

# SOIL SURVEY OF CLARENDON COUNTY, SOUTH CAROLINA.

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## DESCRIPTION OF THE AREA.

Clarendon County, with an area of 464,000 acres or 725 square miles, is situated in the central-eastern part of South Carolina, between parallels  $33^{\circ} 25'$  and  $33^{\circ} 55'$  north latitude and meridians  $79^{\circ} 50'$  and  $80^{\circ} 40'$  west longitude. It is bounded on the north by Sumter County, on the northeast by Florence County, on the east by Williamsburg County, and on the south and west by the Santee River, which separates it from Berkeley, Orangeburg, and Calhoun

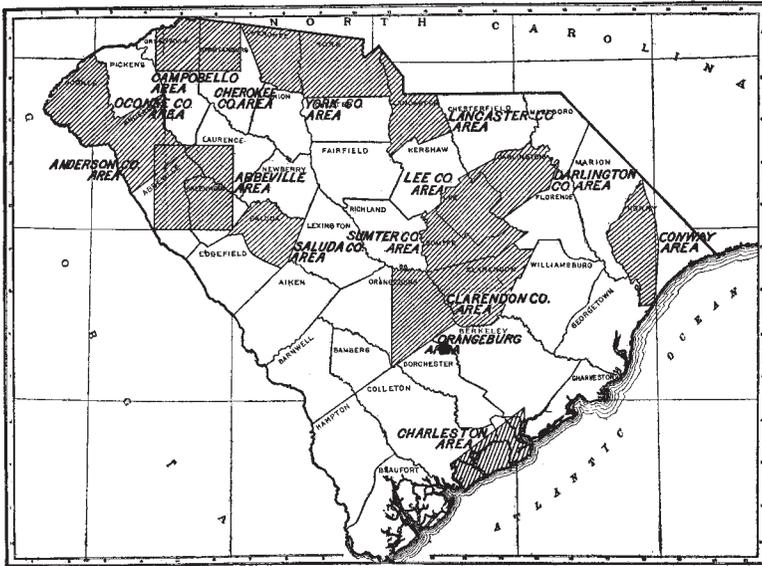


FIG. 11.—Sketch map showing location of the Clarendon County area, South Carolina.

Counties. It lies entirely in the Coastal Plain, or what is designated as the "Low Country" region of the State, being about halfway between the "Up Country," or rolling Piedmont region, and the seacoast. Along the northern boundary it attains a length of nearly 40 miles, while its greatest width north and south is not much over 25 miles.

The surface features are level to gently undulating and rolling, and large tracts are so level as to be poorly drained. The more level

topography characterizes practically all of the eastern and central portions of the county, or roughly the territory east and north of a line passing through Pinewood, Paxville, Silver, Davis Station, and Jordan, and thence southeastwardly to the Williamsburg line. Here the streams are sluggish, ill defined, and bordered by swampy strips from a rod or so to 2 miles in width, depending upon the size of the stream. The larger swamps are outlined by rather abrupt slopes from 10 to 30 feet high. Back of these for some distance are level to gently undulating well-drained strips, which give way in turn to slightly lower, poorly drained areas or in many instances to extensive, flat interstream areas. Along the smaller streams, such as have no names, the slopes are more gradual and the local differences in elevation rarely exceed 10 feet, generally being not more than 5 or 6 feet. In the western and southern portions of the county the topography is more varied in character, although the usual swampy strips and numerous level areas are found. The Santee River is bordered on the Clarendon County side by a swampy overflow strip ranging from one-fourth of a mile wide at Wrights Landing to about 4 miles at the Sumter County line and to over 6 miles in the southern part of the county. Between Taw Caw and Jacks Creeks in the southwestern corner of the county is a level area separated from the main swamp by a pronounced ridge of sand. Another level area extends from Jacks Creek immediately along the river swamp to about 2 miles north of Rimini, where it passes into a higher, very sandy section known as the High Hills of the Santee. The remainder of the county is of a level to gently rolling nature and has fairly good natural drainage except in local areas. The Santee River swamp ranges from about 50 to 110 feet above sea level. The uplands range from 140 feet in the eastern part of the county to 200 feet or more in the sand-hill section in the northwestern corner. At Manning the elevation is about 150 feet above sea level.

The western and southern edges of the county are drained by a number of creeks and smaller streams emptying into the Santee River. Among these may be mentioned Spring Grove, Jacks, Taw Caw, and Potato Creeks and Wyboo and Doctor Swamps. The central and eastern sections are drained by the Pocotaligo and Black Rivers, respectively, which unite a few miles west of the Williamsburg line. Both of these within the limits of the county are large swamps rather than well-defined streams, and the drainage is very much retarded by a tangle of trees and undergrowth. Puddings Swamp, crossing the northeastern corner, has gained considerable fame on account of the excellent quality of tobacco grown in the near-by territory. It empties into the Black River a short distance in Williamsburg County, being joined by Douglass Swamp before reaching the

line. The main tributaries of the Pocotaligo River are Sammy and Ox Swamps, both entering it from the west.

Clarendon County was established in 1856 from a part of the old Sumter district, one of the earlier divisions of the State. There were a few settlements in the section as early as 1775, but even up to the time when the county was established the population was small and scattered. The settlers moved in from other sections of the State and to some extent from North Carolina and Virginia. The present white population is composed largely of descendants from the early settlers. In 1880 the total population of the county was 19,190, with the ratio of 1 white to 2 negroes. By 1900 the population had increased to 28,184, with the ratio of about 5 negroes to every 2 whites. The bulk of the white population is found in the towns and on the better lands around Summerton and north to Pinewood, and in the section east of the Black River, where there were a number of small farms operated without slaves prior to the Civil War. The old slave plantations were mostly along the edge of the larger swamps, as along the Santee Road and the roads on each side of the Black and Pocotaligo River swamps.

The county has a fairly good system of public roads, but in many places they are too sandy to permit heavy hauling. Work has already been begun looking toward the improvement of all of the roads by claying them wherever they are too sandy, and grading them up and putting in sand where they are wet and clayey. The rural delivery service extends to all sections where there is any need for such service.

The railroad facilities, while not the best, are adequate for the handling of all of the traffic of the county. The Atlantic Coast Line between Sumter and Charleston crosses the east-central portion of the county in a general southeasterly direction. The Augusta branch of the same line crosses the northwestern corner and the Northwestern Railroad of South Carolina extends from Sumter to St. Paul, below Summerton, and from Summerton east to Wilson on the Atlantic Coast Line. The Alcolu Railroad has been built recently from Alcolu into Florence County, and it is to be extended to Florence. These roads give direct outlet to Sumter, Columbia, Augusta, Charleston, and all northern points. The farthest points from the railroad are along the southern edge of the county and north of the Black River, along the eastern boundary.

Manning, the county seat, is centrally located and has about 2,500 inhabitants. Summerton is a place of about half that size in the southwestern part of the county. Among the smaller places may be mentioned Pinewood, on the railroad between Sumter and Augusta, Paxville, St. Paul, and Davis Station, on the Northwestern, and Alcolu and Foreston, on the line between Sumter and Lanes. The bulk

of the cotton and trade goes to the different towns in the county, although a considerable amount of it reaches Sumter and Mayesville, and a great deal of the tobacco is marketed in Timmons ville, in Florence County. The only manufacturing interests of any importance consist of a cottonseed oil mill at St. Paul, one at Manning, and a large lumber plant at Alcolu.

#### CLIMATE.

Clarendon County has a mild, pleasant climate, with a growing season long enough to mature a great variety of crops. On account of the long summers and very mild winters many plants adapted to a semitropical climate are found growing. Generally by the 10th of March the danger of heavy frosts has passed, and it is about this time that the planting of corn begins, sugar cane and some of the vegetables even being planted in February. Cotton, being more susceptible to cold, is not planted as a rule until after the 1st of April. Real summer weather sets in before the end of May and continues until well on in September, then till late fall it is mild and very pleasant, usually being dry and favorable to the gathering of crops. The winters are so mild that no expensive housing is required for the stock and farming operations can go on almost uninterruptedly. Some winters do not have any snowfall, but the average is about 2 inches.

The Weather Bureau has no station in the county, but the general climatic conditions are fairly well represented in the table below, which is compiled from the records of the station at Trial, just across the Santee River, in Berkeley County. It will be seen from this table that the average annual rainfall of about 50 inches is well distributed throughout the year, although heaviest in the summer months. The variation in the precipitation as shown is from 41.8 inches in the driest year to 67.3 inches in the wettest year. The mean annual temperature is 64° F. The hottest periods usually are of very short duration, and it is of rare occurrence that temperatures as low as 15° F. in the winter are recorded. A great deal of the damage now done by wet and dry spells could be overcome by better methods of tillage and cultivation, or in the case of the wet lands by supplementing these with good drainage. In some instances the failures are due to the planting of soils to crops to which they are not at all adapted.

