandy loam is a gray to slightly reddish brown loamy fine sand to fine sandy loam, varying in depth from 6 to 20 inches, with a probable average of about 8 inches. The subsoil usually consists of a few inches of yellowish fine sandy loam, which passes quickly into yellowish-red to reddish-brown, friable fine sandy clay. In some small areas the surface soil is finer in texture than is typical, approaching a very fine sandy loam, and where the type occurs near gravelly slopes a small percentage of gravel may be present on the surface. The subsoil in places is quite stiff and compact, being very sticky when wet, but brittle and friable when moderately dry. Minute mica flakes are generally present.

The Cahaba fine sandy loam is a second-bottom, or terrace, soil, principally along the Alabama River and in a few small areas near some of the larger creeks. The most extensive areas occur in the broad river bends.

The topography is comparatively smooth, and both surface drainage and subdrainage are fairly well established, except in the small, low-lying or basinlike depressions, which can be drained by ditching. The type is largely above overflow, although much of it may be inundated by high floods.

The Cahaba fine sandy loam is an important and desirable soil. Approximately 80 per cent of it is under cultivation, the remainder being forested with pine, oak, gum, dogwood, maple, and hickory.

Corn and cotton are the principal crops. Small quantities of oats, cowpeas, velvet beans, potatoes, rye, sugar cane, peanuts, sorghum, and clover are grown, and since the advent of the boll weevil these crops have received increased attention. Cattle raising is an important industry, and a large part of the type is utilized for pasture.

Yields of corn range from 10 to 40 bushels, with an average of about 20 to 25 bushels, per acre. Cotton produced between one-fourth and 1 bale per acre before the advent of the boll weevil, but the average yield now is probably less than one-fourth bale. Oats produce from 10 to 40 bushels per acre, though the crop usually is not thrashed.

The methods of farming employed on this soil are much the same as on the other soils of the county.

Until recently commercial fertilizers, mainly 10-2-2 or 8-3-3 mixtures, were used and were applied to practically all crops in similar quantities, usually 200 to 300 pounds to the acre. At present commercial fertilizer is not used, but instead cover crops are turned under and barnyard and compost manures are applied.

Land of this type sells for \$8 to \$30 an acre, depending on improvements and nearness to towns and railroads.

To build up this type organic matter should be added, either as green cover crops plowed under or as barnyard and compost manures. Lime also is beneficial, especially where clover is to be grown. With proper treatment the higher and better drained areas should grow alfalfa successfully. Air-slaked lime or ground limestone should be used. Pecan trees appear to do well; commercial groves have been set out on similar soils in other sections of the South.

CAHABA SILT LOAM.

The Cahaba silt loam is a dark-gray to brown silt loam 3 to 5 inches deep, grading into a yellowish-red to brownish-red silt loam. This passes at 6 to 8 inches into a yellowish-red silty clay subsoil, which is very stiff and compact, though not very plastic. In the lower depths there may be some mottling of brown, yellow, gray, and red. There is one notable variation in the subsoil of the type. In a number of areas there is a tendency toward the characteristics of the Leaf silt loam, but these areas, while heavy, compact, and plastic when wet, are always crumbly and friable when moderately dry. A few "gall spots," where the surface soil appears to have been largely removed, are encountered within areas of this type.

The largest areas of the Cahaba silt loam are located along the Alabama River, in the southern part of the county, with smaller areas along all the terraces. It is a second-bottom soil and lies largely above overflow, except in times of very high floods.

The topography is smooth to undulating and, in general, drainage is only fairly well established. It is rather poor in the basin-like depressions and the low-lying areas that are flanked by low, marshy land.

The type is not very important agriculturally. Approximately 60 per cent is under cultivation, the remainder being largely cut-

over land. A small acreage has a forest growth of shortleaf and swamp pine, beech, gum, maple, oak, and hickory. Corn and hay are the principal crops grown. A large part of the type is used for pasture. Cotton is grown in a very small way. Corn averages about 20 bushels per acre and hay about 2 tons.

In handling this soil the plowing is very shallow, on account of the stiff nature of the soil and the lightness of the farm equipment. Otherwise the methods correspond with the general practices prevailing in the county. The use of commercial fertilizers has been practically discontinued on account of the prohibitive prices for useful grades. Formerly acreage applications of about 200 pounds of an equal mixture of acid phosphate and cottonseed meal commonly were made.

This type sells for \$7 to \$20 an acre, depending mainly on the location.

The two most important factors limiting production on this soil are shallow plowing and the compact nature of the subsoil. Deep plowing in the fall and subsoiling, with the addition of liberal quantities of organic matter at frequent intervals, would greatly improve the soil. Liming is highly beneficial, both in counteracting sourness and improving the physical condition of the soil, which clods badly if not plowed when in just the right moisture condition. Lespedeza and Sudan grass are desirable hay and forage crops that could be grown successfully.

