

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
IN COOPERATION WITH ALABAMA DEPARTMENT OF AGRICULTURE
AND INDUSTRIES.

SOIL SURVEY OF GENEVA COUNTY ALABAMA.

BY

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[Advance Sheets, Field Operations of the Bureau of Soils, 1920.]



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[PUBLIC RESOLUTION—No. 9.]

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

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

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

Approved, March 14, 1904.

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

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MAP.

Soil map, Geneva County sheet, Alabama.

SOIL SURVEY OF GENEVA COUNTY, ALABAMA.

By A. H. MEYER, In Charge, C. O. JAECKEL and L. R. SCHOENMANN.

DESCRIPTION OF THE AREA.

Geneva County is situated in the southeastern part of Alabama, bordering the State of Florida. It is bounded on the west by Covington County, on the north by Coffee, Dale, and Houston Counties, and on the east by Houston County. It forms a rectangle 42 miles in length east and west and 14 miles in width north and south. The county comprises an area of 578 square miles, or 369,920 acres.

The topography of Geneva County varies from fairly smooth to undulating and rolling. Much of the more rolling topography occurs in the northern and northeastern parts of the county, particularly in the vicinity of Coffee Springs, Mount Moriah Church, Martin Store, and High Bluff. The more level to undulating areas are developed in the eastern end, along the western border, in places along the southern border, and in the central part of the county. With the exception of a few of the steeper slopes, all of the land in Geneva County has a surface favorable for agriculture, and even the steep slopes may be advantageously used for pasture, and also for crops if properly terraced and handled.

Choctawhatchee River, Pea River, and Double Bridges Creek have cut fairly wide valleys across the county and have built up almost continuous and fairly broad second bottoms or terraces. In a few places, particularly along Pea River and Double Bridges Creek, there is no first-bottom land, or, in other words, the streams have cut rather deep channels, and the lands adjacent to these channels lie sufficiently high above normal overflow to be classed as second bottoms or terraces.

Practically all the upland of the county, except that part occupied by the Plummer sandy loam and a small proportion of the area formed of Norfolk sandy loam, has good drainage; a large part of the stream bottoms is poorly drained. The main drainage



FIG. 9.—Sketch map showing location of the Geneva County area, Alabama.

of the area is effected through Choctawhatchee River and its branches, Pea River, Double Bridges Creek, Spring Creek, Hurricane Creek, and Flat Creek, with their numerous tributaries and streamlets, which are well distributed throughout the county.

The elevation of the county varies from about 100 to 300 feet above sea level. The highest points are found along the northern boundary and in the east-central part. The second bottoms or terraces usually lie from 10 to 25 feet above the present flood plains. The lower lying areas of the second bottoms are subject to overflow during periods of extremely high water.

Originally all the upland was thickly forested with longleaf pine. Some oak, gum, and other hardwoods grew in the swamps. At first very little value was placed on the timber, which was destroyed in making clearings, and sawmills have been erected only within the last 30 years. One large sawmill is situated in the county, at Geneva, but it gets its supply of logs entirely from Florida. Small sawmills are scattered over the entire area. The greater part of the forested land has already been cut over.

The first settlement in the territory embraced within the county was made about 1810, but there was little increase in population until 1830. The county was organized in 1868 from parts of Coffee and Dale Counties, with Geneva as the county seat. The early settlers came largely from Georgia, North Carolina, and South Carolina. At present the farming population consists for the most part of negroes and native whites. The population, according to the census of 1920, is 29,315 all of which is classed as rural, no town in the county having 2,500 or more inhabitants. There are 50.7 persons to the square mile. Geneva, Samson, and Hartford with populations of 1,581, 1,646, and 1,561, respectively, are the largest towns and are distributing points for supplies of all kinds. Slocomb, Black, Coffee Springs, Bellwood, Malvern, Hacoda, Chancellor, Highnote, Lowery, Ganer, Sellersville, Pera, Spears, Marl, Lytle, and Thurston are smaller towns and villages.

The county has good railroad facilities. A line of the Louisville & Nashville Railroad traverses the area in a southeast-northwest direction and connects with another line of the same system at Georgiana (Butler County), which is a direct line to Mobile, New Orleans, Montgomery, and Birmingham. The Central of Georgia crosses the county in a general west-east direction, giving direct connection with Dothan (Houston County), the largest commercial town in southeastern Alabama.

There are several excellent graded sand-clay roads through the county. Most of main roads, as well as secondary roads, do not follow section or land lines. All the roads are of earth construction and

little attention is given to the minor roads. The more important highways are dragged as soon as the ground permits after each rain.

The local towns furnish a good market for butter, eggs, and sweet potatoes. Peanuts, cotton, corn, beans, hogs, and fat cattle are the chief products shipped out of the county. Hay and oats are the leading agricultural products brought in.

The rural free delivery of mail reaches a large part of the county, and telephones are available to most sections.

CLIMATE.

Geneva County has a mean annual temperature of 67.1° F., a mean winter temperature of 52.4° F., and a mean summer temperature of 80.6° F. The lowest temperature recorded is 15° F. and the highest 106° F.

The average date of the first killing frost in autumn is November 15 and of the last in spring March 8, giving an average growing season of about 252 days, which is sufficient to mature a number of crops in succession. The date of the earliest recorded killing frost in autumn is October 25 and of the latest in spring March 28.

There is an average annual rainfall of 53.8 inches. The total amount for the driest year for which there is record is 52.97 inches and for the wettest year 57.75 inches. The distribution is comparatively uniform, with the summer season the wettest and the fall season the driest. July is the wettest month, with an average precipitation of 6.62 inches, and November the driest, with 2.58 inches. Droughts occur, but rarely are sufficiently prolonged to be serious.

The prevailing direction of the wind during the winter months is from the northwest, and during the rest of the year from the south. The average velocity of the wind is low, except in March, when it is moderately high. Occasionally storms cause considerable damage to farm and city property, besides endangering life.

There is no Weather Bureau station in Geneva County. The nearest station is located at Marianna, Jackson County, Fla. The records of this station, it is believed, are fairly representative of the conditions existing in Geneva County. However, a comparison of the data from the records at Marianna with similar data from the records of the Weather Bureau station at Ozark, Dale County, which lies north of Geneva County, indicates that in parts of Geneva County the temperature may average a little lower, the growing season may be slightly shorter, the average annual rainfall may be a little less, especially in the summer and fall, and the annual precipitation may vary more from year to year.

The following table, giving the normal monthly, seasonal, and annual temperature and precipitation, is compiled from records of the Weather Bureau station at Marianna, Jackson County, Fla.:

Normal monthly, seasonal, and annual temperature and precipitation at Marianna, Jackson County, Fla.

(Elevation, 120 feet.)

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1913).	Total amount for the wettest year (1902).
	° F.	° F.	° F.	Inches.	Inches.	Inches.
December.....	53.2	83	15	4.31	4.76	1.72
January.....	51.9	84	15	3.46	3.30	.70
February.....	52.1	85	15	5.48	4.64	6.15
Winter.....	52.4	85	15	13.25	12.70	8.57
March.....	61.1	94	22	5.29	4.82	12.38
April.....	66.1	97	33	3.11	2.84	1.27
May.....	74.5	103	43	3.66	3.81	4.99
Spring.....	67.2	103	22	12.06	11.47	18.64
June.....	79.7	106	51	4.85	4.93	3.63
July.....	81.0	103	58	6.62	6.66	5.14
August.....	81.2	103	60	5.46	5.40	2.68
Summer.....	80.6	106	51	16.93	16.99	11.45
September.....	78.0	102	45	5.97	5.79	12.80
October.....	68.0	99	30	3.01	3.07	2.50
November.....	58.4	90	22	2.58	2.95	3.79
Fall.....	68.1	102	22	11.56	11.81	18.09
Year.....	67.1	106	15	53.80	52.97	57.75

AGRICULTURE.

Geneva County is in the wire-grass belt of the Coastal Plain. It was originally covered with forest, in which game was abundant. As soon as the land could be cleared and cultivated, small patches were devoted to the production of such foodstuffs as corn, sweet potatoes, and other vegetables. On most of the farms cotton soon became the cash crop, and several acres were given to its production. The open forests were used largely for the grazing of cattle and sheep. Lumbering began in 1868, but only the largest trees were cut. The systematic cutting of the large forests and turpentineing began in 1885. This was followed by the clearing of much land and the production of crops on a larger scale. The completion of

the Louisville & Nashville and the Central of Georgia Railroads opened new markets for farm crops and gave a great impetus to the agriculture.