From the records of the same station we find that the average date of the last killing frost in the spring is April 4 and of the first in the fall November 5. Occasionally a light frost occurs later in April. The earliest date for frost in the fall is October 10, though this, too, is of rare occurrence. Taken as a whole, the climate is healthful and very favorable to agricultural pursuits.

*Normal monthly, seasonal, and annual temperature and precipitation, at Trial, Berkeley County, S. C.*

Months.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.	Snow, average depth.
	° F.	° F.	° F.	Inches.	Inches.	Inches.	Inches.
December.....	49	85	10	3.0	2.4	5.0	0.1
January.....	46	82	9	3.5	2.9	0.9	0.1
February.....	48	82	-3	4.2	4.0	0.6	1.7
Winter.....	48			10.7	9.3	6.5	1.9
March.....	55	90	13	3.6	3.3	3.1	0.0
April.....	61	92	26	2.5	3.1	5.4	0.0
May.....	70	97	38	4.5	6.7	6.3	0.0
Spring.....	62			10.6	13.1	14.8	0.0
June.....	76	99	43	5.8	10.0	7.2	0.0
July.....	79	103	54	6.2	1.1	9.6	0.0
August.....	78	101	56	7.7	3.9	15.2	0.0
Summer.....	78			19.7	15.0	32.0	0.0
September.....	72	101	39	3.9	2.6	3.0	0.0
October.....	63	91	29	3.1	0.5	4.9	0.0
November.....	56	92	13	2.5	1.3	6.1	0.0
Fall.....	64			9.5	4.4	14.0	0.0
Annual.....	63	103	-3	50.5	41.8	67.3	1.9

Average date of first killing frost in autumn, November 5; of last in spring, April 4. Date of earliest killing frost in autumn, October 10; of latest in spring, April 28.

AGRICULTURE.

The agricultural development of Clarendon County has been along the general lines characteristic of most of the upper Coastal Plain belt of the State. The first to be attracted to the section were hunters, trappers, and dealers in furs, skins, etc. A little later came others, who devoted practically all of their time to collecting or herding cattle and driving them to Charleston and other distant markets. The extensive upland areas, while heavily timbered, afforded ample pasturage during the summer months, and in the winter green feed could be had in the swamps, where cane abounded. About 1850 these earlier industries began to give way to permanent settlement, with farming as the chief means of livelihood. All the lands were taken up, but actual farming was confined almost entirely to well-drained uplands, occurring for the most part along the swamps. The extensive wet upland areas were not considered of any value until later, when turpentine and lumbering became important in-

dustries, but from the first the larger river swamps were prized for pasture lands, making it possible for the owners of them to keep large numbers of cattle and hogs at little or no cost.

From the first scattering settlements was gradually developed the system of agriculture which prevailed without many changes until the Civil War. The raising of hogs and cattle soon became important industries with many of the farmers, and all of the others kept at least a few hogs, cows, and sheep for home use. Corn and wheat were the main crops, but many others were grown in a limited way. Among these may be mentioned oats, rice, and grasses for hay. Some attention was also given to the growing of indigo, which proved a very profitable crop as long as the bounty was kept on it by the English Government. The removal of this tax during the Revolutionary War and competition in the East Indies caused a rapid decline in the industry, resulting in its being practically abandoned by the beginning of the nineteenth century. About this time (1794) the cotton gin was introduced, and with the decline of the indigo industry the production of cotton on a more extensive scale began to attract attention, and this industry grew steadily in importance. Corn was an article of export until cotton began to be grown extensively, when its production declined and hardly enough was produced for local use.

Lands being cheap and plentiful, it was not considered of special importance that a field should be kept in a productive state. If it became run down to a point where it would not produce profitable crops, as likely as not it would be abandoned and new lands cleared to take its place. In spite of the crude and careless methods, however, a very substantial prosperity existed among the majority of the farmers. This was especially true of the slave plantations, including nearly all of the larger places. With the smaller farmer conditions were less favorable. At the time there were no near-by markets of any consequence nor any transportation facilities except those afforded by the Santee River, which was used to a considerable extent until the advent of the railroads. Wrights Landing gained considerable importance as a shipping point, but now it is entirely abandoned.

While farming soon became the main occupation with the settlers, a great deal of attention was given to the products of the forests for both domestic use and for export. Turpentine gradually became an extensive industry and resulted finally in almost ruining a large part of the longleaf pine timber for lumbering. Lumber, shingles, staves, etc., were also articles of export.

Conditions were greatly changed by the Civil War. More and more the farmers drifted into the growing of cotton with less and less attention given to stock raising and the growing of corn, wheat,

oats, and such other crops as were needed on the farm. What was at first taken up as a necessity led virtually into a one-crop system, which since has been the greatest drawback to the agricultural development of the section. With little stock, other than the work animals, there was very little manure to return to the soil, and the methods of tillage and cropping were in general very careless, and carried on without any special reference to crop adaptability or special requirements of the soil. As a result the soils continued to decline in productiveness until the yields were very low and unsatisfactory. Then the use of commercial fertilizers began on an extensive scale.

The majority of the farmers found it hard to make more than a bare living for a long time after the war and a great deal of the land changed hands through the foreclosure of mortgages and as the result of cash sales by those seeing no future for agriculture in the section. As a further hindrance to progress a great many of the landowners moved to town and turned their farms over to tenants. Conditions, however, continued to improve until about 1890, when the price of cotton fell below the cost of production. To some this meant disaster, while to others it proved a blessing, as the way was paved for the diversification of crops. In the section east of Black River and in places west of the river tobacco began to be grown and generally it proved very profitable. It enabled many who had been living under heavy mortgage soon to pay off their debts, to acquire better equipment for the farm, and to improve the general home surroundings. In the last 10 years decided improvement has taken place in all sections of the county wherever the farmers are handling their own land, owing in a large measure to the better prices paid for cotton. It is possible now to operate nearly on a cash basis, and many signs of improvement are to be seen, among which is the buying of good farm stock and the replacing of the antiquated implements and machinery by the latest improved types.

With all of this, hardly the beginning of the agricultural possibilities of the county have been realized. The soils on the average are not producing one-third what they should of any of the crops now grown, and only a relatively small number of the farmers realize the importance of and the great opportunities in diversified farming. In many instances soils are being used for a system of farming to which they are not at all adapted, whereas with some other crops and careful methods they could be handled profitably. Besides the opportunities afforded by the naturally well-drained areas, the extensive areas now too wet for successful farming could be drained and brought under cultivation at a very reasonable cost. In their present condition they are practically waste lands and a menace to the health of the section.

Some idea of the extent of development in the county and the importance of the different crops can be had from the figures given in the 1900 census reports. Since that date there has been a gradual extension of the land under actual cultivation, the cotton acreage has been increased, probably also the average yields are being increased, as the result of heavier application of fertilizer, and better methods are being practiced. Of 280,877 acres in farms, less than one-half, or 131,492 acres, was reported as improved. The lands and improvements, exclusive of buildings, were valued at \$175,530, the buildings at \$530,100, live stock at \$443,493, and products not fed to live stock at \$1,528,250. There were 45,660 acres in cotton, producing 23,642 bales; 45,788 acres in corn, producing 460,630 bushels; 3,693 acres in oats, producing 58,410 bushels; 1,836 acres in tobacco, producing 1,355,280 pounds; and 2,248 acres in grains and grasses cut for hay, producing 1,688 tons. Cowpeas had a total of 4,238 acres and sweet potatoes 1,272 acres. Among the minor crops intended for home use may be mentioned Irish potatoes, sugar cane, sorghum, peanuts, and miscellaneous vegetables. As will be seen from this, practically the whole energies of the farmers are devoted to the growing of cotton and corn, and not nearly enough of the latter is grown to satisfy the home demand. The tenant farms are devoted almost exclusively to these two crops. According to the above figures the average yield of cotton is slightly over one-half bale to the acre, which is low, though above that of many other counties of the State. The average yield of corn is about 10 bushels and of oats about 16 bushels per acre. That the general low yields are the result of lax methods rather than of any natural unproductiveness of the soil has been proved time and again by some of the best farmers. They have shown that it is not unreasonable to expect the average lands to produce from 1 to 2 bales of cotton, 50 to 100 bushels of corn, and that any of the lands suited to oats should produce 50 to 100 bushels of this crop.

The total value of the forest products, including lumber, crossties, shingles, wood, etc., was reported at \$22,101. This evidently did not include a large part of the lumber industry, as there is a large lumber plant at Alcolu, large quantities of logs are being shipped to mills in Sumter, and a great quantity of valuable timber is being cut in the Santee Swamp and handled by a mill just across the river in Berkeley County. Some valuable pine timber is still found in spots through the county, but the bulk of the extensive uncultivated areas have had about all of the merchantable timber removed. The Black and Pocotaligo River swamps are heavily timbered with cypress, gum, etc., which is now becoming very valuable, especially the cypress and sweet gum, the latter being used extensively in making shipping baskets and cases for fruit and truck crops.