CHATTAHOOCHEE FINE SANDY LOAM.

The surface soil of the Chattahoochee fine sandy loam consists of a gray to slightly reddish loamy fine sand or fine sandy loam, varying in depth from 6 to 24 inches, with an average of about 8 inches. The subsoil consists of a red, friable fine sandy clay which often shows a yellowish-red color in the first few inches. In some localities the texture of the surface soil approaches a very fine sandy loam, and these areas usually have a slightly darker color than the typical soil, owing to the accumulation of vegetable matter in the presence of moisture.

This type is not widely distributed. Practically all of it occurs in the vicinity of Coy and in the bend on the opposite side of the river to the north. Locally the type is known as "piny-woods land." It is a second-bottom or terrace soil.

Usually the surface is level or nearly level. In places, owing to the presence of small streams and creeks, the surface resembles that of the uplands, but the slopes are gentle and nearly always tillable. Both the surface drainage and underdrainage are good, except in some small areas where the type occurs as narrow, low-lying ridges

between areas of wet, marshy land. Even in these places very little trouble is experienced from excess moisture during the summer months. The type is not subject to overflow.

The Chattahoochee fine sandy loam is one of the extensive and important soils occurring in the vicinity of Coy and Walnut Bluff. A large part of it is under cultivation, approximately 85 per cent, the remainder being largely cut-over land. The forest growth, which is being removed, consists mainly of shortleaf pine, maple, white oak, post oak, and water oak.

Corn, cotton, and oats are the important crops. Cattle raising and hog raising are carried on in a small way. The minor crops common to the county are grown in a small way, with a tendency toward an increase in their acreage. Yields of corn range between 12 and 40 bushels, with an average of about 20 bushels per acre. Before the appearance of the boll weevil cotton yielded from one-fourth to one bale per acre, but since that time the average is less than one-fourth bale. Oats yield between 15 and 40 bushels with an average of about 20 bushels per acre.

The methods of handling this type are practically the same as for the upland soils of the county. Very little broadcast plowing is done, and the old system of bedding in the spring is largely practiced, some farmers rebedding immediately before planting. Practically no fertilizers are used at present.

This type of soil sells for \$8 to \$30 an acre, depending upon local improvements and nearness to towns and transportation facilities.

The practice of growing and turning under velvet beans, soy beans, cowpeas, and clover, either before or after pasturing, is highly beneficial in the improvement of this soil. Deep fall plowing and the more extensive seeding of winter cover crops, which are planted to a small extent at present, are needed. Liming is beneficial, especially where clover is to be grown. The higher and well-drained areas of the type, if well limed and properly cared for, should prove well suited to alfalfa. Pecan trees do well. There is a great similarity between this type and the Orangeburg fine sandy loam, and the crop adaptations are comparable.

AMITE FINE SANDY LOAM.

The Amite fine sandy loam consists of a brown to reddish-brown light fine sandy loam, 6 to 8 inches in depth, grading into a red, friable sandy clay subsoil which extends to a depth of 36 inches or more without appreciable change.

It is found in small bodies, principally near Coy. The soil is alluvial and occurs on second terraces along the Alabama River. It lies above overflow. The surface is smooth and gently sloping. Natural drainage is fairly well established.

This is not an important soil, on account of its limited extent, although it is recognized as a very desirable soil for light general farming. A very large part of the type is under cultivation.

Cotton and corn are the chief crops. The minor crops are those commonly grown in the county. Clover does well and the yields of all other crops are good.

The type is handled in cultivation about like the other sandy loam types of the terraces, particularly the Chattahoochee fine sandy loam and Cahaba fine sandy loam. No fertilizers are used at present on account of the high prices, though formerly applications of 200 to 300 pounds per acre of an 8-2-2 or an 8-3-3 mixture commonly were made for both cotton and corn.

This type has a value of about \$10 to \$20 an acre. It requires about the same treatment as the Chattahoochee and Cahaba fine sandy loam types for its improvement.

The following table shows the results of the mechanical analyses of samples of the soil and subsoil of the Amite fine sandy loam:

Mechanical analyses of Amite fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
415230....	Soil, 0 to 7 inches.....	0.6	2.6	3.0	40.9	26.9	20.1	5.3
415231....	Subsoil, 7 to 36 inches.....	.3	1.4	2.0	19.1	15.8	34.2	26.7

TRINITY CLAY.

The soil of the Trinity clay, to a depth of 6 to 15 inches, is a dark-gray to black, stiff, heavy clay loam to clay. The subsoil is a drab to gray heavy clay, very stiff and tenacious, usually lighter than the soil in color and often mottled at lower depths with shades of gray and yellowish brown. Occasionally the dark color extends to a depth of 36 inches. The soil is very sticky and plastic when wet, and ordinarily bakes hard on drying.