In 1879 corn occupied the largest acreage, being grown on 9,476 acres, as compared with 4,947 acres in cotton. Oats were grown on 1,705 acres, sweet potatoes on 350 acres, and sugar cane on 118 acres. Rice and tobacco each occupied less than 100 acres. Cotton was strictly a cash crop, while the rest of the crops were used largely at home.

There was a remarkable increase in the acreage of the leading crops from 1879 to 1889, the area devoted to corn increasing to 21,154 acres and that in cotton to 21,133 acres. Oats were reported on 2,084 acres, peanuts on 1,860 acres, and sweet potatoes on 755 acres. Rice was grown on 82 acres. There was a total production of 83,170 gallons of sugar-cane sirup and 48 gallons of sorghum sirup.

The rapid increase in the acreage of crops continued during the decade following 1889. In 1899 corn was by far the most important crop, being grown on 44,816 acres, but cotton in that year occupied 28,382 acres. The area in peanuts increased to 10,490 acres, while that in oats decreased to 1,580 acres. Wheat was reported on 65 acres. Millet and Hungarian grass occupied 67 acres and other tame grasses 51 acres. Sweet potatoes were grown on 944 acres and all other vegetables on 348 acres. Dry peas were reported on 723 acres, tobacco on 63 acres, Irish potatoes on 30 acres, beans on 24 acres, and rice on 151 acres. Sugar cane occupied 998 acres. There were about 10,623 peach trees, 5,612 grapevines, and 2,430 apple trees. The animals sold and slaughtered in that year had a value of \$53,917, the dairy products \$893, and the poultry products \$17,724.

From 1899 to 1919 the acreage of cotton doubled and hay crops showed considerable increase. Corn suffered a slight decrease in acreage, while peanuts, oats, sweet potatoes, and vegetables made a fair gain.

The chief type of farming in Geneva County at present consists of the production of corn, peanuts, and cotton. The raising of hogs and other live stock is an important industry. The tendency is to grow more peanuts, hay, and corn.

Corn is by far the most extensively grown crop and the main feed crop. The 1920 census shows corn grown on 64,857 acres in 1919, with a production of 1,000,370 bushels and an average yield of 15.4 bushels per acre. The crop is grown on all the improved soil types of the county, but does best on the heavier types. Tennessee Red Cob and the native White Cob are the main varieties. Corn is planted from March 1 to June 1. It is usually planted in furrows. Corn is commonly grown with velvet beans or peanuts, or both. When

grown with velvet beans, the beans may be planted in the same rows, or in alternate rows, or every third row. When grown with peanuts, the latter occupy alternate rows or are put between the hills of corn in the same row.

In harvesting the corn the ears are pulled from the standing stalks, stored with the shucks on, and husked as fed. A few farmers, about two weeks before the corn is ripe, strip and cut the upper better part of the stalks, tie the fodder in bundles, and store it for winter feed. Most farmers, however, pasture their corn land after harvest. There are a few silos in the county.

The black bug or corn-ear weevil and the flying weevil are the worst enemies of the corn plant, and also destroy a large quantity of corn in the bin. For this reason a variety of corn is being sought which has the ear tightly and completely covered with the husk, and also has a hard grain that the weevil can not readily penetrate. In tight bins the weevil can readily be destroyed by fumigation.

Peanuts have become an important cash crop in Geneva County, having taken the place of a part of the cotton acreage since the advent of the boll weevil. According to the census reports, the acreage devoted to the crop has steadily increased. In 1919 the area in peanuts was 20,314 acres, as compared with 12,755 acres in 1909. This crop does well on all the improved soils, with the highest yields on the Greenville sandy loam and Orangeburg sandy loam. The yield of peanuts ranges from 15 to 80 bushels per acre.

Peanuts are generally planted on beds in rows 30 to 36 inches apart. They are usually harvested in October and threshed by machine. Most of the crop is sold; the rest is gathered by turning hogs into the fields, and this is the common practice when the crop is interplanted with corn. The vines make excellent hay. The chief varieties grown are the Spanish, North Carolina, and Virginia runners.

Since the advent of the boll weevil the cotton acreage has declined rapidly. The 1920 census reports 47,991 acres in cotton in 1919, with a production of 12,003 bales, as compared with 56,645 acres and a production of 21,722 bales in 1909. Under existing conditions only early maturing cotton is profitable. The Wannamaker variety meets this requirement and is grown by the more progressive farmers. Covington and Half-and-Half are also grown. Cotton is strictly a cash crop.

The area devoted to oats in 1919 was 1,728 acres. The yield of oats ranges from 15 to 30 bushels. The crop is grown largely for grain and to a small extent to supply pasturage during the winter months. September and October are considered the best months for sowing oats. The crop may be pastured lightly during the

winter and still produce grain. The grain is harvested the latter part of May. Cowpeas or peanuts are successfully grown after the oats are harvested. Practically all the oats grown in the county is fed to work stock, and in addition a large quantity is imported.

Peanut vines, cowpea vines, and grains cut green furnish the principal supply of hay. According to the census, 7,367 tons of hay and forage were cut from 8,380 acres in 1919. Peanut vines constitute more than half the hay crop. There are 8,000 or 9,000 tons of this hay obtained from the acreage grown for the nuts, and this hay is not included in the census totals. Considerable hay is shipped in every year, but little of this finds its way to the farms.

The permanent pastures contain some Bermuda grass. This grass grows luxuriantly on the productive, rather wet soils, yielding 1 to 2 tons per acre of hay of good quality. It is the best crop for land subject to overflow. It is also used for holding the soil on steep, eroded slopes. Johnson grass is not very common in Geneva County. Owing to the difficulty of eradicating it in cultivated fields it is considered undesirable, but it produces a heavy yield of hay and affords good pasturage for one or two seasons. Crab grass is a volunteer plant which generally follows cultivated crops. It affords good pasturage and makes fair hay. Broom sedge is confined to the cleared areas of poorly drained soils. It flourishes on the poorly drained terrace soils. It is relished by stock early in the season when the growth is tender, but in summer it becomes too hard and woody. Switch cane grows in places in the swamps and provides some pasturage in winter. Other plants in the swampy areas furnish grazing, among them a "blue stem" and a wild vetch that furnishes late winter pasturage.

A small acreage is utilized in the production of cowpeas. This crop does well on all the soil types, makes excellent feed, and is an effective soil improver. Most of the cowpeas are sown broadcast, but some are sown between the rows of corn just before the last cultivation. Three to six pecks of seed are required for an acre, depending on the kind used. For making the best hay the vines are cut as soon as the earliest pods become yellow. When cut at that stage the vines cure much more easily and rapidly than when cut earlier, the total yield is heavier, and though the hay may not be quite so tender it is eaten more readily and has a higher nutritive value. Not nearly enough cowpea hay or seed is grown to supply the farm needs. Different causes are assigned for the failure of the plants to produce seed, but it seems probable that a weevil which attacks the flower is largely responsible.

The velvet bean is the most important nitrogen-gathering plant grown in Geneva County. It constitutes the principal soil-improv-

ing crop and does well on all the cultivated soils of the area. The seed is planted with corn, as described under the discussion of corn. Most of the crop is left in the field and furnishes excellent winter pasture for cattle and hogs. From a small part of the acreage the seed is picked and sold.

Sweet potatoes are grown for home use, the surplus generally being sold locally. They flourish on the sandy soils, but owing to the scarcity of labor and the small outside demand for the crop it has not become very important. Yields range from 75 to 150 bushels per acre. Porto Rico, Nancy Hall, and Triumph are the chief varieties grown. Some attention also is being given to the commercial production of Irish potatoes.

Sugar cane does well on all soils, but does best on well-fertilized sandy loam types. Nearly every farmer has a small patch for the production of sirup. Ordinarily 200 to 300 gallons per acre are obtained. Most of the sirup is consumed at home, although a number of farmers make a business of selling it in neighboring towns and to farmers who do not produce it. Sugar cane is considered a very profitable crop. It is planted about the first of April and harvested just before the first frost about the middle of November. Enough stalks are bedded at this time for the succeeding crop.