Lands intended for cotton or corn are left bare during the winter months, and practically no plowing is done until early spring. Greater thoroughness is needed in the preparation of the soil for all of the crops grown. The cotton and corn lands should first be given a thorough breaking with a two-horse turning plow, then harrowed to good tilth, if inclined to be cloddy, before the rows are laid off. The planting should be done on as nearly level ground as possible, so that improved harrows and cultivators can be used, thus saving both time and labor, besides minimizing the loss of moisture through evaporation. Every effort should be made to reduce the amount of hoeing, because it is slow and costly. Too often the farmers plant their crops with the least amount of preparation possible, and attempt to put the soil in condition afterwards when they are supposed to be cultivating the crops. All of the cultivation should be shallow, especially after the crop has attained some size, because deep cultivation keeps the feeding roots pruned off when the plants need them to get the necessary nourishment for strong, healthy growth.

While it is necessary to cultivate to keep down grasses and weeds, the main object of cultivation is to conserve the moisture in the soil, hence the necessity for stirring the surface as soon as the soil is in condition after rains. Evaporation is very rapid from a compact surface, but with a loose soil forming a mulch the soil below gives up its moisture much more gradually. Corn that has every promise of making a good crop is often ruined by using a turning plow toward laying-by time. The pruning of the roots proves very harmful unless rains follow soon afterwards, and even then some injury is done. Deep cultivation has also been the means of seriously injuring the cotton, and the plan of laying it by early when it is still fruiting rapidly is a serious mistake, especially if the weather is dry. At no other season does the plant need more moisture than at this time. It is not advisable to try to cultivate close up to the stalks where the growth is rank, but shallow cultivation through the middles would prove very beneficial as long as the plants are setting fruit. The first object, of course, should be to get a good, vigorous growth, and the second to have the stalk well filled with fruit. A large growth without the fruit is an unnecessary drain upon the land.

What is said in regard to the preparation of cotton and corn lands applies equally as well to oats and other crops. If oats follow corn, cotton, or cowpea stubble where the soil has been prepared thoroughly for the previous crops, it is not necessary to do more than to go over the field once or twice with a disk harrow. On the other hand, if the soil is not in good condition it should be given a deep breaking with a turning plow and then harrowed to good tilth. The planting could best be done with grain drills so as to insure a good even stand.

Not much attention is given to the systematic rotation of crops, either as a means of increasing the resources of the farm or of keeping the soil in a productive state. Cotton may follow cotton for a number of years, or cotton and corn may alternate in an irregular way. Experience has taught many that it is not wise to plant tobacco upon cowpea stubble, or after corn where cowpeas have been grown. Without seeking any new crops it would be possible for the farmers to practice a systematic rotation that would keep the soils in a productive state without resorting to the extensive use of fertilizers. One of the great factors in maintaining a soil in a productive state is to keep it well supplied with humus and if inclined to be wet to supply adequate drainage. It is not possible to keep the soil well supplied with humus where a one-crop system is practiced. A good rotation with the present crops would be: Cotton one or two years, corn one year, and oats and cowpeas the next. After the third year go back to cotton or such other crop as the nature of the conditions demands. After the cotton in the fall, rye, bur clover, or vetch should be planted as a winter cover crop. These could be grazed to some extent and later be plowed under to make way for the following crop of cotton or corn, as the case may be.

In a general way it is known what soils of the county give the best results with the different crops, but with the exception of tobacco no special soil adaptations are taken advantage of. It has been found that the shallower level phases of the Norfolk sandy loam and the Norfolk fine sandy loam give the best results with tobacco.

The greater development of this industry east of the Black River has led to the belief that it can be grown to better advantage on the Norfolk sandy loam than on the Norfolk fine sandy loam, but it is safe to say that this belief is not well founded, and good crops can be grown wherever suitable areas of either type can be found. Some have grown tobacco on the sandier Norfolk areas, including the Norfolk sand, but generally the yield or the quality is not satisfactory. Scarcely any attention is given to the raising of hogs and cattle, which should be an important feature wherever the general crops are grown. Hogs could be raised at a very low cost on account of the great variety of crops that could be grown for this purpose, including cowpeas, peanuts, artichokes, rape, rye, and many others. Another important industry would be the growing of early vegetables for the northern markets, the Norfolk sandy loam and the Norfolk fine sandy loam being especially adapted to this purpose. The best areas of the Norfolk sand also could be used for some of the earliest crops of peas, beans, lettuce, cabbage, etc. The Portsmouth types would make excellent corn and oat land if properly drained. In the line of special crops the two sandier types with good drainage could be used to advantage near the railroad for the growing of summer cabbage, Irish

potatoes, onions, asparagus, and strawberries. The growing of pecans is now beginning to receive some attention, and it is probable that the industry will be put on a commercial basis within the next few years. Any of the well-drained areas except the sandiest lands will grow good pecan trees, although the Norfolk sandy loam, Norfolk fine sandy loam, and Orangeburg sand are best adapted to this purpose.

The expenditure of Clarendon County farmers for fertilizers in 1899 amounted to \$108,660, and the amount used annually for this purpose at present must be at least \$150,000. Fertilizers are used on all of the cotton and tobacco land and some for corn and the other crops. For cotton the applications range from 150 to 1,000 pounds to the acre. A great many use ready mixed or so-called complete fertilizers, composed of phosphoric acid, potash, and nitrogen in varying proportions ranging in analysis from 8-2-2 to 10-3-3. Others use a mixture of acid phosphate, cottonseed meal, and kainit in proportions corresponding in a way to the complete fertilizer. A higher grade of complete fertilizer is used for the tobacco and the usual application is heavier. Fertilizers containing cottonseed meal in any quantity or muriate of potash should not be used for the tobacco crop, because in the former case it hinders the ripening and in the latter case it injures the burning qualities of the leaf. Cottonseed meal with about half the amount each of acid phosphate and kainit makes a good corn fertilizer, although the applications and the composition should vary with the condition of the land.

In addition to the usual application of the above-mentioned fertilizer at planting time some give a top dressing of nitrate of soda at the rate of 50 to 100 pounds to the acre. If properly applied, it results in a very marked increase in the yield of oats and cotton.

It is not good economy to use cotton seed as a fertilizer. It should be exchanged for cottonseed meal, as in this way a good price is obtained for the oil, which has no fertilizing value. Where seed is used it should be killed by composting or allowing to heat in bulk, because if applied green unless covered very deeply it will sprout and lose much of its fertilizing value.

In general, commercial fertilizers give the best results on soils deeply and thoroughly prepared and well supplied with humus. Here again is seen the necessity of diversified farming as a means not only of reducing the amount of fertilizers, but also of getting the greatest good out of what is used. It is variously estimated that from one-third to one-half of the money put in fertilizers is thrown away on account of the lack of knowledge as to the manurial requirements of the different soils for the different crops and of the lax method of tillage and cultivation employed.

There is quite a wide range in the size of the farms. Some of the old estates contain from 500 to 1,000 or more acres, but by far the

greater number range from 100 to 400 acres. The average size of the farms as operated, including all tenant holdings as separate farms, is about 90 acres. According to the 1900 census reports 31.2 per cent of the total number of farms were operated by white people and 68.8 per cent by negroes. The owners, most of whom are white, operate only 26.2 per cent of the total number of farms.

Under the prevailing type of tenantry the owner furnishes a house and from 20 to 30 acres for each mule or horse the tenant has, and charges a stipulated sum in cash, or the equivalent in cotton, as rent to be paid in the fall, upon the gathering of the crop. The rents range from \$50 to \$200 for a one-horse farm containing the usual amount of cultivable land. If rented by the acre the rate ranges from \$2 to \$8, depending upon the desirability of the land and nearness to town. Where share cropping is practiced the landowner may furnish everything but the labor and receive in return from one-half to three-fourths of the crop. If he furnishes just the house and the land he gets a fourth or a third, and where he furnishes the land, house, and fertilizers he usually gets half of the crop. A very large proportion of the negro labor is absorbed in the tenant system, but it is still possible to get the day help needed at 50 to 75 cents a day, or by the month at \$10 to \$15, with board or rations and a house in addition. The tenants depend almost entirely upon their families for the necessary help in producing their crops.

Land values have advanced rapidly within the last 10 years, and it is expected that they will continue to advance for some time to come. The choicest areas of the Orangeburg sandy loam will easily sell for \$100 an acre. Other areas of this type and the Norfolk sandy loam and fine sandy loam are valued from \$25 to \$75 an acre. The sandiest areas, exclusive of the true sandhill, sell for \$5 to \$10 an acre. The wet Portsmouth lands, which are not now farmed, can be had at a very low price, and if properly drained they would rank with the best lands of the county. The swampy areas are considered of no value, except for the scant pasturage they afford or for the timber they support.

The farmers in general should realize that the growing of cotton as the only money crop and the buying of a large part of the necessities for home use can not lead to any substantial prosperity. As it is now, all of the tenants and some of the landowners have to operate on a credit basis, buying fertilizers, most of the food, and, with many, the feed of the work stock on credit, being forced to sell their cotton in the early fall at the lowest prices in order to meet their obligations. By growing as much as possible of the necessities—and no section could be much better adapted to this line of farming—the liens to the merchants could be greatly reduced or entirely dispensed with. Then the cotton could be held for sale as the market conditions justified.

