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UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF CHEMISTRY AND SOILS
In Cooperation with the Georgia State College of Agriculture

SOIL SURVEY
RANDOLPH COUNTY, GEORGIA

BY

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COUNTY SURVEYED

Randolph County is in the southwestern part of Georgia, about 10 miles east of Chattahoochee River and 65 miles north of the Georgia-Florida State line. It is irregular in outline but is roughly rectangular in shape, the maximum dimensions being 21 miles from north to south and 25 miles from east to west. The included area is 436 square miles or 279,040 acres.

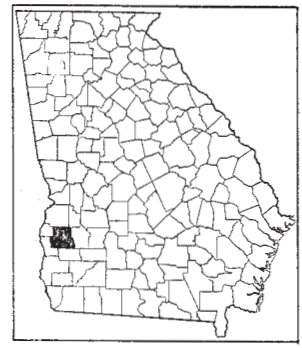

FIG. 1.—Sketch map showing location of Randolph County, Ga.

The greater part of Randolph County is a nearly flat or gently undulating plain, the surface of which is broken by numerous flat-bottomed depressions and low, flat-topped ridges. This plain is part of a physiographic feature known as Dougherty Plain. The northwestern part of the county, however, is a part of the "Fall Line Hills" and includes ridges and hills with rather steep slopes.

The ridge extending southwestward from a point in Stewart County north of Benevolence through Cuthbert and Coleman marks fairly well the line between the hilly part and the flatter, smoother part of the county. This ridge forms the divide between the Flint River and Chattahoochee River drainage basins. The most hilly and broken areas in the county are northwest of this ridge, as the drainage here flows directly into Chattahoochee River which has a drop in elevation of more than 250 feet within a distance of 20 miles. The streams and tributaries are actively cutting back and this part of the county is characterized by deep stream valleys with steep slopes. In places the land is badly dissected. The remainder of the county has no prominent topographic features. It is fairly smooth with the exception of narrow, and in places steep and eroded, belts along the stream slopes. Throughout the county most of the slopes on the south and east sides of the streams are abrupt and steep, whereas those on the north and west sides are longer and more gentle.

In the eastern and southern parts of the county there are numerous flat depressions and ponds or limestone sinks, many of which contain water through part or all of the year. These depressions are most

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numerous south of Dawson Road and east of Blakely Road. North of Cuthbert, in the vicinity of Wades, a number of distinct, small, steep-sided sinks are connected with underground drainage ways and do not hold water except after heavy rains. Most of the smaller sinks and depressions are round or oval, but the larger ones are of various shapes and range in size from less than an acre to the Hundred Acre Pond in the southeastern part of the county. The depressions are caused by a settling of the surface soil in consequence of the solution of some of the material in the underlying limestone formations.

The flood plains of the larger streams average about a hundred feet in width but in places attain a width of as much as half a mile. Very little of this bottom land is suitable for cultivation, owing to the variability of the soil and the fact that the wider bottoms are, for the most part, covered with water or are water-logged during most of the year. No well-defined or typical second bottoms or terraces have developed along the streams in Randolph County. In a number of places along the large streams in the western part of the county there are remnants of old high terraces. The edges of these have become so eroded and the drainage ways so well established that the surface relief is typical of the upland. Areas of this kind occur along Hog Creek and Taylor Branch, near their junction, and along Pataula and Punkin Creeks, and have been mapped with the corresponding upland soils. Small areas of low terraces are along Hog Creek, north and east of Coleman; along Cemochechobee Creek where tributaries enter the main valley; and in a few places along Ichawaynochaway, Pachitla, and Carter Creeks in the eastern part of the county. These areas are of such small extent and slight agricultural importance that they have not been mapped separately.

The highest elevation occurs on the drainage divide extending across the county. At Coleman the elevation is 391 feet above sea level and at Cuthbert is 446 feet. The elevation increases northeastward into Stewart County. At Shellman, on the eastern side of the county, the elevation is 379 feet; and at Morris Station, just outside the western edge of the county, along Holanna Creek, it is 242 feet. The maximum relief, or range between the highest and lowest points in the county, is about 350 feet. In the eastern part, where the relief is more subdued, the elevation ranges from 100 to 150 feet. The prevailing slope of the county is to the south and southwest.

The drainage of the western part of the county is through Pataula and Cemochechobee Creeks and their tributaries. These streams are tributaries of Chattahoochee River. The smaller streams have fairly swift currents, owing to their rapid descent to the main bottoms, and they are cutting back at their heads; the larger streams flow through wide, swampy bottoms and in places are so subdivided that it is difficult to determine the main channel. With the exception of these wide swamps and small seepy areas around springs at the heads of branches, this part of the county is well drained, and each farm has one or more drainage outlets. The drainage of the eastern part of Randolph County is through Ichawaynochaway, Pachitla, and Carter Creeks and their tributaries, into Flint River. In general, the streams in this section are more sluggish, are not cutting back so rapidly, and have wider stream bottoms or swamps than those west of the divide.

Randolph County was laid out in 1828, about 10 years after the troops under General Jackson blazed a trail through this section on their way to south Georgia and Florida to prevent Indian outbreaks. This territory had been acquired in 1825 by the State of Georgia from the Cherokee Indians, but little settlement was made until about 1830. The early settlers came principally from other parts of Georgia, the Carolinas, and Virginia. The present white population consists almost entirely of their descendants. According to the census, the population in 1920 was 16,721, 81.9 per cent of which was classed as rural. The average density of the rural population was 33.3 persons to the square mile. Negroes make up 65.8 per cent of the total population of the county. The most thickly settled areas are south and east of Cuthbert, in the vicinity of villages, and along the principal roads. Large areas in the sand-hill section west, south, and north of Coleman and extending north to the Stewart County line, and in the northeastern and eastern parts of the county between Benevolence and Terrell County and south of Brooksville, are uninhabited and practically abandoned, largely because of the migration of the negro tenant farmers northward.

Cuthbert, the county seat, largest town, and principal trading center, is in the central part of the county. In 1920 it had a population of 3,022. Several large cotton gins and warehouses, a sawmill, and a fertilizer factory are located here, as is also Andrew College, a denominational school for women. Shellman, in the eastern part of the county, is next in size and importance. In 1920 it had a population of 1,074. It is an important peach-shipping point and trading center for the eastern part of the county. The populations of other towns, as given by the 1920 census, are: Coleman, in the southwestern part, 342; Carnegie, in the southern part, 200; Benevolence, in the northern part, 219; and Springvale, in the northwestern part, 148. Box and peach-basket factories are located at Coleman and at Springvale.

A number of portable sawmills are in operation in various parts of the county, and the merchantable timber is rapidly being exhausted. Bauxite deposits in the northwestern part have been worked to some extent. Some fuller's earth and kaolin are also present. Limestone containing much lime carbonate is exposed near Griers Cave and along the old Lumpkin Road where it is crossed by Little Punkin Creek. Much of the lime used in the county was formerly quarried and burned at the latter point.

The Central of Georgia Railway crosses the central part of the county, running through Shellman, Cuthbert, and Springvale Station. A branch of this railroad runs from Cuthbert southwestward through Coleman to Fort Gaines, Clay County. The Georgia, Florida & Alabama Railway runs southward through Benevolence, Cuthbert, and Carnegie and affords shipping facilities to the northern and southern parts of the county.

The principal roads are built of local sandy clay material and are maintained in fairly good condition throughout the year. The two main roads across the county, the Dawson-Eufaula road running east and west and the Blakely-Cuthbert-Lumpkin road running north and south, are graded and kept in good condition by the State high-

way department. The more densely settled areas in the eastern, central, and southern parts are well provided with settlement and district roads. Rural mail routes extend into all sections, and telephone service is available over most of the county. Excellent centralized schools are maintained in Cuthbert and in other towns and communities. School busses serve the outlying districts.

Cuthbert, Shellman, and Coleman are the principal local markets for farm produce. Some cream is shipped to Montgomery, Ala., and Columbus, Ga. Cotton, peaches, and peanuts are marketed largely through exchanges and cooperative associations of growers in the larger cities in Georgia and the Northern States.

CLIMATE

The climate of Randolph County is characterized by short, mild winters and long, warm summers. The winters are characterized by more or less well defined cycles of a week or 10 days in length. A few warm days are followed by rain with subsequent clearing, lower temperatures, and a gradual return to warm days. Although the temperature rarely goes below freezing, the cold, owing to the comparatively high humidity, is more penetrating than in sections farther north and in higher altitudes. The coldest weather usually comes in January. As a rule, the weather is such as to allow farmers to do a considerable amount of plowing and preparation of land for crops in the winter. Grazing is afforded throughout most of the year, and there is little need for shelter for livestock. Spring is usually pleasant, although in some years fruit and early vegetables suffer from unseasonably low temperatures.

The average length of the frost-free season is 240 days. Summer is hot, the temperature being sometimes as high as 105° F. and averaging 81°. However, the heat is usually tempered at night by cool south breezes. The fall is warm and dry, affording ample opportunity for harvesting crops.

The average annual rainfall is 50.02 inches. The heaviest precipitation occurs during the summer months, July, with a rainfall of 6.43 inches, being normally the wettest month. Fall is the driest season of the year.

Altogether the climate of Randolph County is well adapted to a wide variety of crops. Winter wheat, rye, oats, and winter and early spring vegetables can be grown. Early peas, beans, and potatoes can usually be planted early in March with a considerable degree of certainty that they will not be injured by frost. This region is noted for its great variety and profusion of wild and cultivated spring flowers and shrubs.

The accompanying table gives the normal monthly, seasonal, and annual temperature and precipitation as recorded at the Weather Bureau station at Fort Gaines, in Clay County. These data are fairly representative of conditions in Randolph County.

Normal monthly, seasonal, and annual temperature and precipitation at Fort Gaines, Clay County

[Elevation, 166 feet]

Month	Temperature			Precipitation			
	Mean	Absolute maximum	Absolute minimum	Mean	Total amount for the driest year (1904)	Total amount for the wettest year (1912)	Snow, average depth
	°F.	°F.	°F.	*Inches*	*Inches*	*Inches*	*Inches*
December	49.9	81	12	4.46	4.85	4.35	Trace.
January	49.0	83	13	4.24	4.50	9.15	Trace.
February	50.3	84	−2	5.70	4.25	4.84	0.2
Winter	49.7	84	−2	14.40	13.60	18.34	.2
March	59.2	92	21	4.81	2.00	7.13	0
April	65.7	94	32	3.76	2.02	9.87	0
May	74.6	100	41	2.45	1.49	2.71	0
Spring	66.5	100	21	11.02	5.51	19.71	0
June	80.3	103	47	4.21	1.68	3.46	0
July	81.6	105	56	6.43	2.02	7.51	0
August	81.1	104	59	5.68	5.87	9.29	0
Summer	81.0	105	47	16.32	9.57	20.26	0
September	77.2	100	42	2.95	.80	4.95	0
October	66.8	99	29	2.53	.00	2.57	0
November	57.2	88	21	2.80	2.92	4.85	.1
Fall	67.1	100	21	8.28	3.72	12.37	.1
Year	66.1	105	−2	50.02	32.40	70.68	.

AGRICULTURE

When the first settlers reached Randolph County it was heavily forested. Short-leaf and long-leaf pine predominated on the sandy lands and oak, hickory, and other hardwoods on the heavy-textured soils and on the moist bottom lands. Lands along the stream slopes and the well-drained ridges and uplands in the western, central, and northern parts of the county were the first to be taken up, and the forest cover was removed in preparation for crops. Much of the "red lands" and pebbly lands were not considered productive because they supported a hardwood forest and because the heavier soil was difficult to cultivate. The flat and depressed areas of the Blakely soils and the limestone sink ponds of the Grady soils were regarded as objectionable. Hence the Greenville, Blakely, and Carnegie soils have been generally brought under cultivation more recently than other soils. These are now regarded as the most desirable agricultural land in the county.

The crops grown by the early settlers were largely subsistence crops, such as corn, oats, rye, and wheat. Cattle and hogs were allowed to range the open woods. These animals, with an abundance of game, furnished meat for the settlers. Transportation facilities to the north in the early days consisted principally of coach roads from Lumpkin and Columbus. Fort Gaines, on Chattahoochee River, was the principal shipping point for produce and supplies before the advent of the railroad about 1860. After the Civil War the farmers

were much impoverished and the need of a cash crop was so urgent that the growing of cotton, which was greatly needed in the North and brought ready cash, resulted in a system of cotton farming. Few farmers at that time raised sufficient foodstuffs and feed to supply their own needs.

Cotton continued to be the principal crop and was grown on a constantly increasing acreage until in 1909 the maximum of 59,809 acres was reported. Corn was also grown on a larger acreage each decade, reaching the maximum of 44,767 acres in 1899. Oats were formerly of considerable importance, but since 1889 the acreage devoted to this crop has been greatly reduced. Cotton continued to be the crop of major importance until about 1916, when the boll weevil began to make serious inroads. Since that time the acreage in cotton has been decreased to about three-fifths of the acreage in 1909. The acreage in corn has increased slightly, and peanuts have replaced some of the cotton. At the present time cotton occupies the principal place in the scheme of agriculture. It is followed in importance by corn, peanuts, and hay crops. Peaches are an important special crop, and pecan trees are rapidly being set out, in many places being interplanted in the peach orchards.

According to the 1920 census, 34,372 acres, or 29.2 per cent of the acreage of arable land, were planted to cotton in 1919. The average yield was slightly more than one-fifth bale to the acre. The acreage for 1924 is reported to be about 10 per cent less. In 1919 corn was grown on 38,650 acres, or 32.8 per cent of the arable land in the county. The average yield was 9.1 bushels to the acre. Peanuts were grown on 7,508 acres, or 6.4 per cent of the arable land, and hay crops on 3,711 acres, or 3.1 per cent of the arable land in the county. Peanut yields average about 20 bushels to the acre, but individual yields as high as 45 bushels have been reported. At present prices peanuts are a profitable cash crop, and the acreage is increasing. The small Spanish variety is commonly grown for market, but the large white peanut is grown in places for hog grazing. The peanut vines are used for hay. According to the 1920 census, there were 1,375 acres in oats and 455 acres in wheat. The average yield of oats was 18 bushels to the acre. Fulghum and Red Rustproof (Texas Rustproof) are the varieties commonly grown. Some corn, oats, and hay are shipped into the county each year, as the local production does not supply the demand.

Most white farmers raise enough hogs to supply their own meat needs, but many tenant farmers are dependent on others for their meat supply. A number of cattle are grazed, particularly in the more hilly sections where the rougher lands, bottoms, and swamps are devoted mainly to pasture. A few years ago several farmers began to raise and feed cattle rather extensively. They met with little success and soon abandoned the enterprise. Little meat, except smoked and salted pork products, is shipped into the county. Dairying is not carried on widely but is of some importance near Cuthbert and Shellman. A few farmers ship cream to outside markets. Poultry raising is growing in importance, and a number of purebred flocks of standard breeds are being developed. Tobacco was formerly grown, but lack of experience in its culture and management resulted in losses and a subsequent complete abandonment of the crop.

Sweet potatoes and sugar cane are grown on most farms to supply the home needs. Velvet beans are an important crop, being planted principally in the corn and used largely for pasturage and ground feed for livestock. Brabham is the common variety of cowpea grown both for seed and hay.