The Trinity clay occurs at intervals along many of the smaller streams that issue from or flow through areas of Houston soils. It is alluvial in origin, derived mainly from reworked material washed from the calcareous prairie soils.

The surface is smooth and either flat or slightly sloping. Both surface drainage and underdrainage are sluggish.

The Trinity clay occurs only in small bodies, and its total area is small. It is largely under cultivation or is utilized as hay land. The leading crops are cotton, corn, and hay. Alfalfa is grown in a few places. Cotton yields range from one-eighth to one-fourth

bale per acre, the low average being due to injury by the boll weevil. Formerly yields ranged from one-half to 1 bale. Corn produces from 20 to 50 bushels per acre and is now the principal crop. Johnson grass yields from $1\frac{1}{2}$ to 3 tons of hay per acre per season, two or three cuttings being made. Alfalfa and melilotus give similar yields.

This soil is used largely for growing summer crops. The land is plowed in the spring and later bedded for both cotton and corn. Ridge culture is desirable on account of the wet or moist condition of the soil. Soy beans and velvet beans are often planted in the corn crop. No fertilizers are used.

The Trinity clay has a value of \$10 to \$25 an acre, depending on the location and improvement.

Improved drainage, better preparation of the seed bed, and more frequent shallow cultivation in the growing season to conserve moisture are some of the changes that would give better results with this soil. Cover crops also should be plowed under, both to increase and maintain the productiveness of the type and to improve the soil structure.

CATALPA CLAY.

The soil of the Catalpa clay consists of a dark-gray to dark-brown silty clay loam to silty clay 6 to 9 inches deep. The subsoil is a brownish or drab silty clay, in many places mottled with shades of gray and yellow at lower depths. Both the soil and subsoil are very sticky and plastic when wet and become hard and brittle on drying. In places the entire soil profile is quite dark, very closely resembling the Trinity clay. Much of the immediate surface portion is calcareous, the areas lying near the limestone elevations highly so. The areas occupying central positions in broad valleys do not contain sufficient lime to effervesce with acid.

This soil occurs in the eastern part of the county, chiefly along Wolf, Indian, and Cedar Creeks and smaller tributaries. It lies in the first bottoms and consists of material washed principally from the Houston soils. The more typical areas are confined to the outer edges of the stream bottoms, where the soil has been washed directly from the adjacent limestone hills.

The topography is smooth to flat and drainage is sluggish. Low, flat areas are often swampy. The outer edges of the bottoms have a somewhat greater elevation than toward the stream and slope slightly and have fairly good drainage.

This type is not extensive, but it is held in high esteem. A very large part is under cultivation. The low, wet areas are forested, mainly with gum, willow, cypress, and magnolia.

Cotton and corn are the chief crops grown. The activity of the boll weevil on the heavy, moist land during the last two years has caused a marked decrease in the acreage devoted to cotton on this type, although it still holds its place as the main cash crop. Yields range from one-eighth to one-fourth bale per acre, while formerly the ordinary yields ranged from one-half to 1 bale. The production of corn, to which the type is well suited, has increased. The yields of corn range from 25 to 50 bushels per acre, depending largely on moisture conditions. Johnson grass is the important hay crop. On account of the frequent overflows in the winter and the long wet seasons the soil is used only for summer crops.

Some velvet beans and cowpeas are planted in the corn crop and used as field forage for cattle and hogs after the grain crop is harvested. Small patches of alfalfa are grown successfully along the outer edges of the type. No fertilizers are used.

The Catalpa clay has a value of \$10 to \$30 an acre.

This is a heavy, strong soil of high productiveness. It requires a heavy farm equipment. The soil breaks into a good tilth under favorable moisture conditions, but if plowed when wet it forms clods that are later pulverized with difficulty. Drainage by canals and ditches is necessary for its successful cultivation. The preparation of a deep and thoroughly pulverized seed bed for summer planting and frequent shallow cultivation during the growing season to conserve moisture are needed. The plowing under of cowpeas, melilotus, soy beans, lespedeza, etc., improves the physical condition of the soil and increases its productiveness. Where well drained, the type is well suited to cotton, corn, alfalfa, melilotus, lespedeza, soy beans, velvet beans, clover, and Johnson grass.

OCHLOCKONEE FINE SANDY LOAM.

The soil of the Ochlockonee fine sandy loam is a light-brown to brown fine sandy loam, 6 to 10 inches in depth. With increasing depth the soil becomes more silty and generally heavier, although frequent layers and pockets of fine sand may be encountered. Below 12 to 16 inches the subsoil is a brown fine sandy loam to silty clay, often mottled with drab, gray, and shades of brown. At lower depths the subsoil is a plastic silty clay. Minute mica flakes are often present throughout the soil profile, being more numerous in the upper part of the section.