The lands devoted to cotton should be kept in a much higher state of productiveness so as to get profitable yields. A half bale or less to the acre is not profitable at any reasonable price for the crop. From a purely business point of view the landlords can very well afford to encourage thriftiness among their tenants. It would be well to direct their operations in so far as possible, and at all times they should be impressed with the importance of maintaining the soil in a productive state. To those who are willing to apply their brains and energies to the farm, Clarendon County offers exceptionally good opportunities. The soils and climate are favorable to a great variety of farming interests.

#### SOILS.

South Carolina is divided into two great soil or agricultural belts coincident with the two main physical divisions of the State, namely, the Piedmont Plateau, extending west from a line passing near Columbia in a general northeast-southwest direction and the Coastal Plain, extending east to the Atlantic Ocean. In the Piedmont Plateau, which is high and of a general rolling character, the soils owe their origin to the underlying rocks. The Coastal Plain or flat country, on the other hand, was at different times in the remote past a part of the ocean bed. So here, instead of igneous and highly metamorphic rocks, we find a series of unconsolidated formations overlying each other almost horizontally, and such of these as reach the surface give rise to the different upland soils. In both divisions the lowlands or alluvial soils are of recent origin, either from local wash along the smaller streams or from material thoroughly reworked and transported long distances by the larger streams. As Clarendon County is entirely in the Coastal Plain, its soils are unlike any of those of the Piedmont region, although similar soils are found in many places through the Coastal Plain belt, from Maryland to Texas.

The Coastal Plain is built up of a series of layers of sand, sandy clay, and clay, all lying nearly horizontal. The youngest of these is the Columbia formation and the oldest one that is exposed at the surface is supposed to be the Lafayette formation. In addition to these formations there are alluvial deposits along all of the larger creeks and rivers draining the county. Since the original materials making up these deposits were all very much alike and subsequent weathering has affected all of them alike it is not an easy matter to identify any of them except the alluvial deposits.

In general the coarser material occurs in the western part of the county. The soil material becomes finer in grain eastward. The coarsest material makes up the sandhill section of the western part of the county. On the basis of the character of the original material and the subsequent changes brought about by weathering three gen-

eral series or groups of soil, besides some miscellaneous types resulting from peculiar local conditions, have been identified in the county. Areas with a red clay subsoil within 3 feet of the surface constitute a distinct group known as the Orangeburg series. Those with yellow to yellowish-brown clay subsoils within 3 feet of the surface and other deeper well-drained sandy areas less sandy than the true Sandhill constitute the Norfolk series, and the dark-gray to black soils of the wet areas constitute the Portsmouth series.

Sandhill is a term applied to the very sandy areas which have little or no agricultural value. The sand ridge in the southwestern part of the county consists of the Norfolk coarse sand, and the silty clay areas give the two types, Kalmia clay and Portsmouth clay.

All of the alluvial lands, including the Santee River Swamp, are classed as swamp on account of their very wet condition, which renders them unfit for any agricultural purposes except pasture.

Including Swamp and Sandhill 13 types of soil were recognized and mapped. Their names and relative and total extents are given in the following table:

*Areas of different soils.*

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Swamp.....	120,576	26.0	Kalmia clay.....	9,280	2.0
Norfolk sandy loam.....	100,864	21.7	Norfolk coarse sand.....	8,832	1.9
Portsmouth sandy loam.....	89,472	19.3	Orangeburg sand.....	6,528	1.4
Norfolk fine sandy loam.....	40,896	8.8	Greenville clay loam.....	2,624	.6
Norfolk sand.....	33,728	7.3	Sandhill.....	2,496	.5
Orangeburg sandy loam.....	28,992	6.2			
Portsmouth fine sandy loam...	10,432	2.3	Total.....	464,000	.....
Portsmouth clay.....	9,280	2.0			

NORFOLK SANDY LOAM.

The soil of the Norfolk sandy loam to a depth of 4 to 7 inches consists of a medium to rather coarse gray sand or light sandy loam. Material of about the same texture but of a light yellowish color extends below this to a depth of 12 to 24 inches, where it grades abruptly into a yellowish-brown sandy clay of a light friable nature. The clay is of nearly uniform color and texture to a depth of 2½ or 3 feet; below this it becomes more or less mottled with gray, yellow, and brown colors, and may be interbedded with occasional seams of sand or small waterworn gravel. The average depth to clay is about 18 inches. Where it occurs at greater depths the overlying material generally is almost a straight sand, and the soil proper is only slightly loamy from the small amount of vegetable matter it contains. In the heavier phases the soil is more nearly a true sandy loam, although as elsewhere generally deficient in humus.

This is an extensive type over a large part of the county. In places it is the main upland type, with level to gently sloping topography, while in other places it occurs either as narrow, level strips bordering the streams at an elevation of 5 to 20 feet or as slightly elevated areas through the extensive "pine flats" or Portsmouth areas. The latter are especially noticeable through the eastern and central sections of the county. Some of the largest areas are found in the vicinity of Paxville and extending from near Manning to the Santee Swamp south of Davis Station. South of Wilson is a large area interrupted by numerous small areas of the Portsmouth sandy loam, which could not be shown on the soil map. The areas along Ox Swamp and its tributaries are largely of the coarser phases. Other areas of coarse texture occur immediately along Sammy Swamp and Cuckolds Branch and associated with the Orangeburg types farther west. The areas in the southern part of the county between Taw Caw Creek and Wyboo Swamp are high and rolling enough in places to allow considerable erosion.

The natural drainage is fairly good, except in some of the small depressions and low, flat areas approaching the character of the Portsmouth sandy loam. These could be easily drained, as the streams are generally 5 to 10 or more feet lower than the surface.

The type is derived from both the Columbia and Lafayette formations, the greater part of it, it is thought, being derived from the former. Differences in the original material have modifying influences upon the soil and subsoil. The deeper sandy areas usually are underlain by a lighter-textured and more friable clay than the shallower areas, and where the texture of the soil is inclined to be coarse or fine there is a corresponding coarseness or fineness in the sand content of the subsoil. The reddish yellow of the subsoil often observed along the brow of the slopes is due to better drainage rather than to any differences in the original material.

The original timber consisted mainly of a good growth of longleaf pine. About all of this has long ago been removed, and something over 75 per cent of the type is under cultivation, being considered very desirable for cotton, corn, and other general crops. In the neck of the county east of Black River, on the "Puddings Swamp section," as it is locally known, the Norfolk sandy loam is used extensively for the production of bright leaf tobacco. While this industry has not been developed to any extent west of Black River, it can be, with assurance of equally as good returns. The areas best adapted to tobacco are those with clay from 12 to 18 inches below the surface. These are also generally preferred for the other crops, as they are less droughty and easier to keep in a productive state. The type is especially adapted to early trucking, but practically nothing is being done along this line. The growing of pecans is a promising industry beginning to receive recognition.

The yields are quite variable, depending largely upon the methods of cultivation and the amount of commercial fertilizer used. Cotton yields from one-third to 1 bale, corn from 15 to 40 bushels, oats from 15 to 60 bushels, and tobacco from 600 to 1,200 pounds per acre. A bale or more of cotton and 40 to 60 bushels of corn are not unusual yields with some of the better farmers. The light, sandy nature of the soil adapts it to some of the more intensive methods of growing corn somewhat after the Williamson plan, which should give a yield of 50 to 100 bushels per acre.

One of the main problems in farming this type satisfactorily is in keeping it supplied with humus. This can best be done by practicing a systematic rotation of crops.

The average results of mechanical analyses of the soil and subsoil of this type are given in the following table:

*Mechanical analyses of Norfolk 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.	<i>Per cent.</i>
23266, 23268.....	Soil.....	2.1	12.7	14.3	37.1	18.5	9.3	6.1
23267, 23269.....	Subsoil.....	2.1	9.2	9.3	28.1	15.2	6.7	28.9

NORFOLK FINE SANDY LOAM.

The Norfolk fine sandy loam consists of 4 to 6 inches of a gray fine sand or light fine sandy loam, underlain to an average depth of 20 inches by a pale-yellowish sandy material of about the same texture and to greater depths by a yellowish-brown, light friable fine sandy clay. In places the clay is inclined to be mottled near the surface, but more generally it is solid in color to a depth of 2½ to 5 feet, where it begins to show considerable mottlings with gray, yellow, and red colors. The variation in the depth to clay is from 12 to 24 inches. Where it is shallowest it is somewhat heavier than in the deeper sandy areas and corresponding differences are also found in the soil and subsoil material. The soil is deficient in humus in nearly all of the older cultivated areas and for that reason light colored and quite sandy in its properties. The newly cleared and timbered areas are somewhat darker and more loamy. It is an easy soil to till and responds generally to good treatment.