Some recognition is given by farmers to crop adaptation of the various soils. For example, peanuts and sweet potatoes are commonly planted on the sandy soils, whereas the heavy soils of the Greenville and Blakely series are thought to be best suited to peas, grain, and hay. The pebbly soils are most sought for cotton, and the red soils, particularly Greenville pebbly loam, are recognized as well suited to peaches. Many of the steeper slopes, after having been cultivated for several years, have become eroded in spite of more or less terracing and have been abandoned and allowed to grow up in broom sedge and briers. Such areas are gradually reverting to forest by the rapid reproduction of pines and oaks. Much of the sandy soil, such as Norfolk sand, Ruston sand, and Orangeburg loamy sand, is cultivated for two or three successive years and is then allowed to lie fallow for a year or two. On these soils the organic-matter content seems to be the limiting factor in crop production. The turning under of sedge and other growths tends to prevent the depletion of this substance.

Cotton is grown, with varying results, on practically all the soils of the county. Success depends on the productive capacity of the soil itself, on the kind and quantity of fertilizers applied, and on the frequency of cultivation. The best results are obtained on Carnegie sandy loam, Greenville pebbly loam, and Marlboro sandy loam, the pebbly lands in particular being high producers. Petty's Toole and Cleveland are probably the cotton varieties most widely planted in Randolph County.

Most of the fertilizers used in the county are applied to the cotton fields. The kinds and quantities of fertilizer applied vary widely. Probably the most widely used commercial fertilizer is a 3–9–3 [1] mixture applied at the rate of about 200 pounds to the acre at the time of planting. Many farmers, however, make additional applications in May of a complete fertilizer or of nitrate of soda at the rate of from 75 to 100 pounds to the acre. Some cotton farmers apply fertilizer at rates ranging from 600 to 800 pounds to the acre. On the Carnegie and lighter colored soils, fertilizers containing from 4 to 6 per cent of potash are used by many farmers. A large number of farmers are now mixing their own fertilizers.

Fertilizers are not so extensively used for corn as for cotton. In many cases, no fertilizer is applied at the time of planting, but from 50 to 100 pounds of nitrate of soda are applied by many farmers as a side-dressing after the corn is about knee high. Most of the barnyard manure is scattered on the cornland. Little attention is given to the varieties of corn grown, although the prolific varieties, such as Hastings Prolific, are most commonly planted.

Although in some cases no fertilizer is applied with the oats, the better farmers usually make a light application of a mixture analyzing about 3–9–3 or of superphosphate (acid phosphate) alone and

[1] Percentages, respectively, of nitrogen, phosphoric acid, and potash.

then apply from 50 to 100 pounds of nitrate of soda to the acre in the spring.

According to the 1920 census, the use of fertilizers was reported by 88.8 per cent of the farmers in the county. The total amount spent for this purpose in 1919 amounted to $255,629 or $124.39 a farm.

The sandy soils are ordinarily selected for peanuts, owing to the greater ease of cultivation and harvesting. When peanuts are grown on heavy soils, some of the soil clings to the nuts and makes them more difficult to handle. Spanish peanuts are used chiefly by oil mills and candy makers. The demand for them by the oil mills is heavy, especially since the boll weevil has reduced the quantity of cottonseed produced. The Georgia and North Carolina running varieties are commonly used for pasturage for hogs.

Peaches are the most important orchard fruit and constitute one of the most important special crops grown in the county. The 1920 census reports 73,177 bearing peach trees in the county in 1919. These trees yielded 20,612 bushels of fruit. Several large orchards have been set out, and others have come into bearing since that date. All the large commercial orchards are on the Greenville soils, principally Greenville pebbly loam and Greenville clay loam, smooth phase. These soils are well adapted to peaches and produce fruit of the highest quality. The selection of varieties is a very important factor in the success of commercial orchards. Hiley Belle is very popular and is especially adapted to this section of the State. Other varieties grown successfully are Belle of Georgia, Carman, and Elberta.

Many pecan trees are being set out in the county. The profitable returns obtained by those who have been in the pecan industry for some time has given a strong impetus to the planting of trees. Plantings are being made irrespective of soil types but generally on soils which have a good sandy clay or clay subsoil within 1 or 2 feet of the surface. The best growth of recent plantings has been made on the Greenville, Orangeburg, and Carnegie soils. Many peach growers have interplanted pecans in their peach orchards. Schley and Stuart are the pecan varieties most commonly planted. Several old orchards of seedlings have been budded with papershelled varieties. Pecan growing is receiving considerable attention and bids fair to become of great importance in the agriculture of the county.

The sandy soils of the county are well suited to the growing of vegetables and berries, and recently the growing of asparagus has received some attention. Such soils as Orangeburg sandy loam and its deep phase, Orangeburg loamy sand, Norfolk sandy loam, and some of the Norfolk sand are especially adapted to asparagus culture. The growing of tomatoes and peppers has also been found profitable. Watermelons are planted to some extent on the sandy soils. In 1924 fairly large acreages near Springvale were devoted to this crop.

The seeding of permanent pastures is receiving some attention among the farmers of the county. Many of the stream bottoms which are not well suited to cultivated crops are adapted to pasture grasses. Carpet grass, especially, does well on the low moist lands. Dallis grass thrives on the better drained areas of the lowlands, whereas Lespedeza does better on the higher, better drained soils. Bermuda

grass, Lespedeza, and broom sedge, before it becomes too woody, furnish most of the pasture, although switch cane and various swamp grasses furnish considerable pasturage during the winter. Acorns and nuts supply some mast for hogs. Alfalfa is grown successfully in near-by counties, especially on the Greenville soils where the land was limed and the seed inoculated.

Small patches of sugar cane and sorghum are grown for home use on moist lower slopes and bottom lands. Except on the larger plantations, farm buildings are small, as little need exists for shelter for livestock or for storage space for much stock feed. The equipment on the tenant farms consists largely of one-horse implements, but the larger plantations are generally well equipped with two-horse plows, grain drills, and binders, and on many farms where the surface is such as to allow their use tractors and heavy plows, and on some farms threshing outfits, are kept. Most of the work animals are mules, although oxen are used in lumbering operations around some of the sawmills.

Soil erosion is one of the most important problems on the farms of the county. Where the land is sloping it is absolutely essential to construct terraces in order to control erosion. If they are properly built, with broad bases and correct slopes, the upkeep of the terraces is not difficult, and they do not interfere with cultivation.

Definite rotations are not commonly followed, although cotton grown in a field for two or three years is generally succeeded by corn for a like period of time.

The white owners of small farms and most of the negro farmers depend upon themselves and the members of their families for labor. Practically all of the hired laborers are negroes. Since the World War the emigration of the negroes northward has seriously reduced the supply of labor and has resulted in the abandonment of large acreages, particularly in the sandy lands near Brooksville and Coleman and in the more hilly regions in the northern and western parts of the county. Some of the best types of soil in the county are included in these districts. According to the 1920 census, 46.8 per cent of the farms of the county reported an expenditure for labor of $122,604, an average of $113.21 for each farm reporting. Sufficient labor for picking and handling the peach crop seems to be available. Much fruit is picked by negro women and children, many of whom come from towns and villages to engage in this work. Wages for farm labor range from $20 to $30 a month, less being paid where board is furnished. Laborers gathering the peach crop are paid either by the day or by the basket.

The 1920 census reports 2,315 farms in Randolph County. These include 71.8 per cent of the land in the county. The average size of the farms (each tenancy being classed as a farm) is 81.8 acres, which is a decrease of 13.5 per cent since 1910. The individual holdings range from a few acres to large plantations of several thousand acres. Large holdings are very common, but as most of the owners live in town, these holdings are not so carefuly developed and maintained as they would be if the owners lived on the land. Much of the hilly, cut-over land is held in large tracts in conection with a much smaller area of tillable land. Tenant farming is on the increase. In 1920,

79.1 per cent of the farms were operated by tenants and 20.1 per cent by owners. Under the share-rent system, as operated in Randolph County, the owner furnishes the land, livestock, and tools, one-half the fertilizer, and one-half or all the seed, and the products are divided equally between owner and tenant. A few farms are rented for cash and others for a certain amount of cotton, but since the advent of the boll weevil these systems have been practically discontinued.

SOILS

Randolph County is in the southwestern part of Georgia, in the high part of the coastal plain region, and is largely in the so-called "red lands" belt. The western side, or practically one-third of the county, is covered by gray soils, and the remainder comprises areas of typical red soils. A glance at the soil map reveals the distribution of the dominant soils of the county. The particular distribution is probably the result, in a large measure, of the underlying formations and, to some extent, of erosion and leaching of the original materials. The larger areas of the Norfolk, Cuthbert, and Susquehanna soils occur in the western part of the county. The Carnegie soils are in the south-central part and along the Calhoun County line. The broadest belts of the "red lands," included in the Greenville series, are in the central, northeastern, and southeastern parts of the county, and the Ruston soils are well distributed across the northern part.

The soils of Randolph County are prevailingly light in color, the surface soils ranging from light gray to red. This light color indicates that they are poorly supplied with organic matter. The darkest soils, ranging in color from dark gray to black, occur in the depressions or sinks under rather swampy conditions. As the county was forested until it was reclaimed for agriculture, it lacked the grass which favors the accumulation of organic matter in the soils. In the wooded areas there is a noticeable quantity of rather coarse vegetable matter in the soil near the surface, but the plant remains have not become incorporated in the soil, as in areas originally covered with grass.

The soils have been strongly leached, owing to heavy rainfall and comparatively high temperatures. Carbonate of lime has not accumulated. Furthermore, the original carbonates in the parent geologic materials from which many of the soils have developed have been entirely removed to a depth of many feet. Very few of the soils are decidedly acid, though practically all of them respond to liberal applications of lime. This is particularly true of the Grady soils and of muck. Most of the soils of the county owe their origin to the weathering of the underlying beds of clay, sandy clay, sand, and limestone. The Greenville soils have apparently been influenced to some extent by the underlying siliceous limestone. Henderson stony loam seems to be derived from this limestone, as outcrops of it are common throughout the area of that soil, and fragments are present throughout. The Susquehanna and Cuthbert soils have been derived largely from beds of light-gray or bluish-gray laminated clay which contains thin streaks of brownish-yellow fine sand or in places, as in the Cuthbert soils, from tough, red, yellow,

and purplish clays. Below the heavy and well-oxidized subsoil, or horizon B, is mottled, blotched, or streaked, hard but brittle sandy clay or loose sand.

Underlying the soils of Randolph County is the Vicksburg [2] formation which consists of white siliceous limestone, sand, and clay. The limestone has been extensively silicified, and the formation in many places is characterized by the presence of flinty fragments and large siliceous bowlders. Outcrops of these materials are seen in the southwestern part of the county and along the streams in other parts. The Claibourne group of sands and clays, sandy limestone, red, and varicolored sands occurs throughout the central part of the county. In the extreme northwestern corner there are small areas of the Midway formation of sands, clays, and marls. Midway limestone crops out along Little Punkin Creek, just south of Punkin Creek Church, and also in the vicinity of Griers Cave to the northwest.

One of the characteristic features of the soils of the Carnegie series, of some members of the Greenville series, and to a less extent of some of the Ruston and Orangeburg soils, is the presence of large quantities of small, rounded, hard, brown or almost black iron concretions. These are very abundant in Carnegie sandy loam and Greenville pebbly loam.

The most striking features of the texture profile of the well-developed soils in the county are (1) a comparatively light textured topsoil, or A horizon, and (2) a heavier textured subsoil, or B horizon. The material which constitutes the substratum, or C horizon, may vary considerably in texture, but in most places it is heavier in texture than the surface material and lighter than the subsoil, or horizon B. The texture of each of these layers varies greatly, the surface layer ranging from clay loam to sand and the subsoil from clay to very light sandy loam or sand. The substratum, or horizon C, consists of unconsolidated geologic material that is extremely variable in color, texture, and structure. The thickness of these soil layers also varies widely, that of the topsoil, or horizon A, varying from a few inches in the case of the clay loams to several feet in the most sandy soils.

The soils of Randolph County may be classified in two main groups. The first group includes all the Greenville, Blakely, Orangeburg, Norfolk, Carnegie, Marlboro, Ruston, Susquehanna, and Cuthbert soils. These soils have well-defined layers. This group may be subdivided into two subgroups on the basis of the color profile, or the successive color layers or horizons of the soil.

The soils of the first subgroup, including the Norfolk, Marlboro, Carnegie, and Ruston soils, are characterized, in the virgin condition, by a color profile which may be described from the surface downward as follows: (1) A layer of dark-colored leaf mold mixed with the mineral constituents of the soil. If the material is mainly sand, the grains are as a rule gray or brown and are rather well mixed with the organic matter. This layer may be a mere film or may have a thickness of 3 inches. It is in most places thickest in the sandy soils. (2) A pale-yellow or grayish-yellow layer of loose or single-grained material which contains very little organic matter. In the sandy soils

[2] McCallie, S. W. THE GEOLOGY OF THE COASTAL PLAIN OF GEORGIA. Geol. Sur. of Ga., Bul. 26, pp. 3–6–324, illus., 1911.

this layer may be as thick as 2 or more feet. These two surface layers constitute the comparatively light textured topsoil, or horizon A. (3) A yellow or reddish-yellow subsoil, or horizon B. In the Carnegie soils the subsoil is reddish yellow; in the Ruston soils it varies from yellowish red to yellowish brown. (4) A layer of material which may be reddish, grayish, yellowish, or whitish and mottled. This layer corresponds to the substratum layer of the textural profile. Since this layer is a part of the parent material, its color varies not only with the soil but varies somewhat in different places in an area of a given type of soil.

The second subgroup of soils, differentiated on the basis of the color of the several layers, includes the members of the Greenville, Blakely, and Orangeburg series. The Greenville and Blakely soils are characterized by a brown or reddish-brown topsoil and a red or dark-red subsoil. The Orangeburg soils have grayish-brown surface layers, brownish-yellow subsurface layers, and light-red subsoils. The color of the parent materials which underlie these soils is similar to that of the corresponding layer in the first subgroup, except that there are present an abundance of purplish or reddish mottles or streaks, and that the percentage of soft iron concretions is larger. In these normally well developed soils, such as members of the Norfolk, Marlboro, Orangeburg, Greenville, Ruston, Carnegie, and Blakely series, the intermediate and comparatively heavy layer, or horizon B, is friable and crumbly sandy clay which in the Marlboro, Carnegie, Greenville, and Blakely soils is somewhat sticky. The surface soils in this group, excepting those of Greenville clay loam and Blakely clay loam, are typically very light in texture, being light sandy loam or loamy sand. There is a markedly wide difference between the texture of the surface material and that of the intermediate heavier layer. There is also much difference in the color, structure, and texture of the parent material, or horizon C.

In the Susquehanna and Cuthbert soils the color of the topsoil, or horizon A, is similar to that of members of the first group, but the color and structure of horizons B and C are markedly different. In the Cuthbert soils, the color of the B horizon is similar to that of the corresponding layer in the Ruston soils, but the material is heavier. In the Susquehanna soils, horizon B is mottled yellow, red, and gray plastic clay. The parent material, or horizon C, consists of light-gray or bluish-gray laminated clay or compact sandy clay.