The type as mapped includes a number of variations in color, texture, and structure. The sandy deposits along the first bottoms of the smaller streams tributary to the Alabama River are mapped with this type. These necessarily comprise soils of a variety of textures. Some parts are so variable that a classification on the basis of texture

is impossible. However, these areas are small, and the soil is predominantly a fine sandy loam.

The Ochlockonee fine sandy loam is found throughout the county as narrow marginal strips along the small streams. It is an alluvial soil, occupying the first bottoms, and is composed of reworked material washed from the uplands and deposited along the drainage ways in periods of overflow.

The surface ranges from flat to sloping. Natural drainage is poor. Canals and open ditches are needed to provide good drainage.

The aggregate acreage of this type is relatively small, but the soil is esteemed for general farming where well drained, and a large part of the type is under cultivation. The forest growth of the uncleared areas consists of white oak, water oak, hickory, cypress, elm, loblolly pine, gum, beech, bay, and willow. Cotton and corn are the principal crops. Patches of oats, sugar cane, cowpeas, velvet beans, and clover are grown. Small areas are used as pasture for cattle and hogs. There is usually a good growth of native grasses.

Cotton yields are low on account of injury by the boll weevil, being about one-eighth to one-fourth bale per acre. Normally yields range from one-third to three-fourths bale. Corn yields from 25 to 40 bushels per acre. Johnson grass, Bermuda grass, crab grass, carpet grass, and water grass make good hay and forage crops. Sugar cane yields 250 to 450 gallons per acre, though the quality of sirup is not so good as that produced from cane grown on the lighter upland soils.

This type is used mainly for growing cotton and corn, and the land receives little attention except while occupied by those crops. Practically all the type is subject to frequent overflow in the winter season, and it often remains in a wet condition until late in the spring. Open ditches are commonly used to improve the drainage. No commercial fertilizers are used.

This land has a value of about \$5 to \$20 an acre, depending on location and improvements.

Adequate drainage is the first need of this type. Attention should be given to rotating crops, growing legumes, and supplying vegetable matter to the soil, especially in the higher and lighter areas.

OCHLOCKONEE SILTY CLAY LOAM.

The soil of the Ochlockonee silty clay loam consists of a brown silty clay loam about 8 inches deep. This grades into a brownish-yellow silty clay subsoil, which gradually passes into a yellowish-brown, plastic, tenacious silty clay, mottled with light gray and shades of brown. The mottling increases with depth. Some variations occur in the type, chiefly in a few areas occurring along small streams re-

ceiving drainage from the limestone areas, where the soil has a dark-gray to dark grayish brown color and a decidedly plastic, sticky structure. Both soil and subsoil in such places are heavier than typical. Also where the wash is largely from the heavier Susquehanna and Oktibbeha clays the soil may have a reddish-brown color extending to the upper subsoil. This variation also is very heavy.

This type is found principally in the eastern part of the county along Pine Barren, Cedar, Wolf, Bear, Turkey, and Prairie Creeks, where it occurs extensively over the first bottoms.

The topography generally is flat, and natural drainage is slow and imperfect. The subdrainage also is poor, on account of the heavy character of the subsoil. The low position of the type renders it liable to floods at any season of the year, although it seldom remains inundated longer than two or three days at a time. Cultivation is possible without ditching, though canals and ditches are highly beneficial, even under normal conditions.

This type is rather extensive and is an important bottom-land soil along the principal streams in the southeastern part of the county. Probably 60 to 75 per cent of it is under cultivation. The uncleared areas support a forest growth of oak, gum, willow, loblolly pine, cypress, poplar, and sycamore.

Cotton and corn are the chief crops, with sugar cane and grasses as important minor crops. A luxuriant growth of native grasses affords good pasturage, and some parts of the type are utilized for grazing. Velvet beans, cowpeas, and pumpkins do well, but are grown only in small quantities. Some cowpeas and velvet beans are planted in the corn crop as winter field forage for cattle and hogs.

Cotton yields from one-half to three-fourths bale per acre under normal conditions, but since the advent of the boll weevil the average yield has been reduced to one-fourth bale. Corn yields from 20 to 40 bushels per acre. Sugar cane gives high yields—250 to 450 gallons of sirup per acre—but the sirup is rather dark and heavy. Johnson grass and other hay crops do well, yielding from $1\frac{1}{2}$ to $2\frac{1}{2}$ tons per acre per season.

On account of the frequent overflows in the winter and spring seasons this land can be cultivated safely only in summer. It usually is plowed broadcast as early in the spring as possible, and later bedded for both cotton and corn. The low position and moist condition of the land make ridge culture advisable. No fertilizers are used.

This type has a value of \$10 to \$25 an acre, depending on improvements and nearness to markets.