When heavily fertilized, the soils of the county produce good yields of truck crops, but owing to the distance from large markets comparatively little attention has heretofore been given to commercial trucking. In the last three years, however, there has been a relatively large acreage in watermelons. The varieties grown chiefly for market are the Tom Watson and Irish Gray. Melons are shipped from Slocomb, Hartford, Geneva, Malvern, and Black. A total of 492 acres is reported by the census as in miscellaneous vegetables in 1919.

The fruits grown included peaches, pears, plums, and figs. Peaches do well for a time, but for some reason are short-lived. The peach borer and blight do considerable damage, though they can be successfully combated by spraying and proper orchard management. On most farms the peach trees receive no attention after being planted. Warm spells in January and February, followed by freezes, which are quite common, cause considerable damage, the buds being brought out only to be frostbitten. Pears succeed if not injured by blight, to which they are susceptible. Plums do well. Figs do excellently and produce a fruit suited to the manufacture of preserves. All small fruits, such as strawberries, blackberries, and dewberries, bear heavily, but are not grown on a commercial scale. Plums, blackberries, and dewberries flourish in deserted fields, byways, and openings, and more than supply the home demand.

Dairying has not been developed, only enough dairy products being produced, as a rule, to supply the home needs. The methods followed are primitive, the butter-making operations being carried on without modern implements. Generally little attention is given to improved methods of handling milk, sanitation of barns, care of stock, and balanced rations. On some farms the dairy stock is left to shift for itself in the surrounding range, and during the winter losses are common. Usually four or five cows to a farm are kept. Most of the cows are grade Jerseys, but there are a number of purebred Jersey and Holstein animals in the county. The Texas fever tick has been practically eradicated and the county will soon be released from Government quarantine. The census reports the total value of all the dairy products of 1919, excluding milk and cream used in the home, as \$147,481.

There are a few herds of beef-cattle in the county, mainly of Hereford breeding, but most of the cattle used for beef have more or less Jersey blood. The cut-over land, swamps, and unimproved farm lands are largely used for grazing cattle during the growing season, while in winter the cattle are fattened on the velvet-bean fields. Most of the beef cattle are marketed in Montgomery.

A few light horses and "cotton" mules are raised in the county, but practically all the work stock is purchased outside the county. Most of the farm work is done with mules. According to the census, there are 6,096 horses and mules in the county.

Sheep raising is of secondary importance and is confined mainly to the cut-over lands. The Shropshire is the most popular breed, but some Cotswolds also are raised. Small flocks of goats are common on the farms of Geneva County. The census reports 1,189 sheep and 1,259 goats on farms in 1920.

The raising of hogs is the most important live-stock industry in Geneva County. Nearly every owner-operator fattens 10 to 20 head each year, and many raise several hundred. Fewer hogs are kept on the tenant farms. Pork production is profitable, although cholera is prevalent and reduces the profits considerably. Most of the hogs are shipped to Andalusia and some to northern markets. Nearly every farmer butchers enough hogs to supply the home with meat the year round. Duroc-Jersey and Poland-China are the leading breeds, though some Berkshires and Hampshires are raised. The census reports 55,574 hogs in the county in 1920.

The total value of poultry and eggs produced in 1919 was \$289,557. Practically every farmer keeps from 40 to 150 fowls. The eggs and poultry are handled mainly by the local stores.

The adaptation of soils to crops is not considered closely in the farming operations and there is little difference in the type of farming followed on the different soils.

Definite crop rotations are followed by only a few farmers. The general tendency is to plant corn one year, cotton one year, and peanuts one year. A few farmers omit the peanuts.

The tillage operations in Geneva County in general are not thorough enough. As a rule the soil is plowed only to a depth of 2 or 3 inches and rarely deeper than 4 inches. Ridge plowing is generally practiced, though flat plowing is becoming more common. Contour plowing is practiced on slopes. The intertilled crops, except corn, which is planted in furrows, are planted on beds. Improved machinery is being introduced, including the riding cultivator, walking cultivator, two-horse disk plow, disk harrow, mowing machine, hayrake, binder, peanut thresher, bean puller, grain thresher, combination planter, disk cultivator, stalk cutter, and section harrow, but most of the farmers still use the one-horse plow.

The work stock consists mainly of mules. On most farms the one-horse hitch is used. The motor truck is coming into more general use, and there are a few gasoline tractors in the county.

A large quantity of commercial fertilizer is used, the amount expended therefor in 1919, according to the census, being \$434,504. It is used with corn, cotton, and peanuts on every soil type of the county. Fertilizers of the formula 10-2-2 are most commonly used, with some 9-2-3.¹ A few farmers use a 10-2-4 mixture, in which blood, fish, and cotton seed furnish the nitrogen. The methods of applying fertilizers vary greatly. Use is made of the little barnyard manure that accumulates.

The farm buildings, especially the houses, are kept in fairly good repair. There are a few large, modern houses. The barns are usually small, being only large enough to accommodate a few head of stock and a supply of feed. Practically all the fences are of woven wire.

Owing to the demand for labor in sawmills and turpentine orchards, farm labor is scarce. Monthly wages at present (1920) range from \$30 to \$35 with board and \$35 to \$50 without board. From \$2.50 to \$3.50 is paid for day labor. For cotton picking \$1.50 per hundred pounds is the usual wage. Most of the work is performed by the farmers and their families. The total expenditure for labor in 1919 was \$102,805.

According to the census, approximately 79 per cent of the total area of Geneva County is in farms, and 59.7 per cent of the farm land is improved. The average size of the farms is 71.7 acres.² Much of the land is held in large tracts. Approximately 47 per cent of the total area of the county is improved farm land. Forty-

¹ Percentages of phosphoric acid, nitrogen, and potash.

² The census classes each tenancy as a farm.

one and eight-tenths per cent of the farms are operated by owners, 58.1 per cent by tenants, and 0.1 per cent by managers. Both the cash and share system of renting are in use, the latter being the most common. Cash rents range from \$3 to \$10 an acre. Most of the land is rented on halves, the owner furnishing the stock and one-half the fertilizer and the tenant one-half the fertilizer and the labor.

Of the total value of all farm property, 62.2 per cent is represented by the land, 18.7 per cent by the buildings, 4.8 per cent by the implements, and 14.3 per cent by domestic animals. At present (1920) the price of farm land ranges from \$5 to \$100 an acre, depending on the soil, improvements, and location.

SOILS.³

The soils of Geneva County are prevailingly light in color, ranging from extensive areas of light-gray or yellowish-gray soils to comparatively small areas of red soils. All these soils are dominantly low in organic matter, the conditions under which they have been formed not having been favorable for the accumulation of organic matter, as this land was all in forest. In the forested areas there is a noticeable amount of vegetable matter in the first inch or two of the soil, but this is merely a superficial covering and such material has not become incorporated in the soil as it would have if the vegetation had been grass.

Another general characteristic of the soils of this county is the absence of free carbonates. In the soil-forming processes any lime or other carbonates that may have been present in the parent material have been leached out. However, the soils are not strongly acid, though they generally respond to applications of lime. The absence of carbonates in these soils is due in a large measure to the climatic conditions, particularly the heavy rainfall, combined with a warm temperature. Practically all the upland soils are well drained, and under these conditions carbonates can not accumulate. A great deal of leaching is taking place in these soils at present.

³ In Geneva County the Norfolk sandy loam is mapped against a large area of Tifton sandy loam along the Covington County line. This is probably due to the fact that the Tifton soil was typically developed in Covington County and was gradually grading out into the Norfolk along the line, and the Norfolk was typically developed in Geneva County, and as the Tifton was not mapped in Geneva County it was deemed advisable to let the Norfolk extend to the line. The soils of Geneva County do not in every respect join those of Coffee County. The Ruston sandy loam, Greenville sandy loam, and Orangeburg sandy loam of Geneva County have been mapped against Norfolk sandy loam, Greenville clay loam, and Greenville loamy sand in Coffee County. This is due to a better understanding of these types and more recent classification. The soils of Geneva County do not join those of Dale County, as Dale County was mapped in 1910, since which time many changes have been made in the classification of the Coastal Plain soils.