In addition to the soils which have well-developed profiles, there are in the county the soils of the Henderson and Grady series and the miscellaneous classes of land, meadow, muck, swamp, and rough gullied land. The topsoil, or horizon A, of the Grady soils may be of light or heavy texture, but the subsoil, or the material of horizon B, is commonly heavy and tough and lacks uniformity of color. The Henderson soils bear a close relation to the underlying siliceous limestone.

The various soils of Randolph County have been classified in series on the bases of origin, color, and structural characteristics. Each series includes soils which are differentiated on the basis of the texture of the surface soil. The texture is determined by the proportion of sand, silt, and clay entering into the composition of the

surface material. In this county there are 11 soil series, including 22 soil types, in addition to the miscellaneous classes of land, meadow, muck, swamp, and rough gullied land.

The Greenville series includes soils whose topsoils vary in color from brown to red and whose subsoils are heavy, stiff, slightly sticky sandy clay or loamy sand. Small, rounded, brown or almost black iron concretions are present on the surface and through some of the heavier soils. In Randolph County, the soils of this series mapped were the loamy sand, sandy loam, pebbly loam, and clay loam, with a smooth phase.

The Blakely soils occur in close relationship to the Greenville but differ from them in having dark-brown or dark reddish-brown topsoils and dark-red or maroon-red subsoils of firm, rather stiff, smooth clay which contains a few small black concretions or specks. These soils produce strong effervescence when treated with a 15 per cent solution of hydrogen peroxide, thus indicating the presence of manganese. Blakely loam and Blakely clay loam were mapped in this county.

The Orangeburg soils are characterized by surface layers varying from gray to light brown, by yellow and brownish-yellow subsurface layers, and by bright-red, friable and crumbly sandy clay or loamy sand subsoils which are lighter and more friable than in the corresponding soils of the Greenville series. The loamy sand, sandy loam, and a deep phase of the sandy loam member of the Orangeburg series occur in Randolph County.

The soils of the Norfolk series have gray surface soils, yellow or grayish-yellow subsurface layers, and yellow, friable and crumbly sand or clay subsoils. Norfolk sand and Norfolk sandy loam were mapped in this county.

The Carnegie soils are characterized by light-brown or grayish-brown topsoils and deep-yellow or faintly reddish yellow firm but friable and slightly sticky sandy clay and clay subsoils. Scattered over the surface and distributed through the topsoil and to a less extent in the subsoil, are quantities of small rounded reddish or brown iron oxide accretions. Carnegie sandy loam occurs in this county.

The Marlboro soils differ from the Carnegie mainly in their freedom from iron oxide concretions; they differ from the Norfolk soils in having slightly more sticky and crumbly but heavier subsoils. Marlboro sandy loam has been mapped.

The soils of the Ruston series have gray or grayish-brown surface layers, subsurface layers which vary from pale yellow to brownish yellow, and subsoils which vary in color from reddish yellow to yellowish brown and in texture from friable, crumbly, sandy clay to sand. These soils occur in close association with the Norfolk and Orangeburg soils. The coarse sand, sand, loamy sand, sandy loam, and coarse sandy loam members of the Ruston series were mapped.

In the Susquehanna series, the one important characteristic is the plastic clay subsoil which is intensely mottled with red, yellow, and light gray. The topsoil is gray. Susquehanna sandy loam occurs in Randolph County.

The Cuthbert soils have gray surface layers, yellow subsurface layers, and hard, tough, compact clay subsoils which vary in color

from reddish yellow to yellowish brown. These features of the subsoils constitute the principal differences between the Cuthbert and the Ruston soils. Cuthbert sandy loam has been mapped in this county.

The Henderson soils have gray topsoils and tough, stiff clay subsoils mottled with red and yellow and containing a large quantity of soft cherty or siliceous limestone. Henderson stony loam is mapped.

The soils of the Grady series have gray or dark-gray topsoils and light-gray or bluish-gray sticky subsoils which are mottled with yellow, red, or brown. These soils are poorly drained and occur in depressions or limestone sinks in mapped areas of the Greenville and Carnegie soils. Grady sandy loam and Grady clay loam were mapped in Randolph County.

Muck consists of fairly well decomposed vegetable matter mixed with more or less mineral matter. Meadow and swamp are alluvial materials so variable in texture, color, and structure that no type separation could be made. Swamp differs from meadow in being permanently wet. Rough gullied land includes rough, steep, broken, and eroded or gullied areas that are practically nonagricultural.

In the following pages of this report the soils of Randolph County are described in detail and their relation to agriculture is discussed; their distribution is shown on the accompanying map; and their extent is shown in the following table:

Acreage and proportionate extent of the soils mapped in Randolph County, Ga.

Type of soil	Acres	Per cent	Type of soil	Acres	Per cent
Greenville sandy loam	31,936	11.4	Ruston sand	12,800	4.6
Greenville loamy sand	16,064	5.7	Ruston coarse sand	1,984	.7
Greenville pebbly loam	10,880	3.9	Marlboro sandy loam	2,432	.9
Greenville clay loam	13,824	7.2	Norfolk sand	38,912	14.0
Smooth phase	6,016		Norfolk sandy loam	2,496	.9
Blakely loam	3,392	1.2	Susquehanna sandy loam	6,592	2.4
Blakely clay loam	2,880	1.0	Cuthbert sandy loam	11,584	4.1
Carnegie sandy loam	12,672	4.5	Grady sandy loam	448	.2
Orangeburg sandy loam	26,304	10.6	Grady clay loam	1,984	.7
Deep phase	2,752		Meadow	15,232	5.4
Orangeburg loamy sand	11,776	4.2	Muck	960	.3
Henderson stony loam	7,552	2.7	Swamp	15,296	5.5
Ruston sandy loam	9,792	3.5	Rough gullied land	5,632	2.0
Ruston coarse sandy loam	1,984	.7			
Ruston loamy sand	4,864	1.7	Total	279,040	

GREENVILLE SANDY LOAM

In wooded areas the surface layer of Greenville sandy loam consists of dark grayish-brown or brown loamy sand containing considerable organic matter and having a thickness ranging from 2 to 5 inches. This material grades downward into reddish-brown or red light-textured sandy loam or loamy sand which is loose, mellow, and friable. The subsoil, below a depth varying from 8 to 12 inches below the surface, is deep-red rather heavy sandy clay which is slightly tough and sticky, which breaks into irregular lumps showing no definite cleavage lines or stains along the breakage lines, and which finally crumbles into small particles or a structureless mass. The subsoil is heavier in texture than that of the Ruston, Orangeburg, and Norfolk soils. In most places, below a depth of 50 or 60 inches the subsoil grades downward to mottled or streaked light-red,

purplish, yellowish, and light-gray sandy material which is hard and brittle and which contains a few iron concretions.

In places the surface soil is deeper and consists of heavy sandy loam or loam that is somewhat darker red than typical Greenville sandy loam. Where this soil is associated with Orangeburg sandy loam, the surface soil is lighter brown and the two soils grade into each other. Along small drainage ways and on slopes the sandy surface material has been washed off, exposing the red sandy clay subsoil. Such areas are too small to be shown on the map.

Greenville sandy loam is one of the most important and most extensive agricultural soils in the county. It occurs principally in the central and southeastern parts. Smaller areas are scattered through the central, eastern, and southern parts of the county. The surface varies from level to undulating or slightly rolling, and drainage is everywhere well established.

About 90 per cent of this soil is cleared of its mixed forest growth of hardwood and pine. Cotton, corn, peanuts, and oats are the principal crops, and peaches constitute the leading special crop in the eastern part of the county. Yields are very nearly equal to those on the smooth phase of Greenville clay loam. This soil is easily cultivated and very highly prized by farmers, particularly for cotton and peaches. Yields of cotton range from one-fourth to three-fourths bale to the acre, although more than 1 bale to the acre has been reported on a few fields. Even during years of unusually heavy rainfall in the spring and summer months, yields are higher on this soil than on the other soils in the county, with the exception of Greenville pebbly loam and Carnegie sandy loam. Corn produces from 15 to 30 bushels to the acre, and oats and peanuts do well. A 3–9–3 fertilizer is most commonly used and is applied at the rate of from 300 to 500 pounds to the acre.

The current value of this land ranges from $30 to $100 an acre, depending on location and improvements.

Greenville sandy loam is adapted to all the cultivated crops that are grown in this county. The ease with which it is cultivated makes it a most desirable soil. It is not so well suited to small grains and grasses as the heavier textured Greenville clay loam. Deeper plowing, the incorporation of organic matter, and rotation of crops would materially aid in increasing and maintaining its fertility. A few of the better farmers are using a high-analysis fertilizer, such as a 4–10–4 instead of the usual 3–9–3, and are applying from 300 to 450 pounds to the acre.

GREENVILLE LOAMY SAND

To a depth ranging from 6 to 10 inches, Greenville loamy sand consists of reddish-brown or brownish-red very light loamy sand or sand. In virgin areas the surface layer, to a depth of 2 or 4 inches, has a more grayish cast owing to the presence of organic matter and the washing of the quartz sand particles. The subsoil is red, slightly sticky loamy sand which becomes heavier between depths of 18 and 30 inches. This red loamy sand layer is, in most places, from 4 to 8 feet thick and grades downward to the partly weathered yellow sandy material from which the soil has developed.

Near the boundaries where this soil grades into sandy loam it has more body, and the texture becomes heavier with depth. Where closely associated with the Orangeburg soils, the surface soil may be gray in color. Small areas of Orangeburg loamy sand and Greenville sandy loam are included in mapped areas of this soil, owing to their close association and small extent. Along both sides of Pachitla Creek and extending 3 or 4 miles south of Pachitla, much of the soil is slightly heavier in texture than typical loamy sand. Near Brooksville and in a few places in the central and southern parts of the county included patches have a darker surface material than typical and when wet, resemble Blakely loam. In the southwestern part of the county this soil contains a considerable proportion of coarse sand particles.

Greenville loamy sand occurs extensively in the eastern half of the county, principally on the lower slopes along Ichawaynochaway and Pachitla Creeks and their tributaries. It also occurs in many places on the upper courses of these streams around the heads of small drains. It occupies long gentle slopes leading to the streams, and a few areas are in shallow basinlike depressions in interstream areas. Small patches of this soil occur on slopes in close association with Henderson stony loam. In these positions the soil seems to have developed from beds of sand which lie beneath the siliceous formation and from which the Henderson soil has developed. The largest areas are east and north of Shellman, along Pachitla Creek below Harts Mill, east and southwest of Union Grove Church, scattered through the central and eastern parts of the county, and near Brooksville.

Because of the openness and porosity of this soil, the drainage is good. Gullies develop rapidly in the steeper areas unless contour plowing and terracing are practiced.

Scattered scrub oak and long-leaf and short-leaf pine formed the original forest growth, but practically all of the soil has been cleared. About 80 per cent of it is now under cultivation. Corn and peanuts are the principal crops, although cotton is grown extensively. On the more productive and heavier textured areas, yields compare very favorably to those produced on Greenville sandy loam, but in most areas crops suffer during continued dry weather. This soil is especially adapted to such crops as asparagus, watermelons, and cantaloupes. On account of its light texture it is easily cultivated with light implements at all times.

Greenville loamy sand contains very little organic matter, and because it is porous and sandy organic matter and other plant-food elements are rapidly depleted and require constant replenishing if the soil is to be utilized efficiently. Frequent plowing under of legumes will not only maintain the supply of organic matter but will also retard the rapid leaching and removal of other elements and increase the water-holding power of the soil.

GREENVILLE PEBBLY LOAM

The surface soil of Greenville pebbly loam is brown or reddish-brown loam or sandy loam, from 5 to 8 inches deep, which contains an abundance of red iron pebbles. The subsurface material is red or reddish-brown friable sandy loam, and the subsoil, below a depth

varying from 12 to 15 inches, is red, friable, but somewhat sticky, heavy sandy clay or clay. Greenville pebbly loam characteristically has a more sticky subsoil than the other members of the Greenville series, owing to its higher content of fine material.

In places, particularly on slopes and knolls, the surface covering of loam is very shallow, and the soil approximates pebbly clay loam. In other places the sandy surface layer is deeper, and areas of pebbly sandy loam are included. The number of pebbles present is variable, and in places, to a depth of 4 or 5 inches, the surface layer consists of a mass of iron pebbles with a small quantity of sandy or loamy material. The small iron pebbles are distributed throughout the subsurface layer and the subsoil. Where this soil occurs in association with Carnegie sandy loam, the subsoil has not so deep a red color as it has in the typical soil. In small included patches on knolls or low swells or at the heads of drainage ways, the underlying formation lies near the surface and consists of incompletely weathered and poorly aerated parent material. These areas have a mottled gray, purple, and rust-brown subsoil below a depth of about 20 inches. On the slopes below this soil, Greenville clay loam has developed.

Greenville pebbly loam occurs on smooth, broadly rolling swells or ridges and on level or undulating interstream areas. The drainage is well established, and the slopes or undulations make terracing necessary to prevent erosion. The largest areas are west, south, and southwest of Cuthbert, east of Blakely Road, near St. Marys Church, between Shellman and Aycochs Mill, east of Bells Mill, near Union Grove Church, and north and northeast of Cuthbert. Other areas are mapped in the central and eastern parts of the county.

This is one of the most highly prized soils in Randolph County, and all of it has been cleared. It is particularly desirable for cotton and together with Carnegie sandy loam comprises the best land for that crop in the county. Peach growers consider it the best for peach orchards, both because it is easily cultivated and because it produces peaches of higher color and better shipping qualities than do the other soils of the county.

All the general crops of the county are grown on this soil. Cotton yields from one-fifth to one-half bale to the acre, averaging about one-fourth bale, and several of the more progressive farmers, by the use of high-grade fertilizers, careful management, cultivation, and poisons, are obtaining from three-fourths to 1 bale to the acre. Corn yields from 15 to 30 bushels to the acre, although yields as high as 45 bushels have been reported. Peanuts have recently become of considerable importance and yields ranging from 25 to 40 bushels to the acre are harvested. Peanuts are regarded by some farmers as hard on the land. If they are grown for several successive years they materially deplete the supply of available plant-food elements because they are a clean-cultivated crop, and the entire plant is removed in harvesting. However, if they are rotated with other crops, the soil is not weakened. Oats produce from 20 to 35 bushels and cowpeas from 1½ to 2 tons of hay to the acre.

Greenville pebbly loam, if limed, should be well suited to alfalfa as it has a rather shallow surface soil and a firm but friable and readily penetrated subsoil. Liming would also be beneficial for cow-

peas. The prevalent good drainage of this soil, its rolling surface with resultant excellent air drainage, and the higher colored peach which it produces make it almost ideal for that crop. Pecans also do very well.

The current value of this land varies from $40 to more than $100 an acre, depending on the kinds of soils with which it is associated, the location with respect to roads, and other improvements.