Thorough, deep pulverization of the soil as early as possible in the spring is needed for a good seed bed. Adequate drainage can be

provided by ditching, and where possible the land should be protected from overflow by levees or dikes.

Ochlockonee silty clay loam, poorly drained phase.—The Ochlockonee silty clay loam, poorly drained phase, consists of alluvial material occupying low, wet depressions at the heads and along the courses of small streams, and is found principally near Coy. The areas are locally known as “swamps.” Drainage is very poor, the areas being inundated during the winter months, though many of them are moderately dry in the summer months. The soil usually is a brown silt loam to silty clay loam, with a fairly typical subsoil, though the material is nowhere very uniform in texture or color. The phase is separated mainly on the basis of poor drainage.

This soil has no agricultural value at present, although a great many of the small areas might be successfully reclaimed, after which they should have practically the same value as the main type. The forest growth consists largely of cypress, with a scattering of gum and swamp pine.

In the following table are shown the results of the mechanical analyses of samples of the soil and subsoil of the typical Ochlockonee silty clay loam:

Mechanical analyses of Ochlockonee silty clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
415248....	Soil, 0 to 8 inches.....	0.0	0.6	1.4	20.0	8.4	49.6	19.6
415249....	Subsoil, 8 to 36 inches.....	.0	.1	.4	5.6	8.8	54.0	30.9

CONGAREE FINE SANDY LOAM.

The soil of the Congaree fine sandy loam consists of a brown to slightly reddish brown fine sandy loam 9 to 12 inches deep. The subsoil usually is a brown heavy fine sandy loam to loam, which extends to considerable depth. There is no clear line of separation between the soil and subsoil, and often the entire 3-foot section is uniform in color and texture. Small mica flakes are present in both the soil and subsoil.

The Congaree fine sandy loam occurs as narrow marginal strips at intervals along the channel of the Alabama River. It is an alluvial soil, representing the deposition of the heavier materials carried by this stream. The greater part of the first bottoms along the river is very silty and is principally the Congaree silt loam. The material of the Congaree fine sandy loam is derived in part from the crystalline region of the State and in part from the Coastal Plain.

The type is level to very gently sloping, but its porous, friable structure and its location immediately along the river front gives it relatively good drainage.

This is not an important soil, owing to its occurrence in small areas, but it is quite productive. A fair percentage of the type is in cultivation, being used in connection with extensive areas of the Congaree silt loam.

Cotton and corn are the chief crops, with peanuts, sugar cane, potatoes, watermelons, cantaloupes, and a variety of vegetables as minor crops grown for home use. Crop yields usually are good.

This soil is subject to overflow in the winter and spring seasons, and only summer crops are grown. The land is plowed and prepared as early as possible in the spring, and other cultural methods do not differ from those prevailing generally in the county. Much of the type is utilized in connection with broad areas of "swamp land" as pasture for cattle and hogs.

The Congaree fine sandy loam is valued at about \$5 to \$20 an acre.

CONGAREE SILT LOAM.

The Congaree silt loam consists of a brown silt loam 8 to 12 inches deep, underlain by a brown silty clay loam, which extends to a depth of 36 inches or more and occasionally is mottled at lower depths with shades of gray. There are minor variations in the surface soil, resulting mainly from position. The low-lying areas have a darker grayish brown color and a slightly heavier texture, while the higher swells and outer edges of the type show a more decided brown coloring and have a slightly lighter texture. The subsoil is always lighter in color than the surface material and often in the higher level to very gently sloping areas it is mottled with gray, yellow, brown, and reddish brown. A notable instance of such mottling is found in Gees Bend, where the type occurs on a high first bottom that is subject to overflow only during exceptionally high floods. Mica flakes are present in both the soil and subsoil, and the material has a slick, greasy feel.

This type of soil is encountered on the first-bottom lands of the Alabama River, and is locally known as "swamp land." It is distributed in areas of varying outline all along the course of the stream. The soil is alluvial in origin. Most of it is subject to annual overflow, when additional deposits are laid down. The transported material comes largely from the Piedmont section of the State. The topography ranges from flat to undulating, and both surface drainage and subdrainage are slow. The flat, low-lying, and depressed areas are wet and swampy for long periods and unsuited to cultivation without

artificial drainage. Such areas usually are included in narrow swales that are really wet-weather drainage ways.

The Congaree silt loam is an important bottom-land soil. Probably 75 per cent of the type is under cultivation, the remaining part being forested chiefly with cypress, beech, and gum, with a sprinkling of oak, hickory, pine, magnolia, and bay.