By far the greater part of the upland soils of the county are of the sand, loamy sand, or sandy loam class. On the terraces and second bottoms along the larger streams finer textured soils are developed. The soils of this county are, however, prevailingly open and loose in structure, and the subsoils are generally friable, a condition which, coupled with the rolling topography, insures excellent drainage.

Geneva County lies entirely in the Coastal Plain province. There are three main physiographic divisions of the county: (1) Uplands, (2) terraces or second bottoms, and (3) first bottoms. In the uplands the soils of the Greenville, Orangeburg, Ruston, Norfolk, and Plummer series occur; on the terraces or second bottoms, the soils of the Cahaba, Kalmia, Leaf, and Myatt series; and in the first bottoms, Swamp.

The upland soils are derived from unconsolidated sedimentary sands and clays. There are four beds or strata which give rise to the various soils of the county. The oldest soil-forming stratum is the Red Bed, from which come soils of the Greenville, Orangeburg, and Ruston series. Above the Red Bed is the Claiborne formation, consisting of tough, plastic clay beds, with large bowlders and beds of siliceous limestone, and above the Claiborne the Arkose formation, consisting of tough though friable, brightly mottled clay that has a soapy feel. Patches of Hoffman soil in Geneva County are derived mainly from the Arkose formation. These are not shown on the soil map, owing to their small size. A more recent marine deposit than either of those enumerated once covered the entire county. This consists of yellow clays and sands, carrying a variable amount of accretionary material of yellow iron oxide. Erosion has in places removed a large part of this layer, exposing the underlying formations. It gives rise to the Norfolk soils in Geneva County and to the Tifton soils in other counties in the Coastal Plain region, where it contains a high percentage of iron concretions. The Plummer soils are formed in the poorly drained areas of the yellow clay and sand deposits.

The terraces are made up of old alluvium, which was deposited by the streams when they were flowing at higher levels. The character of the material and the sources of the present streams indicate that the alluvium was derived largely from the regional uplands. Four soil series are represented on the terraces—the Cahaba, Kalmia, Leaf, and Myatt.

The soil on the first bottoms or flood plains of the streams of Geneva County is the most recent in formation and is, in fact, in most places still in process of formation, being added to by each overflow. Owing to its variability, no attempt was made to give

it a type classification, all land of this character being shown as Swamp.

The soils of Geneva County are classified in series on the basis of color, origin, topography, and structural characteristics. Each series is divided into types on the basis of differences in texture, or the proportions of particles of various sizes composing the particular soil. Fifteen soil types, grouped in nine soil series, and one type of miscellaneous character are shown on the accompanying soil map.

The surface soils of types of the Greenville series are reddish brown to red, and the subsoil red and compact but moderately friable. The types are closely associated with the members of the Orangeburg and Ruston series. In some localities there appears to have been some modification of the type by admixture of material from the underlying limestone. In Geneva County the sandy loam and loam of this series are mapped.

The Orangeburg series is characterized by types with brown surface soils and a bright-red to deep-red, friable but moderately compact subsoil. These soils are closely related to the Greenville and Ruston soils. In this county only the sandy loam type is mapped.

The types of the Ruston series are characterized by brown surface soils and a reddish-yellow to yellowish-red, moderately friable subsoil, which is prevailingly of sandy clay. The series holds an intermediate place between the Orangeburg and Norfolk soils in the color of its subsoil. The soils are closely associated with the Norfolk and Orangeburg. In this county two types are found, the Ruston loamy sand and sandy loam.

The Norfolk series is characterized by types with gray to light-brown surface soils and a deep-yellow or yellow, friable subsoil. The series occupies nearly level to rolling uplands throughout the Atlantic and Gulf Coastal Plain. The sand, loamy sand, and sandy loam are mapped in Geneva County.

The surface soils of types of the Plummer series are gray when cultivated. The subsoil is gray throughout the 3-foot section in the sand members, and a mottled yellow and gray, friable sandy clay in the sandy loam members. These soils are developed in level areas or slight depressions, in areas about the heads of small streams, and characteristically near the base of the slopes in the rolling areas. Natural drainage is everywhere poor. In Geneva County this series is represented by the sandy loam.

The surface soils of types of the Cahaba series are brown. The subsoil is yellowish red to reddish brown and has a tough, compact, though friable structure. The soils are developed on terraces lying largely above overflow and are for the most part naturally well drained. In color these soils correspond to the Ruston soils of the

uplands. In Geneva County only the Cahaba fine sandy loam is mapped.

The types of the Kalmia series have grayish-brown to brown surface soils and a yellow, friable subsoil. In some of the flatter areas the lower part of the subsoil is mottled yellow and light gray. In the better drained areas, where the subsoil is a yellow, friable sandy clay, the soils resemble those of the Norfolk series. These soils are developed on the second bottoms or terraces, usually occupying a position slightly lower than that of the Cahaba series. The Kalmia sand, fine sand, and fine sandy loam are mapped.

The surface soils of types of the Leaf series are gray in color. The subsoil consists of a yellow, compact, sandy clay, which grades at about 12 to 18 inches into a gray, mottled with red and yellow, tough, and somewhat plastic compact clay. These soils are developed on the terraces and in part are fairly well drained. In their structural characteristics they resemble the Susquehanna soils, which are found in other parts of the Coastal Plain. Only one type, the fine sandy loam is mapped.

The types of the Myatt series have gray surface soils and a gray to mottled gray and yellow subsoil ranging in structure from friable sandy clay to heavy impervious clay. These soils occur on flat terraces which ordinarily lie above overflow. The Myatt fine sandy loam was mapped.

In the following chapters the several soil types are described in detail and their relation to the agriculture of the county discussed. The actual and relative extent of the different soils is given in the following table:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Norfolk sandy loam.....	111,296	30.1	Kalmia fine sandy loam.....	14,464	3.9
Norfolk loamy sand.....	49,024	13.3	Greenville sandy loam.....	12,224	3.3
Plummer sandy loam.....	33,088	8.9	Myatt fine sandy loam.....	6,912	1.9
Orangeburg sandy loam.....	31,552	8.5	Leaf fine sandy loam.....	4,224	1.1
Ruston sandy loam.....	28,416	7.7	Kalmia sand.....	3,968	1.1
Norfolk sand.....	20,224	5.5	Cahaba fine sandy loam.....	3,136	.8
Kalmia fine sand.....	17,024	4.6	Greenville loam.....	1,664	.4
Swamp.....	16,960	4.6			
Ruston loamy sand.....	15,744	4.3	Total.....	369,920

GREENVILLE SANDY LOAM.

In virgin areas the surface soil of the Greenville sandy loam is a reddish-brown or brownish-red sandy loam, about 4 inches deep, grading into a pale-red loose sandy loam. At depths of 15 to 20 inches this intermediate layer passes into a bright-red, compact, sandy

clay subsoil, which is friable under favorable moisture conditions. The subsoil does not stick when smoothed out between the fingers, but rolls up in small, flakelike bodies. The soil is relatively high in organic matter, and according to the litmus test it is slightly acid. Locally along the slopes of stream courses small angular fragments of ferruginous rock and siliceous rock occur, and limonite accretionary material is present in small quantities over some of the type.

The normal arrangement of the soil and subsoil strata of this type has been materially changed by cultivation and consequent erosion. On the smoother areas the upper subsoil has been mixed with the surface soil, giving the latter a somewhat lighter color. On the shoulders of hills and steep slopes most of the surface soil and a part of the upper subsoil has been washed away, leaving the red clay subsoil exposed. The depth of the surface soil and upper subsoil depends entirely on the degree of erosion.

The Greenville sandy loam is inextensive, covering about 19 square miles, and is principally developed in the vicinity of Coffee Springs and Bellwood. It occupies flat to undulating ridges and moderately steep slopes along streams. Drainage is well established. Erosion is a serious factor in farm management, and terracing is practiced to hold the soil on the slopes.

This type was originally forested with longleaf pine, oak, and dogwood. Approximately 25 per cent of it is still in forest, but this land is slowly being cleared. Corn, peanuts, and cotton are the leading crops. Corn ordinarily yields 15 to 25 bushels per acre. Peanuts are extensively grown. The ordinary yield is 20 to 30 bushels per acre, and with proper cultivation and heavy fertilization 60 to 80 bushels per acre are obtained. Cotton produces from one-fifth to one-half bale per acre in favorable seasons. Small patches of sugar cane, sweet potatoes, and garden vegetables are grown on nearly every farm.