GREENVILLE CLAY LOAM

The surface soil of Greenville clay loam, to a depth of 6 or 8 inches, is reddish-brown friable and granular clay loam. The material of the upper 2 or 3 inches of this layer is slightly more sandy than that of the remainder of the layer and contains a slightly larger quantity of organic matter. This layer is underlain by dark-red heavy-textured sandy clay or clay which extends to a depth varying from 40 to 60 inches. It is hard but fairly brittle and breaks into irregular clods which show no distinct cleavage lines or stains on the surface. The next lower layer is a few inches in thickness and consists of light-red sandy clay which is more friable than the overlying material. The deeper part of the subsoil is hard and brittle material mottled reddish brown and yellow. Brownish-yellow sand occurs at varying depths. Small brown, rounded iron concretions may be present on the surface and mixed with the soil, and softer ones occur in the lower part of the subsoil, especially in the region southeast of Cuthbert between Bells Mill and Goffs Mill.

Where this soil occurs on slopes below areas of sandy soils, the surface soil may be sandy loam to a depth of 1 or 2 inches. Where it occurs in gall spots and on slopes in association with Carnegie sandy loam, mottles of yellow and rust brown appear in places in the subsoil. In plowed fields, particularly on slopes, the surface soil is bright red.

This soil is rather extensive. It occurs principally in small areas on slopes or along small drainage ways in the eastern and southeastern "red lands" of the county. Greenville sandy loam or Greenville clay loam, smooth phase, occurs on the flatter areas above the slopes. The surface is sloping or rolling. Drainage is good, in places even excessive, and erosion is playing havoc with some of this soil because of the failure of farmers to build and maintain terraces.

Practically all of this soil has been cleared of its original hardwood and pine growth, and most of it is utilized for growing corn and cotton. Parts of several peach orchards are on this soil. Owing to the slopes and tendency to erode, some areas are no longer cultivated but are used for grazing. The yields, methods of cultivation, and the use of fertilizers are much the same as those described for Greenville clay loam, smooth phase. The rolling surface makes this a less desirable soil than the smooth phase, both because it tends to wash and is more difficult to plow and cultivate.

Surface erosion and gullying could be controlled in a measure by terracing, by increasing the organic-matter content, and by improving the water-holding power of the soil through the practice of deep plowing, a wider use of legumes and hay crops, and the seeding of grass pasture. Applications of lime would benefit the growth of legumes.

Greenville clay loam, smooth phase.—The smooth phase of Greenville clay loam differs from the typical soil principally in its occurrence in flatter areas and in having loam a few inches deep on the surface. This loam gives the soil a darker color and renders it more easily cultivated than the typical soil. Smooth Greenville clay loam consists of brown or dark reddish-brown loam or heavy sandy loam, from 2 to 4 inches deep, underlain by dull-red or red somewhat sticky clay. Here and there a few iron pebbles are present, and in places there are golden-yellow and gray streaks or mottles below a depth of 28 or 30 inches.

The smooth phase of Greenville clay loam occurs in almost level or gently undulating areas, but the drainage is well established. Most of this soil is south and west of Shellman and east and southeast of Union Grove Church. Smaller areas are about 2 miles east of Carnegie, 1 mile north of Benevolence, west and south of Mount Zion Church, and near New Hope Church close to the Terrell County line.

All this soil has been cleared of its original hardwood forest and is farmed. Corn, hay, cotton, and oats are the principal crops, and several very good peach orchards have been set out. Corn yields vary widely, depending on the season and farming methods; they range from 10 bushels on the more poorly tended tenant farms to about 45 bushels to the acre where deeper plowing and better methods of cultivation are employed. Cotton yields from one-fourth to three-fifths bale to the acre. Cowpeas and velvet beans do well and when cut for hay produce from 1½ to 2½ tons to the acre. Oats are grown to some extent and yield from 25 to 50 bushels to the acre. Peaches do well, but growers do not consider this soil so well suited to peaches as Greenville pebbly loam and Greenville sandy loam.

Two-horse plows and other implements are used, and riding cultivators are rapidly coming into general use. The surface relief lends itself well to the use of tractors and the more modern farming implements.

This is considered one of the best soils in Randolph County. It ranges in value from $50 to more than $100 an acre, depending on the location with respect to roads, on the improvements, and on the kind of soil with which it is associated.

Greenville clay loam, smooth phase, is particularly well suited to such crops as corn, oats, and various hay crops. The use of lime would make the soil more granular and would be beneficial to legumes. With the use of lime alfalfa has been successfully grown on this soil in other parts of the State.

BLAKELY LOAM

Blakely loam consists of very dark red or reddish-brown loam from 6 to 8 inches deep, which grades to dull-red or maroon-red, sticky, though somewhat friable and gritty sandy clay or clay loam. The topsoil in places, varies from loamy sand to fine sandy loam. In several shallow sinklike depressions, such as the one 1 mile northeast of Mount Olive Church, the dark chocolate-brown loam surface soil grades downward to red or bright-red loamy sand. The material in such areas is intermediate between Greenville loamy sand and Blakely loam. In places the surface soil is sand washed in

from neighboring areas of Greenville soils; in other places it is loamy sand.

Areas of this soil are widely scattered, occurring typically in Randolph County in small, shallow depressions or flats within areas of the Greenville soils and on shoulder or benchlike areas where the materials from which this soil is derived crop out below the cherty formation that gives rise to Henderson stony loam. In these locations a few white cherty fragments are present on the surface. Most of this soil is in the northern and eastern parts of the county near Wades, near Benevolence, and in the vicinity of Griers Cave. Other areas are widely distributed throughout the southern part of the county. Rain water collects in these depressions from the surrounding higher lands and quickly percolates into the lower substratum.

All of the Blakely loam is cleared and farmed. It is generally preferred to Blakely clay loam because it is more easily managed and cultivated and dries more quickly. Farmers consider it a good soil. Cotton, corn, and peanuts are the principal crops, and cowpeas and velvet beans are grown to a considerable extent in the corn rows. Yields range from one-fourth to one-half bale to the acre for cotton, from 10 to 20 bushels for corn, and from 20 to 30 bushels for peanuts. Although some peaches have been planted, the soil is not considered well adapted to that crop on account of deficient drainage and susceptibility to spring frosts. The peaches are also frequently damaged by brown rot.

Analyses show this soil to be rich in plant-food elements, and generally fertilizers containing low percentages of potash can be more successfully used on this than on the lighter colored soils. Blakely loam is particularly well suited to the production of corn, hay crops, and peanuts.

BLAKELY CLAY LOAM

Blakely clay loam has a very dark brown or chocolate-colored surface soil of heavy loam which, at a depth of 3 or 4 inches, grades downward to dark-red or chocolate-brown friable though sticky clay loam. Below a depth varying from 12 to 15 inches, the subsoil is dark-red or maroon-red sticky clay. In places the subsoil occurs from 4 to 6 inches below the surface and is uniform dark-red sticky clay to a depth varying from 3 to 5 feet.

Mapped areas of this soil include a few patches, such as that about 1¼ miles east of Mount Olive Church, in which the topsoil and upper part of the subsoil are dark brown and the lower part of the subsoil, below a depth of 24 inches, consists of brown or yellowish-brown sticky clay. The subsoil in places is comparatively light in color below a depth of 20 or 24 inches. The surface soil may be somewhat influenced by wash from the surrounding soils, and patches having a loamy surface soil, from 6 to 10 inches deep, are included. This is locally referred to as "push land," owing to the fact that in plowing it does not scour well from the plow, and the furrow cut has a somewhat scuffed appearance.

Blakely clay loam occurs principally in the eastern and southeastern parts of the county. Fairly large areas are west of Shellman, south of Pachitla, north of White House, near Trinity Church, and west of Cuthbert. Smaller areas are in the central, southern, and

southwestern parts of the county, associated with soils of the Greenville series. Most areas of this soil occur in shallow depressions or flats within areas of the Greenville soils, but in the vicinity of Griers Cave some of the land occupies slopes. In the flat areas, surface waters from the surrounding higher soils collect after heavy rains and slowly percolate into the subsoil. This soil does not dry so rapidly as Blakely loam.

In Randolph County, some areas of Blakely clay loam do not return satisfactory yields of cotton and corn. This is caused largely by inefficient cultural methods which result in a compact soil structure that is not favorable either to the normal development of plant roots or to an adequate water-holding power.

Fully 98 per cent of this soil is improved. It originally supported a forest growth consisting principally of hardwoods and some pine. Most areas are flat broken with a two-horse turning plow or disk plow. Corn and hay are the leading crops. Corn yields from 20 to 30 bushels, peas from 1½ to 2 tons of hay, and cotton from one-eighth to one-fourth bale to the acre. Cowpeas and velvet beans do well.

Selling prices of this kind of land range from $40 to more than $100 an acre.

Chemical analyses show that this soil is one of the richest in plant-food elements in the coastal plain section of the State. It is richer in nitrogen and potassium than most of the other soils. In Dougherty County yields of 60 bushels of corn to the acre are reported. Since this soil is heavy, it is particularly well suited to legumes, and grasses and oats do well though they have a tendency to grow rank and lodge in a wet season. When plowed wet, this soil clods badly. Deep plowing and the application of lime would tend to break up the compact layer in the subsoil and to make the structure more granular and friable. Organic matter is not so rapidly destroyed in this soil as in sandier soils, and there is little loss of plant nutrients through leaching. Pecans do well, as this is a natural hardwood soil. Blakely clay loam is not suited to peaches because of its flat or slightly depressed surface. Alfalfa and sweet clover could be grown if the soil were limed, and deep-rooted legumes would naturally help to open up the subsoil.

CARNEGIE SANDY LOAM

Carnegie sandy loam, locally known as "pebbly land," has a surface soil from 1 to 3 inches thick of loamy sand which varies in color from dark gray to brown and which is underlain to a depth ranging from 5 to 10 inches by grayish-yellow or deep-yellow light sandy loam. The subsoil is brownish-yellow, faintly reddish yellow, or deep-yellow friable, crumbly, and slightly sticky clay. Usually, at a depth varying from 20 to 30 inches, this material grades to clay of the same color but faintly streaked and mottled with red. This rather firm but somewhat friable and crumbly material continues downward to a depth ranging from 40 to 60 inches and is underlain by mottled or streaked brownish-yellow, reddish, and light-gray sandy clay material, which is rather hard but brittle. A large quantity of small, rounded, hard, brown or almost black iron concretions, the quantity ranging from about 10 to 60 per cent of the surface soil mass, occur

on and through the surface soil. A small percentage of these concretions is in the subsoil. Some of these concretions are hard, but many in the lower part of the subsoil are rather soft.

In cultivated fields the color of the surface soil ranges from yellowish gray to brown, and in places the yellow subsurface layer has been turned up in plowing. Where the pebbles are more numerous, especially after a rain, the surface appears brown. Where the surface material has been washed off, sandy clay loam is exposed.

As compared with the Tifton soils that occur farther east in the State on the Altamaha geologic formation near Tifton and Sylvester, Carnegie sandy loam in Randolph County has a more shallow and somewhat darker surface layer, a higher content of fine material, and a distinctly more brownish subsoil. Carnegie sandy loam occurs in close association with Greenville pebbly loam, Marlboro sandy loam, and the Grady soils, and patches on ridges and at the breaks or upper parts of slopes have a distinctly reddish-brown subsoil similar to that of Greenville pebbly loam.

Where associated with Henderson stony loam, the soil contains a few scattered fragments of white cherty rock, has a more shallow surface soil which in places is almost entirely removed, and has a somewhat compact subsoil which below a depth of 2 feet contains mottles of purplish red and gray in varying amount. On some of the steeper slopes patches have become gullied to such an extent as to render them almost worthless for cultivation. In the flattest areas of this soil, small areas of Marlboro sandy loam are included. The slopes below Carnegie sandy loam, particularly on the west side of the main body of this soil, are covered with Henderson stony loam. On the east side, however, Orangeburg sandy loam occurs in a like position in a number of places, and at the base of gentle slopes there are strips of Norfolk sand along the stream drainage ways.

Carnegie sandy loam is extensive in Randolph County, being most widely developed in the central-southern part. It occurs in an almost unbroken belt from the vicinity of Shady Grove Church about 4 miles southwest of Cuthbert, to south of Carnegie and to the vicinity of Vilulah Church. Other areas are north of Cuthbert, east of Aycochs Mill, near Martins Store, and northward toward Shellman. The soil occurs on wide, gently undulating flats, low swells, and broadly rounded ridges, as well as on rather narrow ridges or knolls with steeper slopes. Owing to the friability of the subsoil, internal drainage is well developed on Carnegie sandy loam, and the undulating or rolling surface insures good surface drainage. Terracing is essential for the control of surface washing and erosion on the slopes, and the gall spots and gullies on the slopes could doubtless be prevented.

Practically all of this soil has been cleared of its forest cover which consisted of a mixed short-leaf and long-leaf pine and hardwood growth. This is generally considered by farmers as one of the best soils in Randolph County, especially for cotton. The loamy or sandy surface soil renders cultivation easy, and the friable though sticky subsoil affords good drainage. Cotton can be easily cultivated, even after a shower. During 1923 the best cotton yields in the county were produced on this soil near Carnegie. Several farmers reported 1 bale to the acre, and the average for this soil through

the county was about one-third bale. During periods when the nights are cool, cotton is reported to suffer more from the lower night temperature on this and the other lighter colored soils than on the red soils. Many farmers on this soil grow cotton exclusively as this is the surest and most profitable crop that they have ever grown. Corn also produces well. The average yield is from 20 to 30 bushels to the acre, although considerably higher yields have been produced with heavy fertilization. Oats do well and under normal conditions produce from 20 to 35 bushels to the acre. This soil, especially in the sandy areas, is well adapted to peanuts and is being planted more extensively to this crop. Cowpeas yield from 1 to 2 tons of hay to the acre. Pecans make a good growth. Where the soil is limed in other parts of the State bur clover and alfalfa are successfully grown. Peaches are grown but do not seem to attain so high a color as on the red soils.

The current value of this land varies from $40 to more than $100 an acre, depending on the location and improvements.

To maintain and increase the content of organic matter more legumes and cover crops should be grown. The application of lime for legumes should prove beneficial. Experimentation and the experiences of some of the better farmers have proved that heavy applications of fertilizers for cotton are profitable. Complete fertilizers, fairly rich in potash, give best returns.

The following table shows the results of mechanical analyses of samples of the different layers of Carnegie sandy loam:

Mechanical analysis of Carnegie sandy loam

Number	Description	Fine gravel	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt	Clay
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
32300	Surface soil, 0 to 3 inches	2.4	8.5	7.3	40.6	17.4	10.1	13.7
32301	Subsurface soil, 4 to 10 inches	1.1	6.4	6.8	49.0	14.5	16.0	6.5
32302	Subsoil, 11 to 32 inches	1.0	4.0	3.5	18.7	11.0	21.4	40.4
32303	Subsoil, 33 to 48 inches	.9	5.6	4.2	18.7	10.7	11.3	48.5
32304	Subsoil, 49 to 60 inches	1.2	7.2	5.3	21.9	10.9	9.4	44.2

ORANGEBURG SANDY LOAM

In wooded areas the surface soil of Orangeburg sandy loam, to a depth of 2 or 4 inches, is brown or grayish-brown loamy sand which contains a small quantity of organic matter. This grades to yellow, brownish-yellow, or slightly reddish yellow loamy sand which contains very little organic matter and continues to a depth ranging from 12 to 18 inches. The subsoil is bright-red friable and crumbly sandy clay which readily breaks into a granular, structureless mass. The material of the upper 2 inches of the subsoil is, in most places, light-red, heavy, sandy loam. At a depth ranging from 40 to 80 inches, the subsoil is underlain by mottled, streaked, or splotched red, light-gray, and yellow sandy clay material that is usually rather compact and hard but brittle.