Corn and cotton are the principal crops. It is recognized as a valuable corn soil and is utilized more largely for this crop than for all others combined. Cattle raising is important, much of the type being utilized as pasture land on account of the luxuriant growth of succulent native grasses. Hogs, and to a less extent goats and sheep, are raised. Sugar cane gives large yields, but the quality of the sirup is inferior to that produced on the light sandy soils. Cotton yields one-eighth to one-fourth bale per acre under present conditions. The yields were much higher before the boll weevil appeared. The crop makes a rank growth of stalk but the yield of lint is low. Corn produces 20 to 50 bushels per acre, depending on moisture conditions during the growing season. The type is utilized largely as pasture during the winter. The tillage of this soil is attended with some serious difficulties. Late spring rains may delay planting, and late freshets occasionally necessitate the replanting of all crops, but ordinarily there is sufficient time to plow the lands broadcast before the planting season. Plowing is usually done with a two-horse plow, after which the land is bedded, for both cotton and corn. Some farmers merely run furrows on the old seed bed. The corn is dropped by hand into these furrows and covered by a two-shovel cultivator. Velvet beans, soy beans, cowpeas, and pumpkins may be planted in a part of the corn crop to furnish forage for cattle and hogs. No fertilizers are used.

This land has a value of about \$10 to \$30 an acre, depending on location and improvement.

Deep plowing and adequate drainage are the chief needs of this type. The soil is kept productive by the yearly addition of alluvium.

THOMPSON SILT LOAM.

The surface soil of the Thompson silt loam has an average depth of about 6 inches, and is a gray to brown silt loam. The subsoil usually is a yellow to yellowish-gray, mottled silty clay, of rather friable structure. Both the soil and subsoil are variable in color and texture. Occasionally brown and red mottling occurs in the lower subsoil.

Along the Alabama River near Lower Peachtree Ferry there is a large area of this type with included patches of the Cahaba silt loam. These occur as low, very narrow ridges which can not be separated

satisfactorily on the soil map. Most of the type occurs as first-bottom land along some of the creeks in the southern part of the county.

The surface is generally level. It is often broken by washouts and holes near the streams, caused by the frequent overflows, but where the bottoms are broad the land is smooth and can often be tilled. The type is poorly drained and is not important agriculturally. About 90 per cent of it is forested with oak, hickory, maple, tulip, swamp pine, yellow pine, beech, and magnolia. Practically all the type in use is utilized for pasturing cattle and hogs. It furnishes considerable mast.

This type is valued at about \$5 to \$10 an acre, its value depending mainly on its use for pasture.

A part of the type can be utilized for growing hay and corn where good drainage and protection from overflow is provided. The development of a larger growth of Japan clover and Bermuda grass than that now afforded will increase its value for pasture.

SUMMARY.

Wilcox County lies in the south-central part of Alabama, about 40 miles southwest of Montgomery. It has an area of 900 square miles, or 576,000 acres.

The topography ranges from undulating to hilly. The Alabama River, crossing the central part of the county, is the principal drainage way. Elevations above sea level range from about 275 feet in the southern part of the county to 475 feet in the northern part.

The county was established in 1819, and settlement was fairly general by 1825.

The population in 1910 was 33,810. It is classed as rural, with an average of 37.7 persons to the square mile. Camden, the county seat, with a population of about 800, is the principal town.

Three railroads operate in the county, and steamboats navigate the Alabama River. Transportation facilities are good. The public roads are being improved. Public schools are convenient to every section of the county.

The climate in Wilcox County is temperate. The mean annual temperature is about 64° F. The mean annual precipitation is about 42 inches. The growing season is about 240 days.

Most of the land is owned in large tracts. About 66 per cent of the area of the county is in farms. A total of 6,661 farms is reported, averaging about 57 acres per farm, each tenancy being classed as a farm. About 57 per cent of the land in farms is improved. About 83 per cent of the farms are operated by tenants.

Cotton and corn are the principal crops, with oats, rye, velvet beans, soy beans, clover, cowpeas, peanuts, sugar cane, potatoes, hay, and various vegetables as supplementary crops grown mainly for home use and for forage. Cattle raising and hog raising are becoming important industries. The cotton-boll weevil recently has caused a decline in cotton production.

Farm equipment is light and largely inadequate for the best preparation and cultivation of the soils. Farm labor is largely colored, and the available supply is equal to all demands. The average wage is from \$10 to \$15 a month.

The average value of farm land, according to the census of 1910, is \$8.94 an acre. Selling prices generally range from about \$2 to \$50 or \$75 an acre.

The upland soils are derived from the weathering of unconsolidated sediments of the Coastal Plain and are prevailingly sandy. They are classed in the Ruston, Orangeburg, Norfolk, Susquehanna, Greenville, Houston, Sumter, Oktibbeha, and Crockett series.

The alluvial soils occupy the first and second bottoms of the streams. This group includes types of the Leaf, Kalmia, Cahaba, Chattahoochee, Amite, Trinity, Catalpa, Ochlockonee, Congaree, and Thompson series.

