SOIL SURVEY OF PITT COUNTY, NORTH CAROLINA.

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DESCRIPTION OF THE AREA.

Pitt County lies in the central-eastern part of the State of North Carolina. It is included between 77° and 78° west longitude and 35° and 36° north latitude. The center of the county is about 85 miles east of Raleigh and 120 miles southwest of Norfolk, Va. Pitt County is bounded on the north by Martin and Edgecombe counties,

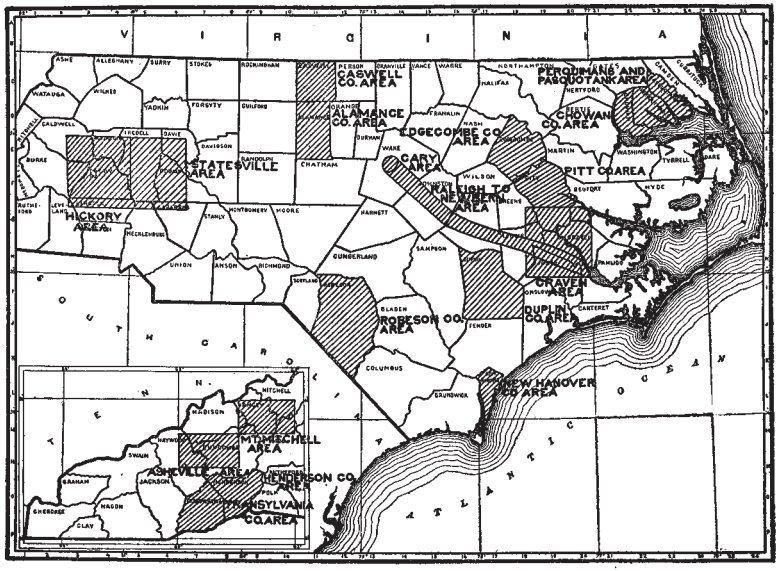

FIG. 13.—Sketch map showing location of the Pitt County area, North Carolina.

on the west by Greene and Wilson counties, on the south by Lenoir and Craven counties, and on the east by Beaufort County. Its greatest length from north to south is about 34 miles and its greatest width from east to west is about 35 miles. In many places the boundary line is somewhat irregular, following, as it does, the stream courses. In area the county comprises 416,000 acres, or 650 square miles.

The general surface features of the county consist of broad, level table-lands and gently rolling to rolling areas, with intervening low,

swampy land. The more rolling areas occur adjacent to the swamps along the small streams and along Little Contentnea Creek, near Grifton, and on the bluff line on the south side of Tar River. Some of the large and level areas of table-land are prominent around Frog Level, north of Arthur, around California, north of Kings Cross-roads, north of Coxville, east of Shelmerdine, north of Pactolus, and along the eastern border of the county in Chicod Township. The largest level upland area is the Grindle Pocoson, which extends from just southwest of Bethel to Staton, embracing about 40 square miles. Most of the surface of the county, however, is level to undulating, which becomes gently rolling to rolling as the streams and swamps are approached. It lies beautifully for general farming purposes.

The slope of the county is to the east and southeast. The elevation at various points will reveal the general surface conditions. The highest point in the county is 121 feet on the western border just north of Fountain, while the lowest place is practically at sea level at the confluence of Tranters Creek and Tar River, on the east edge of the county. The elevation at Farmville is about 85 feet above sea level; at Bethel, 70 feet; at Greenville, 65 feet; at Winterville, 70 feet; at Ayden, 60 feet; at Grifton, 30 feet; at Shelmerdine, 40 feet; at Grimesland, 50 feet; and at Pactolus, 20 feet. The swamp areas along Tar River, Swift Creek, and Clayroot Swamp vary from near sea level to about 20 feet.

Pitt County in all sections is supplied with a sufficient number of streams to furnish good drainage outlets for most of the land. The Tar River flows across the county in a general southeasterly direction. This river with its main tributaries, Grindle, Conetoe, Otter, Tyson, Johnsons Mill Run, Tranters, and Chicod creeks, drains all the northern and most of the central part of the county. Little Contentnea and Swift creeks and Clayroot Swamp furnish good drainage for the southwestern and southern parts. Many of the streams are sluggish. Across some of them dams have been constructed to provide power for gristmills.