In cultivated fields the surface soil varies in color from gray to brown, depending on the quantity of organic matter present and on the methods of cultivation. Where this soil occurs in close associa-

tion with the Greenville soils the surface material is more shallow and browner and in some places has a slightly reddish tinge, but where the bordering soils are of the Norfolk, Cuthbert, and Susquehanna series the surface soil is commonly lighter in color. The subsoil is characteristically brighter red and lacks the stickiness of the subsoil of the Greenville soils. In the northwestern part of the county much of this soil contains a noticeably higher percentage of coarse sand than in other parts. Such areas occur near Punkin Creek Church, west of Griers Cave, and on the tops of ridges on both sides of Pataula Creek near the Stewart County line.

Mapped areas of this soil include several patches which have a decidedly pebbly surface, the pebbles consisting of small iron concretions. The subsoil in these areas contains more than the usual quantity of fine material and is slightly sticky. The largest areas of this variation are just west of Blakely Road about three-fourths mile north of Mitchell Grove Church. Such areas are indicated on the map by gravel symbols. In several areas in the northwestern part of the county, principally on the slopes above Pataula Creek, numerous fragments of red ferruginous sandstone are strewn over the surface. Most of these areas are small and occur on knolls or on upper slopes.

Orangeburg sandy loam occurs extensively throughout the county, as is indicated on the accompanying soil map. It occupies fairly flat or broadly rolling ridges and slopes varying from gentle to steep. All of it has sufficient slope to insure good surface drainage, and the friable subsoil allows the ready movement of water downward. This soil is associated with Greenville sandy loam in the "red lands" part of the county and with Ruston sandy loam in the other parts. In most places strips of Norfolk sand, Ruston sand, or Orangeburg loamy sand lie on slopes below it.

This is an important agricultural soil. About 90 per cent of it is cleared of its original pine forest and about 75 per cent is farmed. The remainder consists of sloping land or steep knolls which, if cleared, would tend to erode. On account of insufficient farm labor many fields have been abandoned and are returning to forest. The tree growth consists mainly of shortleaf pine and a mixed hardwood growth.

Cotton, corn, peanuts, and peaches are the most important crops. Returns vary considerably, depending on the care and quantity of fertilizer given the crops. Cotton yields from one-fifth to three-fifths bale to the acre, corn from 12 to 15 bushels, and peanuts from 25 to 30 bushels. This is said to be a much better cotton soil in a dry season than in a season even moderately wet. It is well adapted to peanuts, sweet potatoes, vegetables, and fruits. Its easily cultivated surface, its generally good relief, and its friable subsoil make it very desirable for peaches, although it is not so good as Greenville pebbly loam and Greenville sandy loam. Oats and cowpeas do fairly well. Asparagus is grown on this soil in other parts of the State. Orangeburg sandy loam is well adapted to the production of pecans. Usually from 200 to 400 pounds of commercial fertilizers analyzing about 3–9–3 are applied to the acre.

Areas of this soil range in value from $20 to $50 an acre, depending on location, associated soils, and improvements.

For continuous cropping, this soil requires heavier fertilization than Greenville sandy loam but has about the same needs as Ruston sandy loam. In most areas the supply of organic matter is low, and its replenishment is one of the first requirements in building up the land. This is best accomplished by growing legumes and by turning under cover crops.

Orangeburg sandy loam, deep phase.—The deep phase of Orangeburg sandy loam differs from the typical soil in having a brighter colored and more sandy surface layer underlain, at a depth ranging from 24 to 28 inches, by a sandy clay subsoil. In general appearance, the deep phase is much like the typical sandy loam, but it occurs in a position intermediate between the typical soil and Orangeburg loamy sand. It is inextensive and occurs in widely scattered areas, the largest of which are south of Cuthbert, east and west of Carter Creek, and about 1 mile west of Griers Cave. This deep soil has about the same adaptations as the typical soil, but the yields are lower. The land is well suited to peanuts, sweet potatoes, and vegetables but is not so well suited to general crops or peaches.

ORANGEBURG LOAMY SAND

Orangeburg loamy sand is brown or grayish-brown sand, from 6 to 10 inches deep, which grades downward to reddish-brown or light-red loamy sand. Below a depth ranging from 15 to 18 inches, is red or light-red loamy sand which is commonly somewhat more loamy below a depth of 28 or 30 inches, in places being sandy loam or loam. The surface soil may be distinctly reddish, particularly on knolls where some of the lighter colored sandy surface has been removed by erosion.

This soil occurs principally in widely scattered areas in the western, central, and northern parts of the county. A number of areas are in the vicinity of Coleman and on ridges in the sand hills to the north. This soil occupies shoulders and upper slopes along Carter Creek and Pachitla Creek south of Cuthbert and in the vicinity of Ebenezer Church. Extensive areas are mapped near Brooksville, near Binions Mill, northwest of Benevolence, west of Wades, and west of Cuthbert. In many places areas lie in an intermediate position between Orangeburg sandy loam, on the upper slopes and capping the ridges, and Norfolk sand, which is piled up at the base. In places Orangeburg loamy sand is associated with Ruston sand.

Most of the areas of this soil are sloping or hilly, but in the sand-hills areas occur on smooth knolls or ridge crests. The open structure and the position of occurrence insure excellent drainage.

Most of the Orangeburg loamy sand has been cleared of its original forest growth, which consisted principally of long-leaf pine with a few hardwoods. This is not a very productive soil and requires constant fertilization to produce crops. Much of it is abandoned, because, with the present shortage of labor, farmers are utilizing their labor on more productive soils. About 10 per cent of this soil is now farmed. The remainder is covered with second-growth forest or with broom sedge in abandoned fields which are used to a small extent for pasture.

Corn, cotton, and peanuts are grown, but yields are generally less than on Orangeburg sandy loam. Corn yields from 8 to 12 bushels,

cotton from one-tenth to one-sixth bale, and peanuts from 15 to 20 bushels to the acre. Some of the better farmers have increased their yields by the use of high-analysis fertilizers and legumes. As is common throughout the lighter sandy lands, this soil is farmed for one or two years and then is allowed to lie fallow for two or three years. It is best suited for peanuts, sweet potatoes, and vegetables, but asparagus and peaches do fairly well in some places. Heavy additions of organic matter and applications of fertilizers analyzing 4–10–4 have proved beneficial, particularly for cotton and peanuts.

HENDERSON STONY LOAM

The topsoil of Henderson stony loam is gray or grayish-brown loam or sandy loam from 5 to 8 inches deep. It is underlain, to a depth of 10 or 12 inches, by yellowish-brown or brownish-yellow friable clay. The lower part of the subsoil, to a depth ranging from 20 to 24 inches, consists of reddish-brown or yellowish-brown stiff, compact clay. The next lower layer consists of mottled yellow and reddish-brown tough clay containing soft cherty or siliceous rock fragments. An abundance of large and small angular fragments of siliceous limestone occur in many places over the surface and throughout the soil. Although the stones are so numerous in places that it is necessary to remove them from the land before attempting to cultivate it, over much of the soil the stones are few and do not seriously interfere with cultivation. In many places, the topsoil is very shallow and is reddish or yellowish brown, and the subsoil is dull-red stiff, tough clay. Such areas represent Greenville stony loam but were not mapped separately on account of their small extent. Light-colored very sandy areas in which the subsoil is yellowish or brownish-yellow stiff clay have also been included in mapping. On many of the knolls small pebbles or iron concretions are present in noticeable quantities; such patches approach in characteristics a heavy phase of Carnegie sandy loam or a pebbly phase of Greenville clay loam.

Henderson stony loam occurs in close association with the Greenville and Carnegie soils. The largest and most continuous areas are south and southwest of Cuthbert immediately west of Blakely Road. Many smaller areas are north of Carnegie and southwest of Benevolence.

This soil occupies ridgy, rolling, or choppy areas. Some of it is on the crest of the highest elevations and some is on the slopes. Part of it, on account of its stoniness and sloping surface, is unfit for cultivation. Surface drainage is everywhere good, but the heaviness and imperviousness of the subsoil cause poor internal drainage.

Probably 50 or 60 per cent of this soil has been cleared; the remainder is forested with short-leaf and loblolly pine, together with some oak, hickory, and dogwood. About one-third of the soil is now under cultivation. Cotton and corn are the leading crops. This is considered a good soil for cotton under boll-weevil conditions as it is well drained and crops mature early. Cotton yields from one-fourth to one-half bale to the acre when a 4–8–4 fertilizer has been applied. Corn yields from 12 to 15 bushels to the acre.

The best use for about half of this soil would be forestry. All the very stony areas and the steepest slopes should remain in forest

or be allowed to reseed. To improve the areas under cultivation, it is suggested that all of the larger stones be removed, that the heavier surface soil be plowed deeper, and that organic matter be supplied by growing and turning under rye or velvet beans.

RUSTON SANDY LOAM

In wooded areas the surface soil of Ruston sandy loam, to a depth ranging from 2 to 4 inches, consists of grayish-brown or light-brown loamy sand containing a small quantity of organic matter. This grades to yellow or grayish-yellow loamy sand or light sandy loam which continues to a depth of 12 or 15 inches. The top layer of the subsoil, which is yellowish-brown or reddish-yellow friable sandy clay, is abruptly underlain by reddish-yellow, red, and in places by yellowish-brown sandy clay which prevails to a depth ranging from 40 to 60 inches. Below this is mottled or streaked reddish-brown, light-gray, and yellow sandy clay material that is rather compact and hard but brittle. The typical subsoil is friable and crumbly and has no definite structure characteristics. Where this soil borders soils of the Cuthbert and Susquehanna series, the subsoil is rather compact and may be slightly plastic.

In cultivated fields, the surface soil varies from light gray to brownish gray depending on its content of organic matter. On some of the knolls and ridges, the subsoil is slightly redder than typical and in these places resembles the subsoils of the Orangeburg soils. In places, the subsoil contains red, yellow, and rust-brown or ocher-yellow stains or mottles. These mottles are especially noticeable in places where this soil is associated with Carnegie sandy loam.

In several localities the soils on old eroded terraces or high second bottoms have profiles practically identical with those of the typical Ruston sandy loam of the uplands. Areas of this kind occur at the junction of Hog Creek and Taylor Branch, at the junction of Rhodes Branch and Cemochechobee Creek, along Crooked Creek, at the point where Morgan Road crosses Pachitla Creek, and north of this point. Other similar included areas of old terrace material occur 2¼ miles southeast of Carnegie and 1 mile southwest of Shivers Mill. The material of included areas along Hog Creek has a more decided red color than typical.

Ruston sandy loam occurs mainly in the western and northern parts of the county on the slopes above Hog Creek, east of Piney Grove Church, west of Butlers Mill, in the vicinity of Punkin Creek Church, southeast of Millirons Mill, and east and southeast of Bethlehem Church.

About 80 per cent of this soil has been cleared at various times, although much of it has been abandoned after being in cultivation a few years. At present not more than 40 per cent of it is farmed. It occurs on slopes or ridges. Surface drainage is good and in places is excessive. Ruston sandy loam is associated with Norfolk sand, with Susquehanna sandy loam, and with Cuthbert sandy loam.

Ruston sandy loam is devoted mainly to cotton, corn, and peanuts. Cotton yields from one-sixth to one-half bale, corn from 10 to 15 bushels, and peanuts about 20 bushels to the acre. Velvet beans and cowpeas are generally grown, and some oats are grown.

Current prices for soil of this kind range from $15 to $30 an acre.

Ruston sandy loam is for the most part poorly supplied with organic matter. For its improvement the growth of legumes, particularly of velvet beans, is recommended. Rotation of crops with legumes planted in the corn and after oats would be of material benefit in increasing the supply of organic matter. This soil naturally responds well to fertilizers and can be brought to a high state of productivity through improved methods of cultivation, better fertilization practices, and the incorporation of organic matter. Terracing is essential to prevent erosion of slopes. The soil is well suited to peanuts, pecans, sweet potatoes, and vegetables.

RUSTON COARSE SANDY LOAM

The surface soil of Ruston coarse sandy loam is light-brown or grayish-brown coarse sand or loamy coarse sand from 6 to 8 inches deep. This grades to yellowish-brown or brownish-yellow friable coarse sandy loam which is underlain, at a depth varying from 15 to 18 inches, by reddish-yellow or yellowish-red friable sandy clay containing more or less coarse gritty material. In some areas small white pebbles about the size of peas are scattered over the surface and through the upper part of the soil. In places mica particles are very noticeable in the subsoil. In some inextensive areas the surface soil is much deeper than typical, and the soil approximates a deep phase.

Ruston coarse sandy loam is associated with Orangeburg sandy loam and Cuthbert sandy loam and occurs only in the northwestern and northern parts of the county. The largest areas are near Springvale, north of Punkin Creek, and along Pataula Creek. The soil occurs on slopes, smooth shoulders, and ridges. About one-half of it is farmed, although about 80 per cent has been cleared of its original forest cover. Pines and various oaks, hickory, and sassafras have taken possession of a number of the abandoned fields.

Owing to the openness, friability, and leachiness of both the surface soil and subsoil, crops often suffer from a lack of moisture during dry spells. The soil is easily worked and is well suited to cultivated crops, but yields vary considerably, being in general somewhat lower than on Ruston sandy loam. This land is in need of organic matter both to conserve moisture and to furnish additional plant nutrients. Much of it is allowed to lie fallow because it has been worn out, which simply means that yields have been reduced through inefficient farming practices. Washing and gullying is not so severe as on the finer textured soils. Methods for improvement and crop adaptations are very similar to those mentioned for Ruston sandy loam.

Ruston sandy loam is for the most part poorly supplied with organic matter. For its improvement the growth of legumes, particularly of velvet beans, is recommended. Rotation of crops with legumes planted in the corn and after oats would be of material benefit in increasing the supply of organic matter. This soil naturally responds well to fertilizers and can be brought to a high state of productivity through improved methods of cultivation, better fertilization practices, and the incorporation of organic matter. Terracing is essential to prevent erosion of slopes. The soil is well suited to peanuts, pecans, sweet potatoes, and vegetables.

RUSTON LOAMY SAND

In wooded areas Ruston loamy sand is grayish-brown or brown loamy sand to a depth of 4 or 5 inches, underlain by brownish-yellow or lighter brown loamy sand to a depth ranging from 12 to 15 inches. This grades to reddish-yellow or brownish-yellow loamy sand which continues downward to a depth ranging from 50 to 60 inches. Below this is reddish-yellow slightly compact loamy sand containing a noticeable quantity of fine material. Both the surface soil and subsoil are mellow and friable. In small areas the entire soil has a reddish cast.

Ruston loamy sand occurs in a few rather small, widely scattered areas, usually in intermediate positions between Norfolk sand on the lower slopes and soils of the Orangeburg and Ruston series on the ridge crests above. A number of areas in the southwestern part of the county occur along small drainage ways and slopes, with Henderson stony loam on the upper slopes and ridges. The larger areas in the northeastern part of the county are closely associated with Ruston sand. The surface is sloping or hilly, and drainage is well established. In dry weather crops may suffer from drought because of the openness and porosity of the subsoil.