This soil is friable and easy to handle, except where the red clay comes close to the surface. It can be cultivated under a wide range of moisture conditions, though it clods slightly if stirred when too wet. This type responds well to good methods of cultivation, fertilization, and the growing of leguminous crops. Large quantities of commercial fertilizer are applied, and also whatever barnyard manure is produced on the farm.

The value of land of the Greenville sandy loam ranges from \$30 to \$75 an acre, depending on location, improvements, and condition of the land.

Deeper plowing should be practiced on this type, especially where the surface soil is shallow. The supply of organic matter should be

increased by planting velvet beans, peanuts, cowpeas, and soy beans in rotation with other crops. Washing of the surface soil should be prevented by terracing and contour plowing as far as practicable.

GREENVILLE LOAM.

The Greenville loam is a dark-red to dark-brownish red friable loam, about 3 or 4 inches deep, underlain by a bright-red to dark-red compact clay of moderately friable structure. The change from soil to subsoil is very gradual in texture, structure, and color. The soil is higher in organic matter than those of the sandy members of the series. Angular fragments of ferruginous rock are present in places throughout the body of the soil. The type is locally called "red land."

Where the soil has been plowed to a depth of 6 inches or more the admixture of the lighter colored subsoil has given a lighter or redder color to the surface soil. In local eroded areas the bright-red subsoil is exposed.

The Greenville loam is a type of small extent. It occupies low-lying positions in the upland and slopes along the stream courses. The type is principally developed in the vicinity of Coffee Springs, Scranton, and Midway School. It is well drained.

Most of this type was originally forested with longleaf pine and oak. About 75 per cent of it is under cultivation. The greater part is utilized for the production of corn, cotton, and peanuts, with yields somewhat higher than on the Greenville sandy loam. It is undoubtedly the most fertile upland soil in the county.

In comparison with the sandy types of the county, the Greenville loam is rather difficult to handle. Unless it is cultivated under the right moisture conditions the soil becomes puddled and hard lumps are formed which are difficult to reduce. The type can be improved by the incorporation of organic matter to loosen the soil structure.

The present selling price of the Greenville loam varies from \$30 to \$50 an acre.

ORANGEBURG SANDY LOAM.

In virgin areas the surface soil of the Orangeburg sandy loam consists of an upper layer, 4 to 6 inches deep, of brown loamy sand to light sandy loam, and a lower layer of yellowish-red sandy loam, which grades at about 15 to 18 inches into a red, friable, sandy clay. The surface soil and upper subsoil are open and friable and the lower subsoil is moderately compact. The soil has good moisture holding capacity and withstands long droughts. This soil is locally known as "gray land," in contrast to the "red land" of the Greenville series.

In the cultivated fields the upper part of the subsurface layer has been mixed with the surface soil, and in places the yellowish-red sub-

soil is brought to the surface. In general the color of the soil in the cultivated fields is lighter than in the virgin state.

The Orangeburg sandy loam differs from the Greenville sandy loam in having a brown surface soil. The subsoils differ in structure, though both have a red color. It is very difficult to draw a definite boundary line between the two soils, because of their patchy occurrence where they are associated.

The Orangeburg sandy loam is best developed in a belt east of the Choctawhatchee River between Roney School and the northern boundary of the county. Small areas are found throughout the county. In general the topography is flat to rolling, with a few steep slopes adjacent to stream courses. The drainage is good. Where the slopes are steep there is considerable erosion, and in many places rather deep gullies have developed.

The Orangeburg sandy loam originally supported a growth of long-leaf pine, oak, and other hardwoods. Approximately 85 per cent of the type is under cultivation. This type and the Greenville sandy loam are considered the most desirable upland soils in the county. About one-third of the farm land is devoted to the production of corn, and the rest is largely in peanuts and cotton. In average seasons corn yields 15 to 25 bushels per acre, and occasionally much larger yields are obtained where special attention is given. Peanuts, which rank second in acreage ordinarily yield 25 to 40 bushels per acre, with exceptional yields of 80 bushels under the most favorable conditions of soil and cultivation. The acreage in cotton is small, owing to the damage wrought by the boll weevil. Yields range from one-fifth to one-fourth bale per acre, though sometimes as much as three-fourths bale is obtained. Velvet beans are grown for feed and do well.

The soil is friable and very easy to handle. It can be cultivated under a wide range of moisture conditions, without clodding or baking badly on drying. It responds readily to good methods of cultivation, fertilization, and the growing of leguminous crops. Large quantities of commercial fertilizer are used, in addition to the little barnyard manure produced. This type requires practically the same treatment for its improvement as the Greenville sandy loam.

The price of land of the Orangeburg sandy loam ranges from \$50 to \$75 an acre, depending on location, improvements, and the condition of the soil.

RUSTON LOAMY SAND.

The surface soil of the Ruston loamy sand consists of about 6 inches of brown loamy sand. This grades into a reddish-yellow or yellowish-red loamy sand, which in places becomes slightly heavier in the lower part of the 3-foot section. In a few places, particularly on the ridges and along the stream slopes in the vicinity of Bellwood, the soil is a reddish-brown to dark-red loamy sand underlain by a dull-

red loamy sand which becomes slightly heavier in the lower depths. In these spots the soil apparently contains more organic matter than the typical material. Here and there in tilled fields of the Ruston loamy sand some of the red subsoil has been mixed with the surface soil, giving the surface a reddish-brown appearance. Both the soil and subsoil are open and friable, and the soil is easily tilled and can be worked immediately after a rain.

This type is not extensive in Geneva County. It is developed mainly on slopes and high flats along the stream courses of the county. The largest areas occur north of Double Bridges Creek between Carter Mill and Spears, and northeast of Bellwood. The topography ranges from flat to undulating, with moderately steep slopes along stream courses. The type is thoroughly drained, but is not droughty in seasons of favorably distributed rainfall. There is very little wash except on the steeper slopes.

The forest growth on this type is mainly longleaf pine, oak, dogwood, and other hardwoods. About 60 per cent of the land is under cultivation. Corn, which leads in acreage, generally yields 10 to 20 bushels per acre. Peanuts rank second in acreage, though first as a cash crop. The yield is 20 to 40 bushels per acre. Ordinarily the yield of cotton ranges from one-fifth to one-fourth bale per acre. Sweet potatoes and sugar cane do particularly well, but are grown only in small patches for home use.

The Ruston loamy sand is very easy to handle and can be worked under practically all moisture conditions. Commercial fertilizers are generally used in large quantities, in addition to small amounts of barnyard manure. Land values range from \$30 to \$50 an acre.

The growing of peanuts should be more extensively developed on this type. As velvet beans do well, they should be grown to increase the supply of organic matter. This is important in this soil because of its bearing on the water-holding capacity of light, open-structured soils.

RUSTON SANDY LOAM.

The surface soil of the Ruston sandy loam is a light-brown to grayish-brown loamy sand, passing at about 5 to 7 inches into a reddish-yellow or bright-yellow, friable, sandy loam, which usually extends to a depth of about 12 to 20 inches. The typical subsoil is a reddish-yellow to yellowish-red or light-red, rather compact but friable, sandy clay. Some iron concretions are found on the surface, and in places a few of these are mixed with the soil. On some of the slopes the subsoil has been exposed in places by erosion.

Included with this type are a few small patches of Hoffman sandy loam, the surface soil of which is practically the same as that of the Ruston sandy loam. The subsoil is a mottled gray, red, purple,

and yellow, hard, brittle clay, and in places it is a rather tough clay with a somewhat soapy feel: Spots of this soil are developed in the vicinity of Coffee Springs, at the heads of the streams, and along the lower slopes of the drainage ways. In many places the surface covering has been removed, exposing the clay subsoil. It is slightly more difficult to till than the Ruston sandy loam, and the agricultural value is somewhat lower.

The Ruston sandy loam has a small development in the county. It occurs mainly in small disconnected areas closely associated with the Greenville and Orangeburg soils. In many places this type grades imperceptibly into the Orangeburg sandy loam on the one side and into the Norfolk sandy loam on the other. The areas occupy gentle to moderately steep slopes, and drainage is well established. Erosion is serious only on the steeper slopes, but contour plowing and terracing are practiced with profitable results on the less steep parts of the type.