Pitt County has been settled since 1714. Its inhabitants are mainly of English descent, though a few are of Scotch descent. Some people have moved into the county from Virginia and others from points in the central part of the State. According to the Twelfth Census the population in 1900 was 30,889, about one-half of which was colored. In all the important towns and throughout the rural districts the population has increased considerably within the last decade. Though the county is fairly well settled, there is still much cleared land which is not being utilized. There are bodies of gently rolling, cut-over uplands or pine forests which could very easily be brought under cultivation. In addition to these are the large pocoson areas, particularly the Grindle Pocoson, which can be drained and

reclaimed and brought under cultivation. All of the land in Pitt County, except some of the lower lying swamps, can be reclaimed and cultivated. The county could easily support a much larger population from the products of its soils. It possesses a variety of soils which are well suited to a large number of crops.

Greenville, the county seat, with a population of about 5,000, situated near the center of the county, on the Tar River, is the largest town. It has made rapid progress and improvements in the last few years, evidences of which are seen in paved streets, electric lights, waterworks, manufacturing enterprises, enlarged school facilities, handsome churches, and many beautiful homes. The location here of the East Carolina Teachers' Training School, which is under state control, gives this progressive town special prominence in the eastern half of the State. Ayden, Farmville, Bethel, Grifton, Winterville, and Grimesland are prosperous and important business towns. Next in importance are Falkland, Fountain, Pactolus, and Shelmerdine. There are many stations and sidings along the railroads where freight is unloaded and farm products shipped.

The county is well supplied with transportation facilities. The Norfolk and Southern Railroad crosses the county in an east and west direction. The Kinston and Weldon branch of the Atlantic Coast Line Railroad passes through the center of the county from north to south; a branch of the same system crosses the northern end of the county by Bethel, and another branch goes from Parmele to Washington by Pactolus. The East Carolina Railroad crosses the western part of the county. The Tar River is navigable for steamboats a good part of the year, and until the advent of the railroads regular boat lines were operated thereon. Some freight, especially fertilizer, cotton, and lumber, is carried to and from all points on the river. The deep water extends as high up as Grimesland wharves, opposite Grimesland, and boats can make regular trips at all seasons of the year from Grimesland to Washington, N. C., and to Norfolk, Va. About one-half of the lumber and fertilizer is barged to and from the Grimesland wharves. Schooners have gone from this point to New England towns carrying meat, corn, and lumber.

The dirt roads in the county are in good condition most of the time on the heavier soils, but over the more sandy areas they are heavy, especially in dry weather, on account of the sand working up deeply in the road. A few miles of sand-clay road have been built, and this work should be extended throughout the county. It is not an expensive road and its durability is well recognized. From the experiment already made the people are becoming more interested in better roads, and it is believed that within a few years great improvement will be noted in this respect.

The rural free delivery of mail is operated throughout the county, telephone lines have been constructed, and commodious schoolhouses and churches have been built at convenient points in the rural districts. The stock law, requiring fenced pastures for stock, extends over about one-third of the county. The farmers as a rule have been enjoying an era of prosperity. Land values have increased greatly within the last few years. The high price of cotton and good average prices of tobacco have enabled many farmers who were handicapped with mortgage and other indebtedness to meet their obligations and establish themselves on a substantial basis.

Greenville is the principal market in the county for tobacco, cotton, and peanuts. Several tobacco warehouses are operated there, and between 12 and 15 million pounds of tobacco and about 15,000 bales of cotton are annually sold. It is one of the largest tobacco markets in the State. Considerable tobacco is also sold at Farmville and Ayden, where warehouses are operated. These and the other towns in the county are markets for cotton and other farm products. Irish potatoes are shipped mostly to the northern markets—New York, Pittsburg, Boston—and other points. The trucking industry will be more extensively developed in the future.

CLIMATE.