About 60 per cent of the Ruston loamy sand is cleared of its original forest growth which consisted principally of pines. The remainder is cut-over land or was once cleared, farmed for a period, and then abandoned. Many farmers on this soil allow the land to lie idle for 2 years, then farm it for 1 or 2 years. Cotton, corn, and peanuts are the principal crops. This soil is generally poorly supplied with organic matter and plant-food elements and requires heavy applications of fertilizers for crop production. Yields vary considerably, depending on the fertilization and the season. Cotton yields from one-tenth to one-sixth bale, corn from 8 to 10 bushels, and peanuts from 15 to 25 bushels to the acre. Rotation is not the general practice, although some farmers plant peanuts after cotton.

To increase the fertility of Ruston loamy sand it is essential to supply large quantities of organic matter. This increases the supply of nitrogen, lack of which seems to be one of the limiting factors in crop production. It also increases the water-holding power and aids in preventing erosion. The use of fertilizers richer in ammonia and potash than the grade used would probably be profitable. The use of legumes, oats, and rye for soil builders is recommended. This soil should be forested. It ranges in price from $5 to $20 an acre, depending on the kinds of soil with which it is associated.

RUSTON SAND

Ruston sand has a surface soil, from 8 to 10 inches deep, consisting of medium sand which varies in color from gray to light brown. This is underlain by yellowish-brown or reddish-yellow sand or loamy sand which continues unchanged to a depth ranging from 3 to 5 feet.

Most of this soil occurs on the higher positions on slopes or on low knolls or swells in areas of Norfolk sand. The two soils grade inperceptibly into each other so that in many places the areas, as

mapped, are separated by arbitrary lines. It is a rather common practice to burn off the dry broom sedge in the winter and spring and thus clear the areas for the young grass. This not only depletes the quantity of organic matter in the soil but damages the young tree growth.

Ruston sand is widely distributed through the western, northern, and northeastern parts of the county. Areas occur along or near the Springvale-Coleman road, along some of the slopes of Rhodes Branch and Cemochechobee Creek, in the southwest corner of the county east of Gay Creek, east and southeast of Benevolence, on both sides of Nochaway Creek, and east and northeast of Brooksville.

Ruston sand, because of its sloping or rolling surface, its loose incoherent surface soil, and its porous open subsoil, is thoroughly drained. About 75 per cent of it was at one time cleared of its original growth of pine, but at present not more than 10 per cent is farmed. Large areas have been abandoned and are growing up to black, red, blackjack, water, and Spanish oaks, some short-leaf and long-leaf pines, and sassafras. These areas are used only for the scant pasturage they afford. Most of them are carpeted with broom sedge.

Cotton, corn, and peanuts are the crops commonly grown, and yields are similar to or a little larger than those obtained on Norfolk sand. Fertilizers leach away rapidly, and it is very difficult to maintain the fertility of this soil. Sweet potatoes and truck crops do well. Most of this land can best be utilized for forestry.

RUSTON COARSE SAND

Ruston coarse sand consists of brown or grayish-brown coarse sand 6 or 8 inches deep, underlain by brown coarse sand or coarse loamy sand. In general, there is little difference in color or structure within 3 feet of the surface. In places, small white gravel are present on the surface, and the subsoil may be somewhat red or reddish brown.

Ruston coarse sand occurs on ridge crests and slopes principally in the western and northwestern parts of the county along Hog Creek and Taylor Branch, northeast of Piney Grove Church, west of Crooked Creek, and in the vicinity of Pleasant Hill Church. Included with this soil in mapping are a number of areas along Hog Creek which are remnants of old terraces so badly eroded that they have taken on the appearance of upland. Practically all of this soil has been cleared of its forest cover, but like the Ruston and Norfolk sands much of it has been abandoned and is now producing a mixed growth of pines and hardwoods.

This soil is more incoherent than Ruston sand, owing to the larger size of the sand particles. Drainage is good.

Cotton, corn, and peanuts are grown to a small extent, and yields are similar to those obtained on Norfolk sand and Ruston sand. Farming methods are similar and fertilizer applications about the same as for Norfolk sand, and the means suggested for increasing the fertility and supply of organic matter for the Norfolk soil apply equally well to this. This coarse sand should be used for forestry.

MARLBORO SANDY LOAM

In wooded areas the surface soil of Marlboro sandy loam is grayish-brown or light-brown sandy loam from 1 to 3 inches deep. This grades to yellow or pale-yellow, light-textured sandy loam which continues to a depth ranging from 5 to 8 inches. The subsoil is deep-yellow or faintly reddish yellow clay, friable and crumbly, slightly sticky, and somewhat heavier than the subsoil of Norfolk sandy loam. In most places, at a depth varying from 24 to 28 inches, this material grades to somewhat heavy textured clay which in places is streaked or slightly mottled with reddish brown. Some of this mottling is caused by the presence of soft iron concretions. In places a few pebbles are present over the surface. In many places the topsoil is only 4 or 5 inches deep, and when freshly plowed the fields appear yellow in spots.

Marlboro sandy loam contains more fine material, is of a darker reddish-yellow color, and is slightly heavier in texture throughout than Norfolk sandy loam, although the two soils are much alike in places. Marlboro sandy loam is also closely associated with Carnegie sandy loam, but its shallow surface soil, lack of many pebbles, and the uniformly yellowish subsoil distinguish it from the Carnegie soil.

This soil occurs in flat or almost level areas, usually within or associated with areas of Carnegie sandy loam. Drainage is well established. Practically all the soil has been cleared, and most of it is in cultivation as it is considered almost as good a soil as Carnegie sandy loam. The largest area is about 2½ miles west of Aycochs Mill in the southeastern part of the county. Less extensive areas are mapped in the vicinity of Bass Store, southeast and south of Mount Zion Church, and scattered through the southern part of the county.

Marlboro sandy loam is devoted chiefly to the production of cotton and corn. Yields of these crops are about equal to those obtained on Carnegie sandy loam, and the practices and fertilization are similar, although applications of fertilizer are in general not so heavy. Peanuts are grown to some extent. They are planted either separately or alternately with the corn rows. Cowpeas are usually grown in the corn.

The methods of improvement suggested for Carnegie sandy loam should apply nearly as well to Marlboro sandy loam. This is a strong, productive soil well suited to oats, clover, and hay crops. Pecans also do well on it.

NORFOLK SAND

In forested areas Norfolk sand has a surface layer, from 3 to 6 inches thick, of gray or grayish-brown sand which contains sufficient organic matter to render it slightly loamy. In cultivated fields the surface color is usually light gray or yellowish gray, and in places where organic matter has been incorporated to the depth of cultivation it is gray. The surface soil is underlain, to a depth varying from 30 to 50 inches, by yellow rather loose and incoherent sand. In places this grades to brownish-yellow slightly loamy sand. This layer ranges in thickness from 1 to 2 feet and grades to sandy

clay material. In some places the presence of a white sand surface cover causes the land to be referred to as " white sandy land."

The texture of this soil is somewhat variable. Southwest of Coleman and in patches near Brooksville the surface soil approaches fine sand in texture, and in the northwestern part of the county the proportion of coarse particles of sand is noticeably high. In the vicinity of areas of Ruston and Orangeburg soils the color of the subsoil is deeper than typical and approaches that of Ruston sand. On low knolls or gall spots and on ridges, steep slopes, or breaks, small patches of Ruston loamy sand and Orangeburg loamy sand are included in mapping. Along lower slopes adjacent to the stream bottoms and small watercourses the soil in a few small patches is water-logged, and both the topsoil and subsoil are gray. Near areas of Susquehanna sandy loam along lower slopes and galled areas small patches of Susquehanna soils are included. Throughout the southern and eastern parts of the county, Norfolk sand occurs along the lower slopes of streams, where the upper slopes and interstream uplands are occupied by soils of the Ruston, Orangeburg, and Greenville series. This characteristic occurrence results from the exposure, by erosion, of beds of light-colored sands under the surface red clays and sands. On the north side of Hog Creek west of Coleman, on the north side of Cemochechobee Creek where it leaves the county, and in a few patches along Rhodes Branch, benches or rather poorly defined terraces are included in mapping. These, if of larger extent, would be mapped as Kalmia sand.

Areas of Norfolk sand vary from flat to gently undulating or slightly rolling in the vicinity of Brooksville and on the broader ridges in the western parts of the county, and from steeply rolling to hilly, ridgy, and rugged in the western and northern parts. The general sloping or hilly surface insures good surface drainage, and the open porous structure of the subsoil allows a ready movement of water downward. During dry spells crops suffer from drought, although crops are reported to do best in a fairly dry season.

This soil originally supported a growth consisting principally of long-leaf and short-leaf pines. Practically all of the original forest has been removed. About 60 per cent of the land was cleared and farmed for a period, largely because of its ease of cultivation. Low yields soon caused it to be abandoned and allowed to grow up to broom sedge, sassafras bushes, and a varied scrubby growth, including varieties of oak and, in places, a cover of pines. At present only about 10 per cent of the soil is farmed. The general practice is to cultivate it for one or two years and then allow it to lie idle for about the same length of time, after which the growth of broom sedge and bushes is either burned off or plowed under and the land is again used for crops for a short period. The small supply of organic matter is the limiting factor in the production of crops on this soil, and the aforementioned practice allows the accumulation of sufficient nitrogen for crop production.

The principal crops on Norfolk sand are corn, cotton, and peanuts, named in the order of their importance. Yields are low and fertilizer must constantly be applied in order to obtain a crop. The yields are about the same as on Ruston sand but are somewhat less than on Ruston loamy sand and Orangeburg loamy sand. Corn yields from

5 to 12 bushels and cotton from one-tenth to one-eighth bale to the acre.

Owing to the open structure of Norfolk sand and to the consequent rapid leaching of fertilizers it would probably be best to apply parts of the fertilizers at intervals rather than all at one time. Heavy applications of high-analysis fertilizers and the growing of legumes will be necessary in the use of this soil for cultivated crops. It is deficient in organic matter and the hot seasons and heavy annual rainfall cause the destruction of the organic matter and the leaching of soluble plant nutrients almost as rapidly as they are made available. Most of the slopes and steeper areas erode rapidly if put into cultivation and should, therefore, be kept in forest. By preventing damage from fires a more profitable return can probably be obtained from the pine timber this land can produce than from any other crop. The large number of abandoned farmhouses on Norfolk sand are evidence that farming has not proved profitable.

NORFOLK SANDY LOAM

Norfolk sandy loam has a surface layer of gray, grayish-yellow, or grayish-brown loamy sand or light sandy loam which grades, at a depth of 6 or 8 inches, to pale-yellow sandy loam, underlain, at a depth ranging from 12 to 15 inches, by the subsoil of brighter yellow friable sandy clay. This soil differs from Marlboro sandy loam in having a deeper surface layer and a more friable subsoil with very little of the stickiness characteristic of the Marlboro soil. The texture of the surface soil ranges from fine to medium, and in places the subsoil is somewhat more compact and is deeper yellow than typical, particularly where it occurs on slopes and in the vicinity of Carnegie, Marlboro, and Greenville soils. A few included areas have a subsoil slightly mottled with gray. A few small areas on low terraces along some of the larger streams have also been included in mapping.

The surface of Norfolk sandy loam varies from gently undulating to somewhat rolling and sloping. This soil is not very extensive in Randolph County, the largest areas occurring in the southeastern part near Ichawaynochaway Creek and in the southern part near Aycochs Mill. Other areas are about 1 mile northwest of Carnegie and about one-half mile northeast of Piney Grove Church. The soil is well drained, except on flats near areas of the Grady soils. In these places it closely resembles Dunbar sandy loam.

This soil has practically all been cleared and is under cultivation. The general crops of this section are grown, with cotton and corn on the larger acreages. Yields are lower than on the associated soils of the Carnegie and Marlboro series, but this soil is easily cultivated and responds readily to fertilizers. In other parts of Georgia and South Carolina, particularly in Bibb County, Norfolk sandy loam is regarded as one of the best cotton soils. It is well adapted to vegetables, because it warms up early in the spring.

Corn yields from 10 to 20 bushels and cotton from one-eighth to one-fourth bale to the acre, although yields of one-third bale to the acre were reported in 1923. This soil is well suited to peanuts, and yields range from 20 to 35 bushels to the acre. Sweet potatoes

do well. The fertilizer commonly used is of a 3–9–3 analysis, although several farmers during the last year or two have been using a 4–8–4 fertilizer with considerable success.

This soil is generally poorly supplied with organic matter, which may be supplied by a wider use of legumes and cover crops. Tobacco growers in southern Georgia and in northern South Carolina consider this soil favorable for the production of the best grade of light tobacco. It is also devoted extensively to truck crops, melons, asparagus, small fruits, and berries.

This soil occurs in farms with other kinds of soil, and its selling price depends on the productivity of the associated soils and the location of the land.

CUTHBERT SANDY LOAM

In wooded areas the topsoil of Cuthbert sandy loam consists of gray or brownish-gray loamy sand grading, at a depth ranging from 2 to 4 inches, to pale-yellow or grayish-yellow loamy sand or light sandy loam, which continues to a depth ranging from 8 to 12 inches below the surface. In cultivated fields the surface layer is light gray or yellowish gray. The subsoil is yellowish-red or reddish-yellow, heavy, tough, compact clay. It is hard but brittle, cracks on drying, breaks into irregular lumps showing no definite cleavage lines, and finally crumbles into a coarse granular mass. In most areas, between depths varying from 20 or 24 inches to 40 or 50 inches, the subsoil is mottled or streaked light-red and yellow clay having about the same structure as the layer above. The underlying material is mottled purplish, reddish, yellowish, and whitish, hard but brittle clay or sandy clay material, or in some places consists of beds of light-gray laminated clay.

In places, the subsoil is red or reddish-brown, stiff, tough clay having somewhat the color of the subsoil of Orangeburg sandy loam; in other places it is deep-yellow or salmon-colored stiff clay. On the surface of some of the areas there is a noticeable quantity of ferruginous sandstone or iron crust and a few iron pebbles. Areas of this soil include patches of Ruston sandy loam and Norfolk sand, and patches where the topsoil is very deep and the tough tight clay is from 18 to 24 inches below the surface. Cuthbert sandy loam occurs in such close association with Susquehanna sandy loam and Ruston sandy loam that in many places it was difficult to draw a boundary line between them. On many of the slopes gall spots are common, and the dull yellowish-red or reddish-brown tough clay is exposed. Taken as a whole, this is one of the most variable soils in the county in texture, depth of soil, and color of subsoil. The texture of the surface soil ranges from fine mellow loamy sand to coarse sand.

Cuthbert sandy loam occurs almost exclusively in the northern and northwestern parts of the county and about 5 miles west of Cuthbert. Some of the largest areas are in the vicinity of Springvale. This soil has a total extent of 18.1 square miles. It occurs on slopes, ridges, and knolls which give it a rolling or hilly surface. Erosion and surface wash have been and are at present very active, and small gullies and deep ravines are numerous. Terracing of the steeper slopes is necessary to prevent surface wash. The natural surface drainage is good, in fact, over most of the areas the rain water runs

off too rapidly, resulting in erosion, as the tough and compact subsoil does not allow a free passage of the rain water downward. However, the soil drains out fairly well and is considered one of the early soils of the county.