The forest growth is similar to that on the Orangeburg sandy loam. About 60 per cent of this type is cleared and devoted to crop production. Corn, peanuts, and cotton are the principal crops. They do well where the land receives an application of commercial fertilizer. Corn ordinarily yields 15 to 25 bushels and peanuts 25 to 35 bushels per acre. The yield of cotton depends largely on the extent of the damage by the boll weevil.

The soil is very easy to handle and can be cultivated under a wide range of moisture conditions. Owing to the friable structure of the soil and subsoil, the type absorbs and retains much of the rainfall, and therefore withstands drought well. Commercial fertilizers are used extensively, in addition to the barnyard manure produced. Land of this type is valued at about \$35 to \$75 an acre, depending on the improvements and distance from markets. It can be improved by applying the methods suggested for building up the Orangeburg sandy loam.

NORFOLK SAND.

The Norfolk sand consists of a light-brown to grayish-brown sand, 2 to 4 inches deep, passing gradually into a loose, incoherent, yellow sand, which extends to a depth of 3 feet or more. Usually from 4 to 6 feet below the surface a yellow sandy loam or sandy clay is reached. As the color indicates, the soil is low in organic matter, which has accumulated largely as leaf mold when in the forested condition. In cultivated fields, when the soil is dry, the surface has a grayish to whitish appearance.

The type is one of small extent, covering about 30 square miles in all. It is developed principally south of Geneva, south and southwest of Marl, west of Samson, and along Double Bridges Creek. It occurs in flat to rolling areas and on slopes along stream courses. The open, porous structure of this sand, coupled with its rolling

topography, insures excellent drainage for all areas, and during dry seasons it has a tendency to be droughty.

The main forest growth was originally longleaf pine; the second growth is mainly blackjack and other species of oak, with little longleaf pine. Only about 10 per cent of the type is under cultivation.

Corn yields from 8 to 15 bushels per acre and cotton from one-fifth to one-third bale. Velvet beans do well, peanuts give fair returns, and peaches and vegetables are successfully grown. The yields of the various crops depend largely upon the amount of commercial fertilizer applied.

One of the essential needs of this soil is organic matter. It is valuable not only in supplying nitrogen, but also in making the soil more retentive of moisture. Rotation, the turning under of any green-manuring crops, and the addition of organic manures are all means of building up stores of organic matter in the soil.

NORFOLK LOAMY SAND.

The surface soil of the Norfolk loamy sand is a light-brown sand, 4 to 6 inches deep. This passes gradually into a subsoil of yellow loamy sand, which becomes slightly sticky or grades into a yellow sandy loam in the lower part of the 3-foot section. A typical yellow, friable sandy clay substratum is encountered nearly everywhere below depths of 4 or 5 feet. In places the deep subsoil is red. Both soil and subsoil have an open, friable structure. The soil is low in organic matter.

Under cultivation the organic matter in the surface soil soon disappears and the lighter colored subsoil is mixed with the surface soil. As a result the surface soil becomes lighter in color, a gray or grayish brown, and in a dry-tilled field it appears light gray.

The type is the second most extensive in the county. It is developed in large, flat to gently rolling areas and on slopes along stream courses. The largest areas are found south of Lytle and in the vicinities of Highnote, Samson, and Lowery. Smaller areas occur throughout the county. The type is characteristically interspersed with areas of Plummer sandy loam. Both surface and internal drainage are excellent.

The Norfolk loamy sand in its native state was covered with a growth of longleaf pine and several species of oak. About 40 per cent of the type now is cleared and under cultivation. Corn, the leading crop, ordinarily yields 10 to 25 bushels per acre. Cotton probably ranks second in acreage. The boll weevil does less damage than on the more productive upland soils, and the yield averages one-fourth bale per acre. A considerable acreage of peanuts is grown, both for winter hog pasture and as a cash crop. The ordinary range in yield is from 15 to 30 bushels per acre. Velvet beans are admir-

ably adapted to this type. This crop is used largely as winter pasturage for hogs and cattle. Sweet potatoes do well, but are grown mainly for home consumption.

Owing to the smooth topography and open and friable structure of the soil, the type is very easy to handle and can be worked under almost any moisture condition. Commercial fertilizers are used in growing the staple crops. Land values range from \$10 to \$50 an acre.

In the improvement of this type the increase of organic matter is the most essential step. This can be brought about by growing velvet beans, soy beans, cowpeas, and rye and turning under the stubble and refuse left after pasturing. Barnyard manure should be saved, protected from leaching, and applied to the fields. Weeds should be turned under while green, and forest litter composted and spread over the land before plowing. In these ways the type can be made more retentive of moisture, its content of nitrogen will be increased, and, through the action of the decaying vegetable matter upon the mineral constituents of the soil, the supply of available potash and phosphoric acid will be increased.

NORFOLK SANDY LOAM.

The surface soil of the Norfolk sandy loam in forested areas is a grayish-brown or light-brown loamy sand, 2 to 4 inches deep. Beneath it is a subsurface layer of pale-yellow to yellow loamy sand or light sandy loam, which, at depths of 12 to 20 inches, is underlain by a yellow, friable sandy clay. In cultivated fields and in abandoned fields the surface soil is gray to light gray or, in places, even whitish in color, and has a depth of about 4 to 6 inches. Both the surface soil and the subsurface layer are friable and porous. The subsoil is more compact, being a sandy clay, but is still friable, except in local spots contiguous to heavier soils. A few small, rounded iron concretions are present on the surface, particularly in areas in the western part of the county. Had these concretions or pebbles been more numerous, such areas would have been mapped as the Tifton sandy loam. In some of the flatter and more poorly drained situations the lower subsoil in places shows mottlings of light gray, and on some of the knolls, especially in those areas bordering the Orangeburg and Greenville soils, the lower subsoil may show mottlings of red.

Generally the Norfolk sandy loam contains a small quantity of organic matter, and this accounts for the gray appearance of the soil. In a few places where erosion has been active the surface soil is yellowish gray.

The Norfolk sandy loam is the most extensive and one of the most important soils in the county. It is the principal type in the eastern part of the county, where it occurs in broad areas broken by narrow

strips of Plummer and other soils. It occurs in rather large areas in the southeastern part of the county, in the vicinity of Coffee Springs, southwest of Geneva, and in the extreme western end of the county. Other small bodies occur throughout the county.

In many places this type occupies the highest positions in the county. The topography is prevailingly undulating to rolling, with the smoother and flatter areas in the southeastern part of the county. Both surface and internal drainage are free, and most of the type is naturally well drained. Some of the flatter areas, particularly near the heads of streams and in close association with some of the Plummer sandy loam, require artificial drainage.

Longleaf pine, various species of oak, and dogwood characterize the forest growth. Probably about 60 per cent of this type is cleared and is used for crop production.

Corn is probably the most important crop at present. The ordinary yield is 15 or 20 bushels per acre. Higher yields are obtained with liberal fertilization and from fields that have been built up by manuring and crop rotation. Peanuts, the crop of next importance, yield from 25 to 40 bushels per acre. Cotton is grown to some extent, in spite of the boll weevil. The yields range from about one-fifth to one-third bale per acre. Velvet beans and soy beans are grown as feed for cattle and hogs. The tendency at present is to grow more corn and other cattle feeds and less cotton. Sweet potatoes, which do exceptionally well on this land, are grown to supply the home demand and also for sale locally. A considerable acreage is in sugar cane, which is used in the manufacture of sirup. Commercial fertilizer is applied to the soil in growing all crops.

The price of land of the Norfolk sandy loam ranges generally from about \$25 to \$75 an acre, and some farms near towns are held for \$100 an acre.

The Norfolk sandy loam is mellow and easy to till, and its subsoil is sufficiently heavy to hold fertilizers and manures well. It responds readily to the application of commercial fertilizers and to the incorporation of barnyard manure and green-manuring crops, and can readily be improved and maintained in a rather high state of productiveness. The growing of more leguminous crops and winter cover crops is recommended for this soil.

PLUMMER SANDY LOAM.