The Ruston soils are not extensive; they are found principally in the southeastern and central parts of the county in small, scattered areas. Two types are mapped, the sandy loam and fine sandy loam.

The Orangeburg types occur on the higher elevations, capping the hills and ridges. The Orangeburg sandy loam and fine sandy loam are mapped in this county. They are not very extensive. They are rather light soils well suited to light general farming. Crop yields are fair to good.

The Norfolk soils occur usually on the lower slopes near streams, mainly in small bodies of smooth topography. Two types are recognized. The Norfolk sand has a rolling surface, and is productive only when highly fertilized. It is a special-crop soil rather than a general-farming soil. The Norfolk fine sandy loam is a desirable soil for light general farming. It has favorable surface features and is fairly productive.

The Susquehanna series is extensively developed in all sections of the county. Five types are recognized. The Susquehanna sandy loam is not an important type. It occurs in small areas, and is utilized for general farming. The Susquehanna fine sandy loam is very extensively developed, and is an important soil type. The topography varies from gently rolling to hilly. General farming is practiced and crop yields range from poor to fair. Cattle raising is an important industry. The gravelly fine sandy loam type differs from the fine sandy loam chiefly in gravel content. Only a small

part of it is in cultivation. The Susquehanna very fine sandy loam is an important type in the southern part of the county. Its topography is level to gently rolling. Cattle grazing is a leading industry. A fair proportion of the type is cultivated. General farming is practiced. The Susquehanna clay is extensively developed. The surface features range from rolling to hilly. This soil is difficult to handle. General farming is practiced, and cattle raising is an important industry. Much of the type is stony.

The Greenville series is represented by a single type, the sandy loam. It occurs on high elevations near the Alabama River and has a smooth topography. It is a very productive soil, and is largely under cultivation. General farming is practiced. A part of the type is quite heavy.

The Houston soils are derived from limestone; they form the region known as the "black prairie." Two types are mapped. The Houston fine sandy loam occurs in the eastern part of the county. Much of it is very stony and unsuited for farming. Cattle raising and hog raising are the principal industries. The Houston clay occurs in the prairie region. It is especially suited to growing grain and grass. Alfalfa does well in selected areas. Cattle raising and hog raising are leading industries. Comparatively large areas of the type have a shallow surface soil overlying rotten limestone. Fragments of the rock are scattered over the surface of many areas.

The Sumter series is represented by one type, the Sumter clay. This soil occurs in broad, uniform areas, and has a gently rolling to rolling surface, with occasional hilly areas. Only a small acreage is in cultivation, though the type is locally important. Cattle raising is the principal farm industry.

The Oktibbeha series includes two types, occurring in close association with the limestone soils. The Oktibbeha sandy loam has a small development in the northwestern part of the county. The Oktibbeha clay is used for general farming and is fairly productive when well tilled. Stock raising is important.

The Crockett series is represented by one type—the clay. This soil is very closely associated with the Houston clay and the Oktibbeha clay. It is not extensive in this county. It is well suited to grasses and grain.

The Leaf series is represented in this county by two types. The Leaf fine sandy loam is extensively developed along the terraces of practically all the streams of the county, particularly in the western part. Much of it is under cultivation and yields are fair to good where proper drainage is provided. Cotton and corn are the chief crops. Grasses and sugar cane do well. Much of the type is used for pasture. The Leaf silt loam occurs along the Alabama River terraces. Drainage is poor on account of the flat topography. About

one-half of the type is under cultivation. Cotton and corn are the principal crops. Native grasses do well and much of the type is grazed.

The Kalmia series includes three types, which are encountered on the second terraces of the principal streams. The Kalmia fine sand is not an important type owing to its small extent. About 75 per cent is under cultivation or cleared for pasture. Cotton and corn are the chief crops grown. Yields are low. The Kalmia fine sandy loam has a flat topography and drainage is poor. About one-third of the type is under cultivation. General farming is practiced, with cotton and corn as the chief crops. Yields are low, mainly on account of the poor drainage. The Kalmia very fine sandy loam is not a very important type. Only a small acreage is in cultivation. The surface is generally level and drainage is rather poor. Cotton and corn are the principal crops grown. Adequate drainage is essential for successful cultivation.

The Cahaba, Chattahoochee, and Amite series are productive soils of the higher and well-drained terraces.

The Cahaba sand is found along the Alabama River. It is not extensive. It is a light soil, better suited to special crops than to general farm crops. Yields are low. Bermuda grass does well. The Cahaba fine sandy loam occurs in a few small areas along the Alabama River. It is a desirable soil for light general farming. Yields are good. About 80 per cent of the type is in cultivation. Cotton and corn are the chief crops. The Cahaba silt loam is found principally in the southern part of the county near the Alabama River. The topography is smooth, and drainage is fairly well established. A large part of the type is under cultivation. Corn and hay are the principal crops. Grazing is extensively practiced over this type.