This type occurs in the eastern half of the county, mostly between the Black and Pocotaligo Rivers, and to the south of the latter stream in the vicinity of Manning. A few small areas occur farther east, near Midway Church, and 4 miles north of Foreston. The surface features range from level to gently rolling or undulating, with scarcely any area subject to serious erosion. Some areas of 10 to 25

acres are almost perfectly level and uniform in texture and the depth to clay. Others of equal extent may be undulating throughout and interrupted by frequent small areas of the Portsmouth fine sandy loam. The elevation of the type is from 5 to 20 feet above the streams and the water table is found at the same general depths. Only the depressions without any outlets and some of the flatter areas adjoining the Portsmouth types need artificial drainage. Any of these can be drained at a reasonable cost and converted into valuable land.

The type is derived from the same formations as those from which the sandy loam is derived, but apparently mainly from the Columbia.

The original timber growth consists principally of longleaf pine, as on the Norfolk sandy loam, about all of this having been removed for timber and other purposes. The cut-over areas that have not been cleared are now forested with a small to medium growth of shortleaf pine or of pine and small oaks. In a great many of the fields the pine stumps have been allowed to stand, giving the field a ragged appearance and making it difficult to use improved implements.

The Norfolk fine sandy loam is used extensively for cotton and corn, and in a limited way for several other crops, including cowpeas, oats, sugar cane, sorghum, etc., for home use. While only a very small acreage is devoted to tobacco, it can be used very successfully for this purpose. In the main, bright-leaf tobacco belt of North Carolina it is generally preferred to the Norfolk sandy loam. It is also adapted to the growing of fruits, pecans, and a variety of early truck crop for the market. No attempt is made to grow cotton without the use of commercial fertilizers, and they are coming into general use for the other crops. The yields vary widely with the amount of fertilizer used and the methods of cultivation. Cotton yields from one-third to 1 bale, corn from 15 to 50 bushels, oats from 15 to 60 bushels, and tobacco from 700 to 1,200 pounds per acre. Under a high state of cultivation it has been made to produce 100 bushels or more of corn, 2 bales of cotton, and proportionately larger yields of some of the other crops. More legumes should be grown, to maintain the humus content of the soil.

The following table gives the average results of mechanical analyses of the soil and subsoil of this type:

*Mechanical analyses of Norfolk fine 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.	<i>Per cent.</i>
23262, 23264.....	Soil.....	0.3	1.3	1.9	62.9	21.9	7.7	4.1
23263, 23265.....	Subsoil.....	.4	1.2	1.2	43.5	16.1	6.6	30.8

## NORFOLK SAND.

The soil of the Norfolk sand, to an average depth of 4 or 5 inches, consists of a light-gray incoherent to slightly loamy sand mostly of medium texture, but varying from fine to rather coarse. The subsoil is a pale-yellow sand of similar texture to a depth of 3 to 6 feet, where the gradation generally is into a yellowish-brown sandy clay, or more locally into a red clay like the subsoil of the Orangeburg sandy loam. The soil is deficient in humus, leachy, and droughty, and while it responds quickly to the use of manures or commercial fertilizers, the effects are not lasting. The natural productiveness of the type as a whole is low, but varies considerably, depending upon the depth to clay and whether the sand is loose and incoherent or contains enough fine material to give it slightly loamy properties.

The largest area of the type occurs in the southern part of the county, extending east from Wyboo Swamp to the Williamsburg line. Several smaller areas are found between this and the Pocotaligo River and farther east, mainly along the edge of Black River and Puddings Swamp. Another area of considerable size borders Sammy Swamp in the northwest central portion of the county. Then there are some small areas at Pinewood, near Paxville, and south of Summerton. The large area at Brewington Church and those associated with the Norfolk fine sandy loam are almost a fine sand in texture, and as the depth to clay is not much over 3 feet they are considered better lands than the general run of the type. The coarsest phases are found on the slopes bordering the streams, mainly along the edge of the Santee Swamp, Bennetts Creek, Mill Branch, Doctor Swamp, and a few smaller streams in this section. The topography here is of a rolling nature with local differences in elevation of 20 feet or more. In the other areas the surface features are mostly level or gently undulating. The natural drainage of the type is good, except where it borders Portsmouth areas.

The Norfolk sand is derived largely from the sandier phases of the Columbia and Lafayette formations, but in many places the material has been reworked and moved about by wind action. It is through wind action that some of the deepest sandy areas, consisting of almost pure quartz sand, have been formed.

The type was originally forested with a thin growth of longleaf pine and scrubby post oak and blackjack oak, the better areas having a preponderance of pine and those of a lighter sandy nature scarcely anything but scrubby oak. The uncleared areas, including about 50 per cent of the type, have all been cut over and very little timber of commercial value has been left standing. Some areas, where practically all of the original growth has been removed, are reforesting themselves with longleaf pine. Old fields that were thrown out of cultivation after the Civil War are now timbered with shortleaf pine.

The cultivated areas are devoted principally to cotton and corn, which give light and uncertain yields. A few farmers are using it for the growing of tobacco, but as a rule it does not give as satisfactory results with this crop as either the Norfolk sandy loam or the Norfolk fine sandy loam. Some of the minor crops grown are cowpeas, sorghum, sweet potatoes, etc., for home use. While not used for this purpose, the type is best adapted to the growing of early truck, watermelons, cowpeas for the seed, chufas, and Jerusalem artichokes, which are splendid hog feed, and sweet potatoes. The present system of farming to general crops is not profitable, but by the proper rotation of crops and the liberal use of rough manures and commercial fertilizer it can be made to produce from one-half to 1 bale of cotton and 30 to 50 bushels of corn per acre. The average yields now are one-fourth to one-half bale of cotton and from 5 to 15 bushels of corn per acre. In the use of commercial fertilizer it pays best to put down a part at the time of planting and the remainder in one or two applications as long as the crop is growing. The use of nitrate of soda as a top dressing for the cotton crop usually gives satisfactory returns if applied at the right time. A good rotation of the general crops would be to put in corn and cowpeas the first year, rye followed by cowpeas the second year, and cotton the third year. A more intensive rotation with some of the special crops mentioned above included would give more profitable returns and at the same time keep the soil in a productive state. The main thing is to keep the soil well supplied with humus.

The results of mechanical analyses of the soil and subsoil of this type are given in the following table:

*Mechanical analyses of Norfolk sand.*

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.	<i>Per cent.</i>
23259.....	Soil.....	2.4	26.1	29.6	32.8	3.9	3.6	1.7
23260.....	Subsoil.....	2.1	24.6	29.4	32.9	4.7	4.1	2.2

NORFOLK COARSE SAND.

The Norfolk coarse sand consists of 4 to 8 inches of a loose, gray or brownish-gray coarse sand, deficient in humus, underlain to a depth of 3 or more feet by a light yellowish brown subsoil of the same material. The smaller areas are underlain by either a yellowish-brown or a red coarse sandy clay at a depth of 3 to 8 feet, but in the two largest areas mapped the average depth to clay is greater, usually exceeding 10 feet. A noticeable feature is that the sand

grains are well rounded and very largely of the coarser grades. The type is leachy and droughty and has a very low natural productive capacity.

The Norfolk coarse sand is not an extensive type and is confined to the western part of the county. An area of about 5 square miles is found in the northwestern corner of the county, extending along the edge of the Santee River Swamp from 3 miles south of the line over into Sumter County. Another area from one-half to 1 mile wide and 8 miles long skirts the swamp south of Jacks Creek. Smaller areas occur about the headwaters of Potato Creek bordering Sammy Swamp and to the west and northwest of Silver.

The surface features range from level to undulating and hilly and natural drainage is perfect. The timber as it originally stood consisted of a scattering growth of longleaf pine and scrubby red, post, and blackjack oaks, except in the area south of Jacks Creek, which supports a mixed growth of live oak and water oak, persimmon, and in places shortleaf pine. Very little of the timber standing is of any value except for fuel.

The exact origin of this type is not very well understood. The area in the northwestern part of the county is high and possibly represents a very sandy phase of the Lafayette formation, modified to some extent by wind action, the same also being true of the areas bordering Sammy Creek and Potato Creek. Some of the smaller areas which occur in rounded ridges 3 to 8 feet high partially surrounding Portsmouth depressions have the appearance of beach deposits. The long, narrow area farther south was deposited there by the Santee River during periods of overflow when the river bed was at a much higher level. There were subsequent changes, due to the winds, which sorted the material and blew it into ridges, hillocks, and dunes, giving rise to the present surface configuration.

Some of the leveler areas are under cultivation, being used principally for cotton and corn, which invariably give very light yields and at times prove almost complete failures. Extensive areas along the Santee and south of Wrights Landing were cultivated before the Civil War, but now they are only farmed in small patches or have been entirely abandoned within recent years. Small areas with clay underlying them at a depth of 4 or 5 feet would grow good peaches, watermelons, and a few other special crops. The yield of cotton generally is less than one-third of a bale and of corn from 5 to 10 bushels per acre. These yields could be doubled by making liberal applications of stable manure or growing frequent crops of cowpeas to keep up the humus content of the soil. It is practically a waste of time to try to farm the rougher deep sandy areas to any of the crops now grown. They should remain forested, or if cleared should be allowed to reforest themselves.