The surface soil of the Plummer sandy loam consists of 2 to 4 inches of black to dark-gray sandy loam, passing gradually into a subsurface layer of gray sandy loam, mottled with yellow. Typically at 15 to 20 inches occurs a subsoil of gray, compact, friable sandy clay, mottled with rusty brown, bright yellow, and pale yellow. Small quantities of iron accretions are commonly present in the sub-

soil. In areas closely associated with the Norfolk loamy sand and Norfolk sand the heavy subsoil may not be reached within the 3-foot section, and the soil may have the texture of a loamy sand. As the color indicates, the surface soil of virgin areas contains much black vegetable mold, but with cultivation the rapid oxidation of the organic matter and the mixing of the subsurface with the surface material soon give a gray surface soil.

This type is one of the more important of the upland soils. It has a total area of about 51 square miles. It is developed in level or slightly depressed areas, mainly around the heads of small streams, though it also occurs at the base of slopes from the upland to the streams or valleys. The surface is generally flat or depressed, except in local areas on hillsides. The drainage is poor and water stands over the type a large part of the year. Some of the areas along stream courses are subject to overflow.

The Plummer sandy loam is forested with sweet gum, tupelo gum, oak, bay, magnolia, and a little longleaf pine. Gallberry forms a characteristic undergrowth. Practically none of the type is in cultivation except small areas in fields composed mainly of other soils. In such cases the type is usually ditched and provided with good surface drainage. The yields of cotton and corn are low. Rice does well and is usually planted on these small areas. At present most of the type is used as range for cattle, sheep, and hogs.

The price of land of the Plummer sandy loam type is \$5 to \$10 an acre, depending on the drainage conditions.

The main problem confronting farmers on this type is drainage. In the better drained situations ditching suffices, but in the more poorly drained areas more pretentious systems would have to be installed. The land is considered of low agricultural value for the general farm crops and is best suited to grazing or forestry.

CAHABA FINE SANDY LOAM.

The Cahaba fine sandy loam is a light-brown, mellow fine sandy loam or loamy fine sand underlain at an average depth of about 6 inches by a yellow, open fine sandy loam, which, at depths of 15 to 24 inches, passes distinctly though not abruptly into a reddish-yellow to reddish-brown, compact, tough clay or fine sandy clay, hard but not plastic. The surface soil is low in organic matter, and where cultivated and leached for some time it has a grayish-yellow appearance.

The Cahaba fine sandy loam is the terrace equivalent of the Ruston sandy loam, the upland type. It is of small extent, covering only about 5 square miles. It is developed principally on the terraces of the Pea and Choctawhatchee Rivers. It has an undulating to almost flat topography and is well drained. During abnormally high floods

some of the lower lying areas are flooded. Owing to the heavy subsoil, it is retentive of moisture and the crops withstand droughts well.

The native trees on this type were mostly longleaf pine, oak, and dogwood. About 60 per cent of the type is under cultivation. Corn, cotton, and peanuts are the chief crops grown, and all do well when fertilized.

Corn ordinarily yields 15 to 20 bushels per acre, and under the best management considerably more. Owing to damage by the boll weevil the yields of cotton are low. Peanuts ordinarily yield 20 to 40 bushels per acre. Velvet beans do well and are generally grown with corn. Sugar cane and sweet potatoes are grown to supply the home demands.

The Cahaba fine sandy loam is easy to handle and can be worked under a wide range of moisture conditions. Practically every farmer on this type uses some form of commercial fertilizer in addition to compost. For the improvement of this type it is recommended that the supply of organic matter in the soil be increased. Over most of the type there is a general need of deeper plowing. The present price of land of this type varies from about \$20 to \$50 an acre, depending on location and improvements.

KALMIA SAND.

In virgin areas the Kalmia sand consists of a light-brown sand, 2 inches deep, containing considerable vegetable mold, passing gradually into a yellow, loose, incoherent sand, which continues to the depth of 3 feet or more. As the color indicates, the soil below the surface is very low in organic matter. The cultivated land has a lighter colored surface soil, owing to the rapid oxidation of the vegetable mold and the mixing of yellow subsurface with the surface material in plowing.

This type is of small extent, covering only about 6 square miles. It occurs in small areas on stream terraces. The surface is generally flat, with slight modifications due to wind erosion. The soil is excessively drained and is very droughty.

The forest growth is the same as on the Kalmia fine sand. About 30 per cent of the type is improved. The crops grown are similar to those on the Kalmia fine sand, but the yields are lower. The price of farm land ranges from \$5 to \$10 an acre. The recommendations for the Kalmia fine sand are applicable to the Kalmia sand.

KALMIA FINE SAND.

The surface soil of the Kalmia fine sand consists of a light-brown fine sand, 4 inches deep, containing an appreciable quantity of very fine sand. It passes gradually into a subsoil of yellow, loose, incoherent fine sand, which becomes lighter in color with depth, being a

pale yellow in the lower subsoil. The soil is very mellow and friable, though low in organic matter. The dry soil in cultivated fields is light gray in color.

This type is rather extensive. It occurs largely as high bottoms, equivalent to second bottoms, along the streams of the county. The surface is generally flat, with a few meandering sloughs. The type has been more or less modified by wind erosion. Owing to the underlying light-textured material, this type has excellent drainage, but it is inundated during very high floods.

The type was originally forested with longleaf pine, oak, cedar, "spruce pine," "yeopen," and prickly ash. Only about 10 per cent of the soil is under cultivation. The rest is used largely as range for cattle, sheep, and hogs. Cotton, corn, and peanuts do fairly well with heavy applications of commercial fertilizers. Cotton yields one-sixth to one-fourth bale, corn 10 to 20 bushels, and peanuts 15 to 30 bushels per acre. Velvet beans are well adapted to this type and ordinarily yield 500 to 800 pounds of seed per acre. Watermelons, sweet potatoes, and truck crops do well.

The soil is easy to handle and can be worked under any moisture condition. Large quantities of commercial fertilizer are used. Phosphorus and potash are lacking and should be applied in the most feasible form.

Land of this type is valued at \$10 to \$20 an acre. As on all of the improved types of the county, there is a general need of increasing the content of organic matter.

KALMIA FINE SANDY LOAM.

The surface soil of the Kalmia fine sandy loam consists of a light-brown, mellow, fine sandy loam, grading at 4 to 6 inches into a pale yellow or yellow fine sandy loam. The subsoil, beginning at depths of 15 to 30 inches, consists of a yellow, compact, friable fine sandy clay. The lower subsoil, as a rule, is somewhat tougher than the lower subsoil of the Norfolk sandy loam. In the poorer drained situations gray mottlings are present in the lower part of the soil section. In cultivated areas the subsurface layer is mixed with the surface material, giving it a more yellow color. The surface has a light-grayish cast and in the poorly drained areas a "sickly gray" color.

This type is one of the most extensive terrace soils in the county. It is developed principally on the terraces of the Pea River, with small areas on those of Choctawhatchee River, Double Bridges Creek, and other streams of the county. The type has a flat to slightly undulating topography and is moderately well drained.

Originally longleaf pine was the characteristic forest tree. About 60 per cent of the type is improved and devoted to the production of corn, cotton, and peanuts. Corn ordinarily yields 14 to 20 bushels

and cotton one-fifth to one-fourth bale per acre. On well-managed farms much larger yields are obtained. Peanuts do well and are a very profitable crop, either for feeding hogs or for sale. Velvet beans do well.

Owing to the mellow and open structure of the type, it is very easy to handle, and except in the poorly drained areas it can be worked under a comparatively wide range of moisture conditions. Large quantities of commercial fertilizers are used in the growing of cotton and corn. A little barnyard manure, produced on the farms, also is added to the land. This type is now valued at \$10 to \$30 an acre, depending on improvements, distance from market, and drainage conditions.

For the improvement of the Kalmia fine sandy loam three things are of first importance: An increased supply of organic matter; better surface drainage in the poorly drained parts of the type, which can be supplied by open ditches; and deeper plowing.

LEAF FINE SANDY LOAM.

The surface soil of the Leaf fine sandy loam consists of an upper layer, 2 to 4 inches thick, of dark-gray, mellow fine sandy loam, grading into a lower layer of yellow or yellowish-gray, friable fine sandy loam extending to an average depth of 15 inches. The subsoil is a plastic, impervious clay, with gray basic color, mottled with bright red and yellow. Though the upper layer of the virgin soil contains considerable organic matter, it soon loses this under cultivation and becomes light gray or where the soil is shallow yellowish-gray from admixture of material from the subsoil.