A large part of the Cuthbert sandy loam was once cleared, but now only a small percentage is under cultivation. Some of the abandoned areas are being reforested to young pines, and some support a merchantable stand of short-leaf and loblolly pines.

Cotton and corn are the principal crops. Cotton yields one-sixth bale and corn from 8 to 15 bushels to the acre. A few cowpeas and velvet beans are grown, but the yields are low unless the soil is heavily fertilized. Sweet potatoes yield well. Garden vegetables make a quick growth and give good returns.

This land sells currently at prices ranging from $5 to $20 an acre.

All of the steeply sloping and broken areas of this soil should remain in forest or should be reforested. The cultivated areas should be protected from surface wash. The soil is deficient in organic matter, and this can be supplied by growing and turning under cowpeas, velvet beans, and rye. Rye is a good winter cover crop for this soil. The fertilizer treatment similar to that suggested for Ruston sandy loam and Susquehanna sandy loam should be adopted.

SUSQUEHANNA SANDY LOAM

In wooded areas the topsoil of Susquehanna sandy loam consists of gray or brownish-gray sandy loam or loamy sand, from 1 to 3 inches thick, underlain by pale-yellow or brownish-yellow loamy sand or light sandy loam which continues to a depth ranging from 6 to 8 inches. The upper part of the subsoil is sandy clay, varying in color from light red to reddish brown. This grades, at a depth varying from 15 to 18 inches, to mottled red, yellow, and gray clay. This is heavy, stiff, and plastic when wet, but upon drying becomes very hard and breaks into irregular lumps and finally into small angular particles. In most areas it continues to a depth varying from 30 to 50 inches and is underlain by bluish-gray or light-gray laminated clay—that is, by thin layers of this clay faintly streaked with yellow fine sandy material. In places it consists of alternate layers of bluish-gray clay and layers of white siliceous material underlain by yellow, loose sand.

In cultivated fields the surface soil, to the depth of cultivation, is normally light gray or yellowish gray. Included with this soil are patches of Ruston sandy loam and Cuthbert sandy loam too small to be shown on the map. Where erosion has been active the sandy topsoil is very thin, but on some of the lower slopes there is an accumulation of light-textured material, and in places the surface soil may have a depth varying from 12 to 20 inches over the heavy clay subsoil. In places fragments of whitish siliceous rock, reddish-brown or rust-colored ferruginous sandstone, or cemented iron crust and a few iron pebbles are present on the surface.

In places along Hog Creek and Taylor Branch the topsoil and upper part of the subsoil resemble corresponding layers of Ruston sandy loam, but the lower part of the subsoil consists of the typical tough, plastic mottled clay. Small patches of Norfolk sand are in-

cluded in mapping. Such areas result in part from accumulations of sand washed down from higher elevations and in part from the sandy beds which crop out in places near the clay. Areas of this soil also include patches of Susquehanna clay along Kitchen Branch, along the upper Springvale-Cuthbert road about 3 miles east of Springvale, and near the Clay County line in the western part of the county. Where the sandy surface soil has been removed, the texture is clay loam, and clay galls are common. Areas of fine sandy loam too small to warrant separation are also included.

Susquehanna sandy loam occurs in general on lower slopes whose upper parts are occupied by Ruston sandy loam, Cuthbert sandy loam, or Norfolk sand. It is found mainly in the western and northwestern parts of the county. Areas are mapped along Hog Creek, Taylor Branch, and around the heads of the tributaries of Short Creek and Little Creek, in the vicinity of Pataula Creek, and south of Springvale. Occurring as it does on slopes, the surface varies from gently sloping to very steep. The surface drainage is well established and in many places is excessive, resulting in gullying, but internal movement of soil water is impeded by the heavy plastic subsoil. Although much of this soil was included among the first lands cleared in the county, very little of it is farmed at present, except where patches are included in fields with other soils.

Where cultivated, this soil is used for corn and cotton. Yields generally are below the average for the county. Corn produces from 5 to 10 bushels and cotton from one-tenth to one-eighth bale to the acre. Heavy fertilization is required for profitable returns.

According to analyses of the Susquehanna soils made by the State College of Agriculture, they are comparatively rich in plant food elements, but a large proportion of these elements is not in available form. A fertilizer analyzing about 3–12–3 has been found by some farmers to give good returns, and this, with an application of lime and an increase in the supply of organic matter through the use of stable manures, legumes, or cover crops turned under, aids in building up the soil. However, the greater part of this soil should remain permanently in forest. Its low productivity and steep slopes greatly reduce its value for agriculture, and timber growing will pay higher returns upon the investment.

GRADY SANDY LOAM

The topsoil of Grady sandy loam is gray or dark-gray loamy sand or friable sandy loam, 8 or 10 inches deep. The subsoil of gray or mottled gray and yellow friable sandy loam or sandy clay grades, at a depth of 15 or 18 inches, to light-gray sticky sandy clay or clay.

Small patches in the central part of depressions of Grady sandy loam consist of Grady clay loam. In a number of places the soil appears to have been developed by the washing in on Grady clay loam of sand and coarse materials from the surrounding sandy or pebbly uplands. Mapped areas of this soil include several variations such as those in areas 2 or 3 miles southeast of Pachitla where the topsoil of sandy loam varies in color from dark gray to grayish yellow and in depth from 2 to 6 inches. It is underlain by pale-yellow sticky sandy clay which grades, below a depth of 18 inches, to

very heavy, sticky sandy clay or clay mottled with pale gray, light red, and yellow. Where these areas are near areas of Henderson stony loam some cherty gravel and a few concretions are scattered over the surface.

In several places west of Carnegie, included patches consist of gray or grayish-yellow loamy sand or sandy loam from 4 to 8 inches deep, underlain by compact yellow sandy clay which becomes more compact and slightly sticky with depth. Below a depth ranging from 15 to 18 inches is compact, pale-yellow clay or sandy clay with some gray mottles that become increasingly prominent with depth. In places below a depth of 26 or 28 inches, gray is the predominant color and mottles of red or rust brown appear. About 1 mile south of Shellman narrow strips of soil along a small drainage way consist of materials 2 or 3 inches deep, washed in from the surrounding uplands, underlain by pebbly dark-gray sandy loam which grades, at a depth of about 6 inches, to pale-yellow sticky sandy loam which becomes heavier with depth and grades, below a depth of 2 feet, to heavy, compact, sticky, mottled yellow, brown, gray, and red clay. A patch of soil north of Benevolence consists of a gray sandy topsoil and a pale-yellow subsoil mottled with gray and consisting of sandy clay that becomes somewhat more compact below a depth of 26 or 28 inches. Usually the boundary line which separates this from the surrounding soils is very distinct. Some of the variations included occur in what appear to be old depressions that since their formation have been reached by small drainage ways and to a certain extent reclaimed from the original wet, poorly drained condition. In many places narrow borders of material corresponding to Norfolk sandy loam and Dunbar sand occur around the edge of areas of Grady sandy loam. The shape of these depressions differs considerably, but many of them are round or oval.

Grady sandy loam, closely associated with the Greenville and Carnegie soils, occurs in depressions or limestone sinks in the southern and eastern parts of the county. It is derived from or influenced by the siliceous limestone that, upon being partly dissolved by underground waters, allows the surface to slump. The flat or depressed surface results in rather poor surface drainage, and the compact subsoil prevents free movement of water downward. The soil is not extensive but is very conspicuous. It originally supported a growth of gum and water oak, some cypress, pine, and poplar, with haw around the edges. About three-fourths of it has been cleared and after being ditched and drained has been used for corn and pasture. This soil can be used for such crops as corn and cane, but it is not adapted to cotton. Corn yields from 10 to 15 bushels to the acre but usually receives little fertilizer.

Thorough drainage and applications of lime are essential in the reclamation of this kind of land. In other counties of Georgia it has been successfully used for corn and hay crops, and yields of corn ranging from 20 to 40 bushels to the acre have been reported. It is well suited for permanent pasture, and with its abundant moisture supply should maintain a good stand of carpet grass, and, on the better drained areas, of dallis grass and Lespedeza.

GRADY CLAY LOAM

The topsoil of Grady clay loam consists of dark-gray clay loam or silty clay from 4 to 6 inches deep. The subsoil is gray or drab heavy sticky plastic clay mottled with red, yellow, and rust brown. In places the subsurface material is pale-yellow or grayish-yellow clay.

This soil is more extensive than Grady sandy loam, occurring most extensively in the red-land belt in the southeastern part of the county, east of Blakely Road and south of Dawson Road. It occupies depressed areas or sinks, as does Grady sandy loam, but it is in most places associated with the pebbly soil and the heavier members of the Greenville series. Most of the sinks are oval or round, and their lowest point is from 2 to 15 feet below the surface of the surrounding uplands. These sinks range in size from about 1 acre to about 100 acres. The mode of formation of this soil was similar to that of Grady sandy loam. The structure of both the topsoil and subsoil is in most places more uniform than in Grady sandy loam, but some small areas of the sandy loam are included in mapping. Patches having a dark-gray or almost black surface soil from 4 to 6 inches deep are included with mapped areas of this soil. Such areas are really Portsmouth clay loam but are not of sufficient extent to be separately mapped.

Grady clay loam is poorly drained, and the surface water from the surrounding higher lands collects in the depressions and remains for long periods of time before it is carried off by slow percolation into the underlying formation or is lost by evaporation.

Grady clay loam originally supported a growth of cypress, gum, poplar, and some water oak and short-leaf pine. Cypress is noticeably more abundant than on the sandy loam. The best of the original growth has been removed, and a few of the ponds have been cleared and are used for pasture. In a few places small ponds have been cleared and drained and planted to oats and corn.

Grady clay loam is naturally fertile, but its wet, poorly drained, and acid condition and the heavy texture of the soil have caused it to be neglected in favor of the better drained, more easily managed soils. Where drained and limed it is well suited to corn and hay. Yields of corn ranging from 25 to 50 bushels to the acre have been reported on this soil in Bibb County, Ga., where the land has been properly managed. Oats do fairly well but tend to grow rank and lodge, and in wet seasons they drown out. In other counties of the State this soil, after being cleared and drained, has been very profitably used for pastures, but in its present condition forestry is recommended.

MEADOW

Meadow includes the soils that occur as bottom lands or flood plains along the smaller streams and in the better drained parts of the larger creek bottoms. It consists of material of alluvial origin of such variable color, texture, and structure that soil type designation is impracticable. The color and structure of this material is influenced by the color and structure of the neighboring upland soils. The color ranges from gray to red, the texture from

sand to silty clay loam, and the structure in the subsoil from open and porous to tight and compact. Most areas are subject to overflow and remain wet for considerable periods during the year, although most of the soil dries in summer. Meadow includes patches of soils which, if of wider extent, would have been mapped as Plummer sand. Small mucky areas are also included.

About 5 per cent of the meadow has been cleared and is used for corn, sugar cane, and pasture. The remainder is covered with a mixed growth of short-leaf pine, sweet gum, poplar, bay, magnolia, holly, beech, hazel, alder, laurel oak, chestnut oak, water oak, hickory, haw, red oak, Spanish oak, black oak, and white oak, with gall berry around the border. In many places a heavy growth of switch cane affords excellent range for cattle, and acorns and other nuts produce a good quality of mast for hogs.

Yields of corn range from 12 to 20 bushels to the acre. The quality of the sugar cane varies considerably with the texture of the meadow material, the lighter sandy soils generally producing a lighter colored sirup of higher quality. In several places in the county, land of this kind has been drained and seeded to pastures of dallis grass, carpet grass, and Lespedeza. The carpet grass does best in the more moist places, and dallis grass and Lespedeza seem best suited to the higher and better drained parts. Liming would doubtless greatly benefit pastures. The use of meadow for pasture and forestry seems the best agricultural use to which it may be put, although it is fairly rich in plant-food elements and contains much soluble material brought from the upland soils.

MUCK

Muck, as it occurs in Randolph County, is from 10 to 30 inches deep and consists of black, well-disintegrated woody material mixed with a considerable quantity of sand in the lower part. Some of the areas along Ichawaynochaway Creek are much deeper and in places the muck approaches peat in composition.

The principal areas of this material occur in bayous or coves along the edge of the swamp of Ichawaynochaway Creek on the eastern edge of the county. Small patches are mapped along Town Branch in the northeastern part of the city of Cuthbert and in several small areas around the heads of branches southeast of Ebenezer Church, southwest of Cuthbert. Most of the muck is heavily covered with trees and brush. Cleared areas are in pasture.

Muck remains water-logged throughout the year and until drained can be of little agricultural value. It is used in other localities for the production of such crops as onions, celery, and cauliflower. Under present agricultural conditions the muck areas of Randolph County are best suited to forestry.

SWAMP

In the classification of swamp are included the areas of first-bottom land that are subject to frequent overflow and remain wet through the greater part of the year. Swamp soil varies widely in color and texture, just as does meadow, and differs from meadow

principally in its more poorly drained condition and the rather more typical swamp growth that it supports. Cattle and hogs are ranged in the swamps which, in many instances, afford the only winter pasturage. The largest areas of swamp are along Ichawaynochaway, Pachitla, Holanna, Pataula, Hog, Carter, and Punkin Creeks.

Under present conditions the use of swamp for timber production seems to be the best use to which it can be put.

ROUGH GULLIED LAND

The rough steep slopes and gullies and the precipitous banks of the branch heads so common through the western and northwestern parts of the county are classified as rough gullied land. Land of this character is unfit for farming purposes and is best suited to forestry. It includes widely different soils. Much of the rough gullied land is the result of erosion of hillsides that, although too steep for practical cultivation, were nevertheless cleared and farmed for a few years until rendered useless by gullies. Improper terracing or lack of terracing have contributed largely toward the eroding of many slopes. In other places slopes are being dissected at the present time by the action of springs which issue from their bases, in many places just beneath or through strata of sand which are gradually disintegrated and carried away by the action of the spring waters. Thus the heavier layer of clays is undermined above and soon slumps. Erosion of this kind is rapidly ruining good fields in the northwestern part of the county and areas of Greenville loamy sand and sands of the other series where small gullies have been allowed to eat their way back unchecked into the slopes and uplands.

Areas of rough gullied land are most extensive in the northern part of the county along Pataula Creek, west and northwest of Pleasant Hill Church, in the vicinity of Kitchen Branch, and in the southwestern part of the county along Cemochechobee Creek. The rough gullied land around the heads of small stream branches is most extensive in the western and northern parts of the county. Some of these ravines have almost vertical sides, and the bottoms are from 20 to 50 feet below the surrounding upland.

Land of this kind is suitable only for forestry. It supports a good growth of hardwood and coniferous trees and can be very profitably retained in forest.

MANAGEMENT AND IMPROVEMENT OF RANDOLPH COUNTY SOILS

Permanent agriculture and the maintenance of the fertility of land require something besides the mere planting, cultivating, and harvesting of crops. They require the intelligent use of all available information that is applicable to any given set of conditions, such as recognition of the natural adaptations of certain soils to certain crops, the methods of culture, management, fertilization, and the rotation of crops.