The following table gives the results of a mechanical analysis of a sample of the soil of this type:

*Mechanical analysis of Norfolk coarse sand.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
23261.....	Soil.....	3.8	40.9	33.4	14.1	2.2	2.5	3.1

ORANGEBURG SANDY LOAM.

The Orangeburg sandy loam consists of 5 to 15 inches of a brownish-gray to brown sandy loam, underlain by a friable sandy clay. The color of the typically developed subsoil is red, but in some areas there is a yellowish cast to the material. Usually there is very little variation in the color or texture of the subsoil to a depth of 3 or 4 feet, but below this it gets to be somewhat mottled and may contain quartz pebbles and scattering iron concretions. The average depth to clay is about 6 inches, and in such areas the soil is loamy and has a pronounced brownish cast, while in the deeper areas it is correspondingly sandier and lighter colored, changing from gray at the surface to a light yellowish brown below. In the slight depressions, where wash material accumulates, the soil is deep, dark colored, and almost a true loam in texture; then on some of the slopes subject to the most active erosion are small areas approaching the character of the Greenville clay loam.

This type is confined to the shallower sandy areas of the Lafayette and Columbia formations, where good drainage has been established, occurring only in the western part of the county. A large body extends from Summerton in a northwesterly direction to near Pinewood. Smaller areas are found between Pinewood and Paxville, extending along Sammy Swamp northeast of Silver to the south of Summerton and Davis Station and west of Big Branch.

The topography is of a level to gently rolling nature without any abrupt features. Near the streams, which are bordered by slopes from 10 to 50 feet high, it generally gives way to the Orangeburg sand or some of the other sandier types. The poorly drained depressions through the type, many of which are too small to be shown on the soil map, constitute a phase of the Portsmouth sandy loam. In the flat areas some distance back from the streams or in those only a few feet higher than the adjoining Portsmouth areas the subsoil is inclined to be yellow instead of the brick-red characterizing the higher lying slightly rolling areas. This feature is most noticeable between Summerton and Silver and northeast of Silver, where the type blends into the Norfolk sandy loam.

The Orangeburg sandy loam was originally forested with a heavy growth of oak, different varieties of hickory, and dogwood, intermixed with longleaf pine. It is now about all under cultivation, being the best land in the county for cotton and one of the best in the State for all lines of general farming except the growing of bright leaf tobacco, to which it is not adapted, or upon which not nearly so good a quality of leaf can be produced. At Ridge Spring, in Saluda County, and in other places through the South the same type has proved especially adapted to the growing of peaches for the market, and very likely it can be used here for the same purposes with equally as good results. It is an easy soil to handle, and by careful management it can be kept in a high state of cultivation, although in this respect varying with the differences in the depth to clay. The deepest sandy areas are the easiest tilled, but those with clay within 4 to 8 inches of the surface are much preferred, because they are more drought resistant and hold improvements better. As a whole, it is less affected by droughts or wet weather than any other soil in the county.

Cotton and corn are the principal crops with all of the farmers. A great many, however, devote a considerable acreage to oats and cowpeas, the latter usually being grown with the corn or often the oats. Cotton will average between one-half and two-thirds of a bale per acre, and when well fertilized and cultivated it is expected to yield a bale or more per acre. Corn with the best farmers produces anywhere from 30 to 60 bushels and oats from 40 to 60 bushels per acre, but the average is not more than about 20 bushels of the former and 30 bushels of the latter.

Among the chief needs of this type are the deeper and more thorough preparation of the soil for the reception of crops, the rotation of crops in order to keep up the humus content of the soil as well as to lessen the necessity for heavy applications of commercial fertilizers, and experiments by the farmers to determine how much and what kind of fertilizers to use under various crops.

While heavy applications of fertilizers prove profitable, unless the seasons are unusually dry or wet, they do not give near the results they would if the soil were kept well supplied with humus and plowed deep enough to incorporate with it a small amount of the underlying clay.

The following table gives the results of mechanical analyses of the soil and subsoil of the Orangeburg sandy loam:

*Mechanical analyses of Orangeburg 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.	<i>Per cent.</i>
23274.....	Soil.....	3.6	18.2	13.8	28.4	23.5	6.9	5.7
23275.....	Subsoil.....	6.0	14.0	9.8	19.3	14.8	5.4	30.5

## ORANGEBURG SAND.

The Orangeburg sand consists of a medium to coarse, gray or light-brownish sand to a depth of 15 to 36 inches, or an average of about 20 inches, underlain by a red friable sandy clay. The surface 4 to 6 inches is somewhat loamy and gray or brownish-gray in color, owing to the presence of a small amount of organic matter, the sandy material below being yellowish brown and less coherent until within a few inches of the clay line, where it begins to get heavier.

The underlying clay, as a rule, has a less pronounced red color and is more open and of a coarser sandy nature than the typical subsoil of the Orangeburg sandy loam. Quartz pebbles are found in both the soil and subsoil in most areas, but usually in very small quantities. With a good supply of humus the soil would be darker, more loamy, a better retainer of moisture, and correspondingly more productive. As it is now, any of the shallow rooted crops suffer badly from droughts, and the effects of fertilizers are not as satisfactory as they otherwise would be.

The Orangeburg sand is not an extensive type, although occurring in a number of areas through the southern and western edges of the county associated with the Orangeburg sandy loam and rolling phases of the Norfolk sandy loam and the Norfolk sand. Some of the largest areas are near and south of Summerton, bordering Taw Caw and Potato Creeks. These are of a moderately rolling nature, as are also those bordering Sammy Swamp and a part of the area about a mile south of Pinewood. The narrow strips along Spring Grove and Jacks Creeks occupy slopes of varying declivity, ranging up to some 30 degrees. All areas mapped are naturally well drained.

The origin of the type is the same as that of the Orangeburg sandy loam. Only the more rolling areas, where the depths to clay is not less than 15 inches or more than 36 inches, are included. Areas where the sandy material has a depth of more than 36 inches were mapped as the Norfolk sand or the Norfolk coarse sand, depending upon the texture of the surface material.

Only the leveler areas back from the streams are under cultivation, the others being still timbered with a mixed growth of oak, hickory, dogwood, longleaf pine, etc., very similar to that on the Orangeburg sandy loam. Cotton yields from one-fourth to two-thirds of a bale and corn from 10 to 20 bushels per acre. These yields have been doubled by some of the farmers practicing improved methods, including the rotation of crops. The type is too light and droughty for best results with oats, but a small acreage is devoted to this crop. Cowpeas and sorghum give good yields. While not used for this purpose, the Orangeburg sand is admirably adapted to the growing of pecans, peaches, and possibly some of the earlier truck crops.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

*Mechanical analyses of Orangeburg sand.*

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.	<i>Per cent.</i>
23272.....	Soil.....	5.2	21.2	18.6	26.3	14.4	11.2	3.1
23273.....	Subsoil.....	6.1	16.3	13.2	15.8	6.1	13.6	28.8

GREENVILLE CLAY LOAM.

The Greenville clay loam typically consists of a brick-red friable sandy clay loam extending to a depth of several feet. The surface 3 or 4 inches varies from a raw clay to a reddish-brown heavy sandy loam or loam possessing claylike properties on account of the small amount of clay plowed up every year. A phase somewhat heavier than this has a reddish-brown to red heavy fine loam soil 4 or 5 inches deep, underlain to a depth of 12 to 24 inches by a red silty clay and to greater depths by the typical red sandy clay. The very shallow depth of the soil and its poor structure, due to the absence of any appreciable amounts of organic matter, causes crops to suffer unduly from drought, and it is mainly for these reason that the yields are not as satisfactory as on the Orangeburg sandy loam. It is naturally a very strong soil, and if plowed deep and thoroughly and kept well supplied with humus it is very drought resistant. By plowing it deep it will tide crops over prolonged droughts without much injury, even though it be very deficient in humus.

The type is of little consequence in Clarendon County, being largely the result of erosion of what were originally Orangeburg sandy loam areas. Parts of the areas bordering Taw Caw Creek near where it enters the Santee River Swamp, the small areas along the stream just west of this and those south of St. Paul are of the heavier phase. Here most of the original material seems to have been worn away, and in its place a thin layer of fine sedimentary material, possibly of river origin, has been deposited. Subsequent erosion in the areas referred to has left only a thin veneer of a silty clay. The area at Rimini, as well as the smaller ones 4 miles west of Summerton and 2 miles east of Wrights Landing, respectively, is typical. The surface features range from level to rolling and the natural drainage is good.

About half of the type is under cultivation. The remainder is forested with a mixed growth of oak and other hardwoods and pine. Cotton and corn are the principal crops, the former yielding from one-fourth to three-fourths of a bale and the latter from 10 to 30 bushels per acre. It is best adapted to cotton and forage crops. No

doubt wheat would give good yields if the soil were prepared deep and thoroughly.