The Leaf fine sandy loam is one of the less important soils of the terrace area. It occupies a total area of about 6½ square miles in the second bottoms of Pea and Choctawhatchee Rivers. The largest area is developed south of Samson. The topography is flat, and the drainage is rather poor, owing to the impervious character of the subsoil. Part of the type is subject to overflow during abnormally high floods.

The native vegetation is largely longleaf pine, various species of oak, and gum. Only about 5 per cent of the type is under cultivation. This is used chiefly in the growing of corn and cotton. Velvet beans do fairly well, but not as well as on the well-drained sandy soils.

When thoroughly reclaimed, this type is rather easy to handle, and if plowed when in the proper moisture condition works up into a mellow seed bed. If worked when too wet it bakes and clods. Commercial fertilizers are used in the production of the staple crops. Drainage is the greatest need over a large part of the type. Ditches would probably serve the purpose in most cases.

This land is valued at \$10 to \$20 an acre, depending largely on drainage conditions.

MYATT FINE SANDY LOAM.

The surface soil of the Myatt fine sandy loam consists of a gray to almost black fine sandy loam, with an average depth of about 4 inches. This passes gradually into a brownish-gray loose-structured fine sandy loam, which grades at depths of 15 to 24 inches into a mottled gray and yellow, compact, friable sandy clay. In places the lower subsoil is tough and hard and approaches in structure the subsoil of the Leaf fine sandy loam. The soil is fairly high in organic matter. Practically all of the type is still in the virgin state. The cultivated soil has a light-gray appearance.

The Myatt fine sandy loam is a type of small extent developed chiefly on the second bottoms of Pea and Choctawhatchee Rivers and Double Bridges Creek. Some smaller areas lie on the second bottoms of the minor streams. Big Swamp constitutes one of the largest areas. The type occurs in close association with the other second-bottom types, and occupies low flats, depressions and sloughs. The surface is generally flat and slightly lower than the surrounding soils, and the drainage is very poor, water standing on the surface the greater part of the year.

The type was originally forested with sweet gum, red gum, tupelo gum, oak, ash, elm, beech, cypress, bay, and magnolia. Practically none of the type is under cultivation, and the land is used mainly as range for cattle, hogs, goats, and sheep. The price of this land ranges from \$5 to \$10 an acre, the price depending on drainage conditions.

SWAMP.

Swamp includes first-bottom alluvial material of such variable color and texture that satisfactory separation into series or types is impracticable. It lies only a few feet above the normal water level of the streams, and is therefore frequently overflowed. Much of it is under water a greater part of the year. Along the smaller streams the texture is mainly sandy loam, and in areas along the larger streams a brown silt loam underlain by a brownish-yellow to yellow friable silt loam. The land is used only for hog and cattle range during the driest months. It has a total area of 26.5 square miles, and is developed principally along the Pea River south of Samson and along the Choctawhatchee River east and south of Bellwood. The native forest consists chiefly of various species of oak and gum, ash, elm, cottonwood, and cypress. Some of the Swamp area, if drained would become good farm land, but the expense of reclamation would be greater than the value of the land warrants at this time.

SUMMARY.

Geneva County is situated in the southeastern part of Alabama. The topography ranges from almost flat to steeply rolling. As a whole the county is fairly well drained. The greater part of the drainage is carried by the Choctawhatchee River and its tributaries.

According to the census of 1920, Geneva County has a population of 29,315, all which is classed as rural. The principal towns are Geneva, Samson, and Hartford. Railroad facilities are good, and in general the county is provided with excellent earth roads. A large part of the county is provided with rural free delivery and telephones.

The average growing season is 252 days in length. The mean annual precipitation is about 54 inches and the mean annual temperature about 67° F.

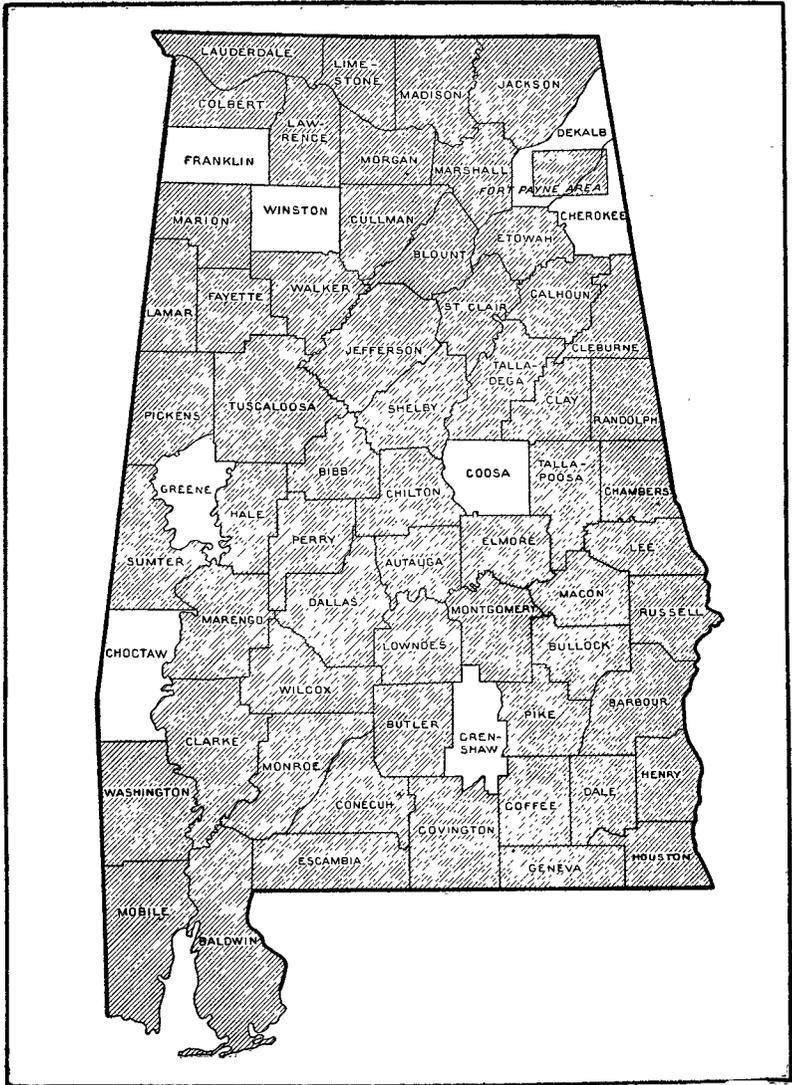
Corn, peanuts, and cotton are the principal crops, ranking in value in the order named. The raising of hogs is an important industry. The fattening of beef cattle and dairying are becoming more important. The farm improvements are fairly good and indicate a fair degree of prosperity.

No systematic crop rotations are followed. Large quantities of commercial fertilizers are used, but scarcely any barnyard manure is applied. Efficient farm labor is very scarce and often impossible to obtain.

The average size of farms is 71.7 acres. About 41.8 per cent of the farms are operated by owners and practically all the rest by tenants. About 79 per cent of the total area of the county is in farms, and of the land in farms 59.7 per cent is improved. The price of farm land ranges from \$5 to \$100 an acre.

The soils of Geneva County are derived mainly from unconsolidated sand and clay of the Coastal Plain deposits. The upland material has given rise to the Greenville, Orangeburg, Ruston, Norfolk, and Plummer soils. The second bottoms along the streams are occupied by the Cahaba, Kalmia, Leaf, and Myatt soils, and recent alluvial deposits along the streams are classed as Swamp.

The Greenville, Orangeburg, Ruston, and Norfolk soils are mainly devoted to the production of corn, peanuts, and cotton. The Plummer sandy loam is largely used as range for cattle, sheep, and hogs. The better drained soils of the second bottoms, such as the Kalmia and Cahaba, are used principally for the growing of corn, cotton, and peanuts. The Leaf fine sandy loam and Myatt fine sandy loam are at present utilized mainly for pasture. The first-bottom soil, Swamp, is used as range for hogs and cattle during the driest part of the year.



Areas surveyed in Alabama, shown by shading.

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