Even though there is some recognition on the part of farmers of the special adaptation of some of the soils to certain crops, on the whole little advantage is taken of this knowledge. For example,

cotton is planted on practically all of the soils in the county because it has for years been the principal cash crop, and the tenant farmers and laborers understand its culture better than that of any other crop. It thrives on the sandy loams and loams of the Carnegie, Greenville, Orangeburg, Marlboro, Ruston, and Norfolk series, but it does not grow well on those soils with compact subsoils such as Blakely clay loam, Cuthbert sandy loam, and Susquehanna sandy loam, or on the deep sand soils of other series. Cotton roots can not penetrate the tight compact subsoils, moisture conditions are unfavorable, and on the deep sands heavy fertilization is necessary owing to the constant and rapid leaching. Soils with a tight, compact subsoil, those on steep slopes, and those having stony surfaces are best suited to forestry under present agricultural conditions, and attempts to farm such soils will eventually result in failure. The use of the sands, the deep phase of the sandy loams, and some of the sandy loams has been successful elsewhere for such crops as peanuts, truck crops, watermelons, asparagus, and berries and should prove so in this county. If cleared, the hilly and rougher areas can best be utilized for pasture or fruit growing.

The clay loams, such as Greenville clay loam, are best suited to corn, hay, and cotton, and Blakely clay loam is well adapted to corn and hay but not to cotton. Meadow and much of the Grady soils can best be used for pasture and corn. Various grasses are being tried on these soils at the Georgia Experiment Station, and it is learned that carpet grass is best for the wetter areas, and dallis grass and Lespedeza do best on the higher and better drained areas. Bahia and "centipede" grass are being experimented with for the drier upland soils and seem very promising.

The plowing of the soils of Randolph County has been uniformly very shallow. In the heavy soils this has resulted in the formation of a "plowsole," a compact layer that interferes with root development and movement of water through the soil. For improving the physical condition of the soil deeper plowing, subsoiling, and the use of lime can not be too strongly recommended. Deep-rooted legume crops force their roots into the subsoil and improve its physical condition and take in and store nitgrogen in the root nodules, thus increasing the supply of plant food. The turning under of legumes, hay crops, or any kind of vegetable matter, such as stubble, leaves, and crop residues, improves the physical condition of the soil. The use of winter cover crops such as oats, rye, and wheat are recommended to prevent or control soil washing and to make use of the plant-food elements that become available during the warm open winters and that otherwise would largely leach away. The crop may be allowed to mature and be harvested or it may be turned under for soil improvement. Terracing and contour plowing are especially to be recommended on the sloping fields as a check on surface wash and erosion.

The rotation of crops has not been very extensively adopted, and the one-crop, clean-cultivated system of farming that has been followed has resulted in a very rapid depletion of the available plant nutrients in the soil. The advent of the boll weevil has forced diversification of crops on the farmers of the county. The rotation of their various crops should be carefully worked out. It should be

so planned that cultivated crops are followed by or grown with grain or hay crops which leave considerable residue in the form of stubble and litter on the land. The following rotation is recommended by the Georgia State College of Agriculture for this part of the State: First year, corn with velvet beans or peanuts, the beans or peanuts to be grazed off; second year, cotton or peanuts for the cash crop, followed in the fall by a grain crop to be harvested the third year, with cowpeas planted in the stubble land for hay or to be turned under. Rotation not only aids in maintaining the fertility of the land but helps to control damage from insects.

The use of fertilizers is essential to the production of crops on the soils of Randolph County. Some authorities have calculated that the average productive capacity of the lands of this region is about 300 pounds of seed cotton or 100 pounds of lint cotton to the acre, and that the application of complete fertilizer at the rate of 200 pounds to the acre adds 250 pounds to the acre to the yield of seed cotton; the use of 400 pounds of fertilizer adds 475 pounds of seed cotton; and 800 pounds of fertilizer would add 800 pounds of seed cotton. These figures, of course, represent probable yields and do not take into consideration damage by boll weevils. Applications ranging from 400 to 800 pounds to the acre of fertilizers varying in analysis according to the needs of the soils and the requirements of the crops, are in general, recommended for the soils of the county.

Nitrogen is the most important constituent needed in the production of such crops as cotton, corn, oats, wheat, cowpeas, and peanuts. It is the limiting factor in crop production on the soils in this county, and in order that the supply may have an opportunity to increase to meet the needs of the crops the light sandy soils must be allowed to lie idle every two or three years. Potash is next as to quantity required for profitable crop production, but it is usually present in much greater quantities than phosphoric acid so that applications of the latter are more essential.

The Georgia State College of Agriculture has made chemical analyses of soils in Early County and has published the results of these analyses in a bulletin.[3] Many of the soils of Early County are similar to the soils of Randolph County, and the analyses of the Early County soils are applicable in a general way to like soils in this county. Those interested in the chemical composition of the soils and their improvement should consult this bulletin.

The soils of this county are for the most part light colored, showing a general lack of organic matter and consequently of nitrogen, which is usually present in the form of humus or decayed vegetable matter. In attempting to build up the soil, therefore, the first step must be to increase the supply of nitrogen. This can not be done solely by the use of commercial fertilizers, because their value depends largely on the physical condition of the soil and this is determined by the content of organic matter. Methods of increasing the supply of organic matter in the soil will depend on the type of agriculture followed. In dairy or livestock farming the manure produced greatly aids in building up and maintaining the supply of organic matter, but the manure should be supplemented by legumes or cover

[3] CARTER, L. M., LOWRY, M. W., COLLINS, W. O., and SOULE, R. M. ANALYSES OF SOILS OF EARLY COUNTY. Ga. State Col. of Agr., Bul. 289, 1923.

crops plowed under. In the usual farming system, however, where cotton and corn are the principal crops, the use of legumes and cover crops plowed under offers the best and cheapest means of increasing the supply of organic matter and nitrogen in the soils. Cotton stalks, litter, and other crop residues are too frequently burned in an effort to control the weevil. The organic matter which has such a beneficial physical effect as well as being a carrier of nitrogen is thus destroyed, and the nitrogen is lost. Turning under deeply all such crop residues is a decidedly better farm practice. Repeated burning probably accounts for as great a decrease in the supply of humus and nitrogen as does continuous cropping. The function of the nitrogen is to promote growth of leaves and stalks; it is responsible for the green color of the foliage. The use of different fertilizers, which supply part of the nitrogen in the mineral form, such as nitrate of soda or sulphate of ammonia, and a part in the organic form, such as tankage, is generally preferable to the use of only one of the two forms. Too much nitrate of soda seems to have a bad physical effect on the soil and tends to make it puddle. In general, from 40 to 70 per cent of the nitrogen should be in the mineral form and the remainder in some organic form.

The content of phosphoric acid is next in importance to crop production. The availability of the phosphorus depends largely on the presence of organic matter. Superphosphate (acid phosphate) furnishes this element in the most readily available form and is the best to use in a mixed fertilizer. However, rock phosphate is cheaper and gives best results when applied alone, in quantities varying from 800 to 1,000 pounds to the acre, or with barnyard manure, as it becomes available more readily in the presence of decaying organic matter. The function of the superphosphate (acid phosphate) or rock phosphate is to aid fruiting and hasten maturity. It is especially valuable for cotton, under present boll-weevil conditions and for grains.

The total amount of potash present in many soils is greater than that of the other constituents, but only a small part of this supply is directly available for plants. The combination in which this constituent occurs in the soil ordinarily breaks down very slowly, but where the supply of organic matter is abundant this dissolution is hastened by the action of organic acids. Rust in cotton is caused by the lack of potash. Potash is necessary in the formation of the starch and of the woody materials which give strength to the stalk. It increases the quality and color of fruit and is of especial value for vegetables.

Most of the soils of Randolph County give an acid reaction when tested for soil acidity. They show a requirement of one-half to 1½ tons of ground limestone to the acre or about one-half this quantity of burnt lime. The leaching that has gone on for such a long period has removed all the soluble lime carbonate from these soils. Legumes and corn naturally grow best in a soil that is sweet or has an abundance of lime, and lime is a prerequisite in obtaining a stand of clover and alfalfa. Lime not only acts as a "sweetener," but also has the effect of making heavy clay soils granular and less subject to clodding. It also improves the internal drainage and aeration of the surface soil and subsoil. The abundant supply of limestone in the

northern part of the county could easily be made available to every farmer in the county.

Finally the improvement and maintenance of the fertility of the soils of Randolph County can be accomplished by deeper plowing, rotation of crops, the intelligent use of commercial fertilizers of the analysis needed for the crops and the soil, and the use of lime.

SUMMARY

Randolph County is in the southwestern part of Georgia. Its area is 436 square miles. The greater part of the county lies in the Dougherty Plain and is characterized by a flat or rolling surface. The northwestern part is in the "Fall Line Hills" and is marked by a hilly and broken surface.

The uplands in the northern and western parts of the county are well drained, but the southern and southeastern parts are characterized by numerous ponds or limestone sinks which hold water part or all of the year. The western part of the county drains into Chattahoochee River and the eastern part into Flint River. Most of the stream bottoms are small and narrow, but along the larger streams there are swamps from one-fourth to one-half mile wide.

The highest elevation occurs on the drainage divide between the Chattahochee and Flint River basins.

The 1920 census gives the population of Randolph County as 16,721, of which 81.9 per cent is classed as rural. The average density of the rural population is 32 persons to the square mile. Cuthbert, the county seat and largest town, had a population of 3,022 in 1920. Shellman, in the eastern part, had a population of 1,074 and is the only other large town in the county.

Agriculture is the principal industry, but a considerable number of people are engaged in lumbering. Bauxite and other clays occur in the northern and northwestern parts of the county and have been mined to a small extent. Limestone of high lime content occurs in the vicinity of Griers Cave and Punkin Creek.

Railroad transportation is afforded by the Macon to Montgomery branch and the Fort Gaines branch of the Central of Georgia Railway, and by the Georgia, Florida & Alabama Railway. The roads of the county are constructed of local sand-clay materials, and the main roads are maintained in good condition.

The climate of this section is characterized by short, mild winters and long, hot summers, but excessively high or low temperatures are infrequent.

Cotton, corn, peanuts, and hay are the principal crops raised. Peaches are raised extensively through the central part of the county, principally on the red soils. Pecan trees are being planted in great numbers. Sweet potatoes and sugar cane are raised on most farms in sufficient quantities to supply home needs. This is also true of hogs.

The average size of the farms in Randolph County, according to the 1920 census, is 81.8 acres, of which 50.9 acres is classed as improved land. Tenants operate 79.1 per cent of the farms, and owners and managers operate the remainder.

The soils of the county for the most part have developed from unconsolidated sands and clays. Henderson stony loam is derived from the siliceous Jackson-Vicksburg formation, and the Grady limestone-sink soils may have been modified to some extent by the underlying limestone formation.

The Greenville, Blakely, Carnegie, and Marlboro soils are derived from the unconsolidated parts of the Vicksburg formation and in part from the Claibourne and Midway formations. They comprise the best agricultural soils in Randolph County. The Carnegie, Greenville, and Marlboro soils are the best cotton soils in the county and are also well suited to pecans. Greenville pebbly loam and Greenville sandy loam are well suited to peaches.

The loamy sands and sandy loams of the Orangeburg, Ruston, and Norfolk series are suited to the general crops of this section and to such crops as asparagus, truck crops, melons, and berries.

Ruston sand and Norfolk sand are low in plant-food elements and are of low agricultural value.

Some of the Henderson stony loam can be cleared of its excess of rock fragments and used for cotton and corn. The rougher areas are best suited to forestry.

The Susquehanna and Cuthbert soils can be used to some extent for farming purposes, but for the most part are best suited to forestry and grazing.

The Grady soils, when drained, are adapted to corn, hay, and use as pasture.

Meadow is adapted to some extent for corn, sugar cane, and pasture.

The muck areas, if drained, might be of value for celery and other truck crops, but under present conditions they are best suited to forestry.

The swamp areas are poorly drained and are best suited to forestry. They afford scant pasturage.

Rough gullied land has little agricultural value except for forestry.

The judicious application of the right kinds of fertilizers, rotation, diversification, and a wider use of legumes and cover crops are recommended for the farm lands of Randolph County. The soils are uniformly low in organic matter and nitrogen. Applications of lime improve the physical condition of the soil and make it more suitable for the growth of legumes and grasses.

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[PUBLIC RESOLUTION No. 9]

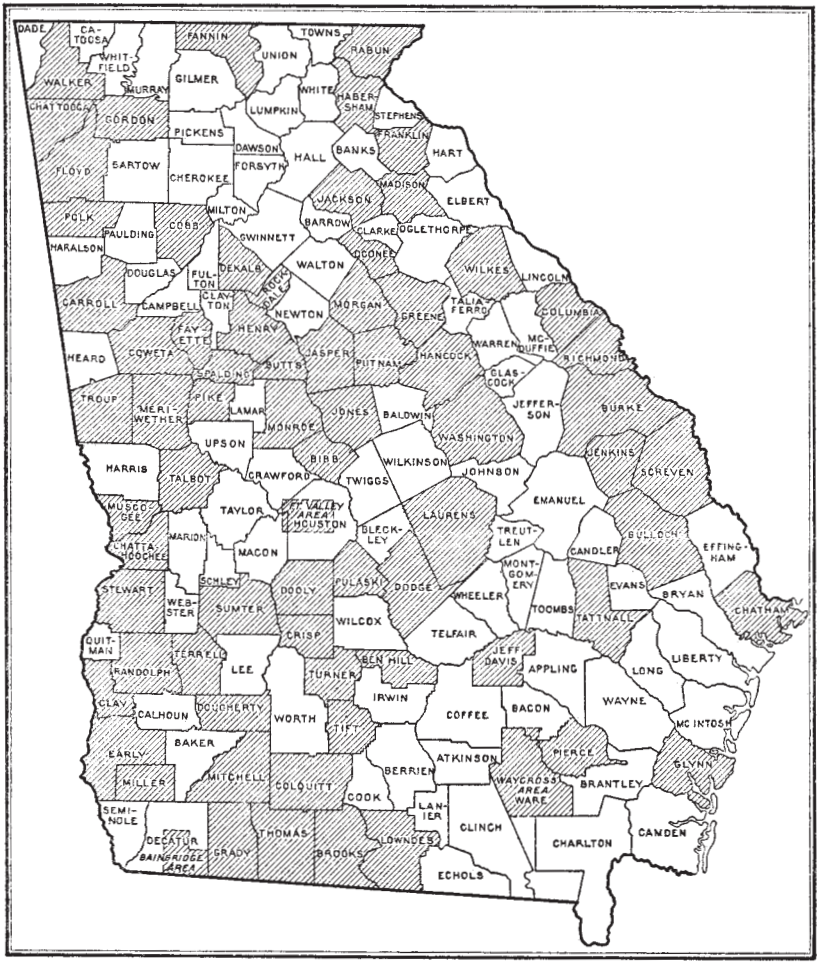
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

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, and on July 1, 1927, the Bureau of Soils became a unit of the Bureau of Chemistry and Soils.]



Areas surveyed in Georgia, shown by shading

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