The results of mechanical analyses of the soil and subsoil of this type are given in the following table:

*Mechanical analyses of Greenville clay 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.	<i>Per cent.</i>
23276.....	Soil.....	2.0	11.3	15.0	27.8	10.5	13.1	20.8
23277.....	Subsoil.....	3.3	10.6	11.6	18.2	14.5	4.6	37.2

#### SANDHILL.

Sandhill includes areas of extreme sandiness, with level to hilly and ridgy topography, and consisting of almost pure quartz sand to a depth of 10 or more feet. The surface 3 to 5 inches is a medium to coarse incoherent sand varying from light gray to white, depending upon whether there is a small amount of organic matter present or not. The underlying material is a white to pale-yellowish incoherent sand of similar texture to great depths.

The largest area mapped occurs in the northwestern part of the county, being the southern extension of an extensive strip up through Sumter County. A few smaller areas occur in different sections, two northwest of Silver, one near Scott Lake, another between Mill Branch and Doctor Swamp, and still another around Dial Bay in the extreme northeastern corner of the county. These areas are old beach deposits, or in the case of the area at Scotts Lake old river deposits, worked over by the winds, until about all of the fine material has been removed. Finally a scant growth of vegetation reclaimed them from wind action, but further than this there has not been much change in the material tending toward the formation of a true soil.

The material is so light, leachy, and droughty that only a few attempts have been made to farm it, and these were confined to the depressions, which are not typical. It is worse than a waste of time and energy to try to make it produce remunerative crops. About the only value it has is for the scant growth of scrub oak and longleaf pine it supports.

#### KALMIA CLAY.

The soil of the Kalmia clay, with a depth of 4 to 5 inches, consists of a grayish or yellowish compact very fine sandy to silty loam, resting upon a yellow very fine sandy to silty stiff and rather plastic clay, which at a depth of 2½ to 3 feet becomes quite mottled with bright red colors. In some of the higher lying areas the subsoil has a distinct reddish cast, while in others, very flat or slightly depressed, it is inclined to be lighter in color, somewhat mottled near the sur-

face and more plastic in its properties, the differences being due principally to drainage. The soil is deficient in humus in most of the cultivated areas. It bakes and clods and can not be kept in a good friable tilth under the present system of management.

The type is confined to a few areas between Spring Grove and Potato Creeks in the southwestern part of the county. It occupies parts of a strip from 1 to 4 miles wide, which has somewhat the appearance of an old river terrace intermediate in elevation between the present overflow lands of the Santee River and the highlands to the east. Over a very large portion of this strip the older formations are covered by a thin layer of very fine material, presumably of river origin, deposited during times of overflow. It is from this fine layer that the Kalmia clay is derived. The surface features are level to somewhat irregular and except in the higher lying areas the drainage is inadequate. Artificial drainage is needed in all of the lower areas and it would also prove beneficial to some of those appearing fairly well drained naturally. Poor drainage and the lack of organic matter are partly responsible for the poor structural properties of the soil.

A small percentage of the type is under cultivation. The remainder is forested with a mixed growth of shortleaf pine, oak, hickory, etc. Cotton and corn, which are the principal crops grown, give quite variable yields, ranging from very light to fair. In an average season cotton would be expected to yield from one-fourth to two-thirds of a bale, corn from 10 to 25 bushels, and oats from 20 to 40 bushels per acre. Small patches of sugar cane and sorghum are grown, which give fair yields if properly manured. Cowpeas give good crops of hay, and should be grown much more extensively, both for the seed and the forage, and as a means of keeping the soil in a productive state. The tendency of cotton is to go too much to weed and fruit scatteringly. To get the best results with any of the crops grown all of the flat and depressed areas should be drained and the soil in general should be kept better supplied with humus by the use of rough manures and the rotation of crops. Light applications of lime would prove beneficial after the soil had been liberally supplied with humus.

The results of mechanical analyses of the soil and subsoil of this type are given in the following table:

*Mechanical analyses of Kalmia clay.*

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.	<i>Per cent.</i>
23270.....	Soil.....	0.9	2.7	1.8	13.0	47.7	20.0	13.9
23271.....	Subsoil.....	.0	.6	.7	3.4	20.4	18.2	57.0

## PORTSMOUTH SANDY LOAM.

The Portsmouth sandy loam consists of 6 to 8 inches of a dark-gray to black medium-textured sandy loam grading through a few inches of a gray heavier sandy loam into a gray mottled plastic sandy clay which extends to a depth of several feet. In some of the lighter textured areas the subsoil is a gray sand to sticky sandy loam, underlain at a depth of 2 to 3 feet by the typical sandy clay. The dark color of the soil is due to the large amount of organic matter, but this varies widely in different areas, depending upon the nature of the drainage. The higher-lying areas, where partial drainage has been established, have a dark-gray shallow soil, while in the depressions, where water stands on the surface most of the time, the soil is deep and consists very largely of organic matter approaching the condition of true muck in places.

The Portsmouth sandy loam occurs in all sections of the county, but to the greatest extent in the neck east of Black River, where it is by far the most extensive type. At Foreston is a large area extending along the Williamsburg line for a distance of about 8 miles, and large areas are found between Manning and Summerton, north of Paxville, and in the vicinity of Pinewood. The numerous small areas associated with the Orangeburg sandy loam constitute a heavy phase of the type. The soil here is a dark-gray to black compact sandy loam or light loam with an average depth of about 6 inches. The subsoil is a gray mottled clay considerably heavier than that found under the typical areas. A few areas of similar nature are found associated with some of the heavier phases of the Norfolk sandy loam, notably just to the east and west of Davis Station and between Summerton and Silver. A glance at the map will show that the main occurrence of the type is back from the main courses of drainage and about the headwaters of the smaller streams.

The surface features range from level to slightly irregular, the general elevation being from 3 to 10 feet lower than the Norfolk and Orangeburg soils immediately adjoining it. The natural drainage as a whole is poor, but varies from extensive flat areas, where water does not stand on the surface except during the wettest weather, to the shallow drainage swales and the small areas completely surrounded by higher land, which have water standing on or within a foot or so of the surface the year round. The water table rarely occurs at a greater depth than 3 or 4 feet in the best-drained areas.

This type is of the same origin as the Norfolk sandy loam and the Orangeburg sandy loam, owing its differences largely to poor drainage. The best drained areas, which represent an intermediate condition between the typical Portsmouth sandy loam and the Norfolk sandy loam, were originally forested with longleaf pine. In places where this has been entirely removed there has sprung up a growth of

roundleaf, blackjack, and scrubby post oaks and shortleaf pine. The more extensive pine flats have or did have a heavy growth of loblolly pine, and in the swales a thick growth of gum, intermixed with loblolly pine and an undergrowth of bay, brambles, etc. In some of the pondlike depressions little else than cypress flourishes.

This type is not cultivated, except in small areas, usually in connection with the better-drained soils, and most of these have been ditched to relieve them of surplus waters. It is considered a productive soil, but uncertain. Cotton goes too much to weed and in places rusts badly, the yields ranging from very low to as much as three-fourths of a bale per acre. With favorable seasons corn and oats give fair to good yields. Small patches are used for sugar cane and the yields are often heavy. When properly drained it is an excellent corn and oat soil, and will produce heavy crops of forage, sugar cane, Irish potatoes, cabbage, onions, and strawberries. Very likely it also could be used successfully in the growing of upland varieties of rice. After good drainage has been established occasional applications of lime should be made to correct any undue acidity in the soil.

The results of mechanical analyses of samples of the soil and subsoil of this type are given in the following table:

*Mechanical analyses of Portsmouth 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.	<i>Per cent.</i>
23280.....	Soil.....	2.1	12.3	16.4	29.4	15.4	17.0	7.2
23281.....	Subsoil.....	2.6	13.4	12.2	16.9	8.6	28.3	18.0

PORTSMOUTH FINE SANDY LOAM.

The Portsmouth fine sandy loam consists of 6 to 8 inches of a dark-gray to black, mucky, fine sandy loam grading below into a less coherent, gray or light-gray fine sandy loam, which at a depth of 12 to 15 inches is underlain by a gray mottled plastic fine sandy clay. In most areas the clay becomes gradually more compact and mottled to a depth of about 2½ feet, and then continues about the same to much greater depths. The soil is friable but clods rather badly under cultivation on account of poor drainage conditions.

This type occurs in the eastern part of the county, principally with the Norfolk fine sandy loam, the two owing their difference to drainage. Two of the largest areas mapped occur east of the Black River, one near Midway Church and the other north of Sardinia along the Sumter County line. Another area of considerable size occurs about 3 miles west of Manning. A number of smaller areas are found to the west and south of Manning and between Black

and Pocotaligo Rivers. As would be inferred, the surface features are level or nearly so and the drainage is poor. The elevation is from 3 to 5 feet lower than that of adjoining areas of the Norfolk fine sandy loam and the water table is found at or within 3 feet of the surface.