The Chattahoochee fine sandy loam occurs chiefly in the vicinity of Coy. It has a sloping topography. Drainage is good. Cotton and corn are the chief crops, of which the yields are good.

The Amite fine sandy loam is not important in the agriculture of the county on account of its small extent. It is a good soil for light general farming, and a large part of the type is in cultivation.

The Trinity, Catalpa, Ochlockonee, Congaree, and Thompson series include first-bottom soils lying along the creeks and smaller streams of the county. These soils are very productive where well drained.

The Trinity clay and the Catalpa clay are derived from material washed from the limestone uplands. They have a limited occurrence along the streams flowing through or issuing from the prairie region. Both types are very productive where well drained. Corn and hay are the chief crops.

The Ochlockonee fine sandy loam has a wide occurrence along the smaller streams. It is a productive first-bottom soil, devoted chiefly to the growing of cotton and corn. Grass and sugar cane do well. Much of the type is used as pasture.

The Ochlockonee silty clay loam is found principally along the larger streams in the eastern part of the county. The topography is flat, and drainage is poor. Cotton, corn, sugar cane, and grass are the chief crops. Much of this type is used as pasture. Overflows are frequent in rainy seasons, and parts of the type are wet for long periods.

The Congaree fine sandy loam occurs at intervals along the Alabama River in small areas. A large percentage of it is cultivated. Cotton and corn are the chief crops.

The Congaree silt loam occupies the first bottoms of the Alabama River, and is locally known as "swamp land." A large part of it is under cultivation, corn being the leading crop. Yields are good. Cattle raising is important, much of the type being utilized as pasture. Native grasses make a good growth.

The Thompson silt loam is not very important in this county. A small percentage of the type is in cultivation. The topography is flat and drainage is poor. This soil is subject to frequent overflow.



[PUBLIC RESOLUTION—No. 9.]

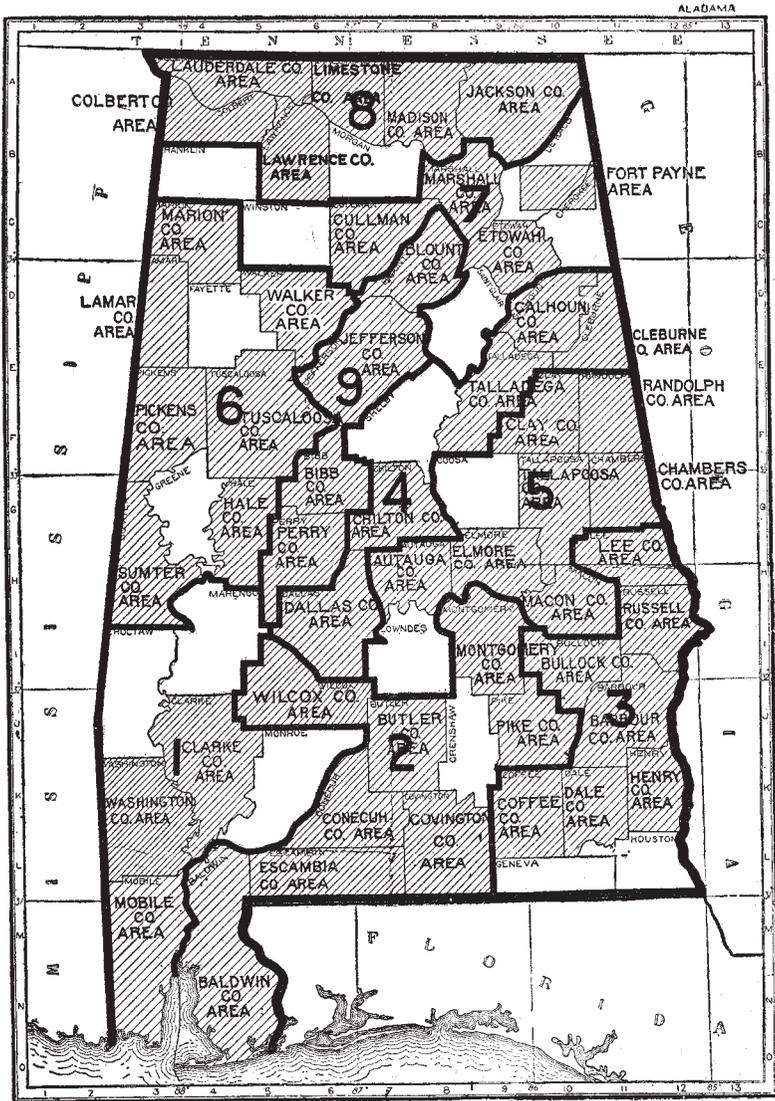
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

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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