The tree growth consists very largely of loblolly pine in the driest areas, of gum and pine in the drainage swales, and of gums or cypress and gums in areas covered with water most of the time.

Scarcely any of the type is under cultivation. Here and there are small areas of an acre or so that have been ditched and brought under cultivation. When the seasons are not too wet these give good yields of corn and oats, the former ranging from 20 to 40 bushels and the latter from 30 to 50 bushels per acre. Cotton grows a large weed, but as a rule fruits very scatteringly, often sheds badly from too much water, and rusts badly in places. With good drainage this type along with the Portsmouth sandy loam would prove the best corn and oat land in the county. It also would be adapted to the growing of forage crops, sugar cane, possibly upland varieties of rice, and such special crops as Irish potatoes, onions, strawberries, cabbage, celery, etc. Areas brought under cultivation should be given liberal applications of lime to sweeten the soil.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

*Mechanical analyses of Portsmouth fine 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.	<i>Per cent.</i>
23278.....	Soil.....	0.0	0.4	1.6	62.5	15.4	9.8	10.1
23279.....	Subsoil.....	.0	.5	.8	46.7	13.5	8.3	30.2

PORTSMOUTH CLAY.

The Portsmouth clay is somewhat variable in texture, but may be described in general as a dark-gray to black heavy silty loam to clay loam to a depth of 5 to 8 inches. Below this is a light-gray mottled plastic silty clay, extending to a depth of 3 or more feet.

The Portsmouth clay is confined to a few areas in the southwestern part of the county. Like the Kalmia clay, its surface configuration resembles that of an old river terrace, and it may be possible that stream action has had something to do with the topography at a time when the waters flowed at a much higher level. This point, however, could not be settled positively, and it seems best to consider the type as a member of the Portsmouth series. It occupies low, flat,

poorly drained areas with the water table at or within 3 feet of the surface.

The heavier phase includes practically all of Canteys Bay and the large area south of St. Paul. These are heavily timbered, with white, willow, and water oaks, swamp hickory, and gum. There is a dense undergrowth of cane in the swampy spots, as along and at the head of Canteys Bay. The areas farther east are slightly lighter in texture and better drained, being timbered principally with loblolly pine and a scattering growth of gums and water-loving varieties of oak.

None of this type is under cultivation. If cleared and given enough drainage to keep the water table a foot or more below the surface it would make good pasture lands. With good drainage it would grow good crops of corn and a number of other crops adapted to a heavy loamy soil. Liming here would prove beneficial, both in correcting the acidity of the soil and making it more friable by flocculating the clay particles.

The results of mechanical analyses of the soil and subsoil of this type are given in the following table:

*Mechanical analyses of Portsmouth clay.*

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.	<i>Per cent.</i>
23282.....	Soil.....	0.3	1.5	1.4	6.9	10.1	30.2	49.1
23283.....	Subsoil.....	.0	1.5	1.2	7.2	9.6	26.2	54.1

SWAMP.

The term Swamp applies to all of the alluvial or bottom lands of the county which, on account of their general swampy character and the frequency of overflows, are not suitable for cultivation. The largest area mapped is along the Santee River. This comprises a strip ranging in width from one-fourth of a mile at Wrights Landing to  $3\frac{1}{2}$  miles along the Sumter County line and 6 miles in the southern part of the county. Over a large portion of this strip the soil is a dark-gray to brownish fine loam to silty clay, underlain by a gray or brownish-gray mottled silty clay, clammy and quite plastic in its properties. Along the stream where the coarser material is deposited the soil varies from a brownish or reddish-brown sandy loam to fine loam, underlain by material of about the same texture or in some instances by heavier claylike material as found farther back from the stream. Other sandy loam or loam areas are found here and there though the main body of the swamp occupying slight ridges or "islands" as they are sometimes called. The surface fea-

tures are level except for the small ridges, occasional sloughs, and depressions, some of which are occupied by lakes. All but the highest areas are subject to overflow during every high water, and these are occasionally overflowed by the high freshets. The wettest areas are heavily timbered with gum and cypress, while in those with better drainage there is a greater variety of trees, consisting of oaks, gums, hickory, maple, loblolly pine, etc.

The Pocotaligo and Black Rivers are bordered by swampy areas with average widths of about 1 mile and 1½ miles, respectively, and narrower strips are found along all of the other streams. The condition of true swamp is better represented in these areas than in the overflow lands of the Santee River. Practically all of the larger areas, as along Pocotaligo and Black Rivers and Puddings, Douglass, Sammy, and a few of the other swamps, are under water or have standing water within 6 inches of the surface the year round. The soil here for the most part is a black, deep, mucky loam, and the timber growth consists of gums, cypress, and other water-loving trees. In the narrower strips the soil is either black sandy loam or loam, containing a large amount of organic matter, but not so much as the mucky areas, being timbered principally with gums.

These Swamp lands are used for agricultural purposes only to a very limited extent for pasture, and their valuation is based very largely upon the timber they support. Any of the Swamp areas mapped would become very valuable lands if cleared and properly drained, and it is safe to say that any of the smaller swamps of the county, including those of the Black and Pocotaligo Rivers, can be profitably drained, but with an abundance of uplands which can be more cheaply drained and improved it is hardly probable that much will be done along this line in the near future.

#### SUMMARY.

Clarendon County, with an area of 464,000 acres, is situated in the central-eastern part of South Carolina, entirely in the Coastal Plain region. The surface is level to very gently rolling, and extensive areas are too wet for successful cultivation. These can be drained and are then valuable for a variety of crops.

The elevation of the uplands ranges from 140 to about 200 feet above sea level. The Santee Swamp lies at an altitude of 50 to 110 feet. The drainage is effected through the Black and Santee Rivers.

The county was formed in 1856 from a part of the old Sumter District, and Manning, near the center, was made the county seat, and it is now the largest town and chief market. The railroad facilities are fairly good.

The interests of the county are very largely agricultural. The best improvements are found on the Orangeburg sandy loam, Norfolk

sandy loam, and the Norfolk fine sandy loam. Corn and cotton are the main crops with practically all of the farmers. Some are growing tobacco and find it profitable. Little attention is given to the raising of live stock. The advantages of diversified farming are only beginning to be realized. Fertilizers are extensively used for cotton and to a less extent for corn and other crops.

Labor is plentiful and comparatively cheap. Land is rapidly increasing in value, but much desirable land can be bought at a very reasonable price.

Both soil and climate are adapted to a great variety of crops.

Eleven types of soil were recognized in the uplands. Four of these belong to the Norfolk series, two to the Orangeburg series, and three to the Portsmouth series. Sandhill, not included in these, represents very sandy areas practically unfit for agricultural purposes. All of these are derived from old unconsolidated sedimentary deposits, mostly of the Lafayette and Columbia formations.

The Norfolk sandy loam is a light sandy soil used principally for cotton, corn, and tobacco. It is very desirable for early trucking, growing of pecans, and other special crops, but not used to any extent for these purposes. By many it is considered the best tobacco soil in the county. It needs to be kept better supplied with humus.

The Norfolk fine sandy loam is a light sandy soil used principally for cotton and corn, which give light to fair yields under the present system of management. Like the Norfolk sandy loam, it is deficient in humus. It is especially adapted to the growing of tobacco, pecans, and early truck.

The Norfolk sand is a deep, loose quartz sand, used mainly for general crops, but not adapted to this line of farming. It should be used in so far as possible for early truck, watermelons, etc. By intensive cultivation it can be made to produce fair crops of cotton and corn, except in the deepest sandy areas, which are very unproductive and should not be farmed. A few are using this soil for the growing of tobacco, but it is not especially adapted to this crop.

The Norfolk coarse sand is a coarse loose to slightly coherent sand. It is cultivated to a limited extent, giving very light yields of cotton and corn. The sandiest areas should not be farmed. The shallowest areas probably would grow peaches.

The Orangeburg sandy loam is considered the most desirable soil in the county. It gives good yields of cotton, corn, and the other crops grown. It is especially adapted to peaches. A better supply of humus is needed.

The Orangeburg sand is a light sandy soil used for general farming, the same as the Orangeburg sandy loam. The yields are generally light. It is adapted to peaches, pecans, and other special crops.

The Greenville clay loam is of very limited extent. It is used for cotton and corn and generally gives rather light yields on account of careless methods. Best adapted to cotton and forage crops.

The Sandhill is of practically no agricultural value and should remain timbered.

The Kalmia clay is a fine compact soil needing better drainage in many places. Where best drained it produces moderate yields of cotton and corn. Liming would prove beneficial on poorly drained areas.

The Portsmouth sandy loam and fine sandy loam are wet types, farmed only to a very limited extent. They will be very valuable lands when drained, and this can be done profitably. They are good soils for corn, oats, and such crops as cabbage, onions, Irish potatoes, celery, and sugar cane.

The Portsmouth clay is a wet, heavy soil. It is not farmed at all. It will make good pasture lands when drained.

Swamp includes all of the alluvial or swamp lands, which are of scarcely any value in their present condition, except for the timber they support.

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