The climate of Pitt County is similar to that of the Middle Atlantic Coastal Plain areas, having short winters and long, warm summers with much rainfall. Outdoor farm work can be done comfortably the year round. The prevailing winter winds are from the northwest and northeast, while the summer winds are from the southwest. Light snowfalls occur almost every winter, but soon melt. The humidity for the area is relatively high.

There is no Weather Bureau station in this county, but the figures in the appended table for the station at Tarboro, in the adjoining county of Edgecombe, are approximately correct for this area. The mean seasonal temperature for a period of over ten years is as follows: Winter 42°, spring 60°, summer 78°, and fall 61° F. The hottest day recorded in any year was 106° in September and the coldest —2° in February. Crops seldom suffer from drought, but damage is sometimes done by too much rain.

The following table contains climatic data compiled from records of the Weather Bureau station at Tarboro:

Normal monthly, seasonal, and annual temperature and precipitation, etc., at Tarboro.

Month.	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	43	79	2	3.6	3.2	3.8	1.7
January	41	78	— 1	4.0	4.4	3.6	1.9
February	43	76	— 2	4.0	5.4	3.6	3.1
Winter	42			11.6	13.0	11.0	6.7
March	51	91	13	3.7	2.7	3.9	0.1
April	59	97	26	3.4	3.3	3.0	0.2
May	69	99	37	5.2	2.1	5.6	0.0
Spring	60			12.3	8.1	12.5	0.3
June	76	104	46	4.3	3.5	3.1	0.0
July	80	105	48	6.3	2.0	11.6	0.0
August	78	105	52	6.9	6.7	22.7	0.0
Summer	78			17.5	12.2	37.4	0.0
September	72	106	36	3.7	1.0	2.0	0.0
October	61	93	28	3.9	1.1	6.1	0.0
November	51	87	16	2.7	3.7	1.9	T.
Fall	61			10.3	5.8	10.0	T.
Year	60	106	— 2	51.7	39.1	70.9	7.0

The average date of last killing frost in spring is April 11, and of the first in the fall October 28.

AGRICULTURE.

Pitt County, or the present area included in it, had its first settlement nearly two hundred years ago. Its agricultural products of to-day are quite different from those of seventy or one hundred years ago, or even just prior to the civil war. The first crops were corn, wheat, and oats, and considerable stock was raised. At a later time some cotton was planted. The lint was picked from the seed by hand. Many hogs and cattle were raised to supply meat for home consumption. About 1850 much cotton was produced. Sheep were raised and wool was shorn. Wheat production continued to a considerable extent until about twenty years ago, but since that time the acreage has been gradually reduced. The turpentine industry flourished and furnished a revenue before the timber was cut. Until recent years quite a number of fisheries were in operation between Greenville and Washington. Immediately following the war cotton

became the money crop. In 1880, according to the census reports, the principal crops were cotton, 15,000 bales; corn, 500,000 bushels; wheat, 22,000 bushels, and oats, 29,000 bushels, while cowpeas, sweet potatoes, rye, hay, and rice were other crops grown.

In 1886 the growing of bright tobacco was begun, and by 1890 its production had greatly increased. The acreage devoted to cotton had increased, while corn remained practically the same; wheat declined, and oats, hay, rice, cowpeas, and sorghum cane increased. About 4,000 bushels of peanuts were produced. Since 1890 there has been an increase in tobacco, cotton, and corn, and also of peanuts, Irish potatoes, cowpeas, grasses, and clovers. The growing of wheat has so declined that only one flour mill was seen in the county. For a number of years a large revenue was derived from lumbering. The sale of timber added considerably to the wealth of many landowners. The greater part of the large areas of merchantable timber has been cut, except the gums, ash, cypress, and other trees in the swamps. Sawmills are in operation in different parts of the county. On the river, at points with both rail and water transportation, are good locations for woodworking factories for furniture, boxes, crates, etc. The gum and ash timber along the river and creeks can be easily and cheaply floated down to these points.

The principal crops now grown in Pitt County are tobacco and cotton. These are the main money crops and all business is based upon them. About 10,000,000 pounds of tobacco with a value of approximately $1,000,000 is annually grown. Between 20,000 and 27,000 bales of cotton is produced. In 1908 the number of bales was 20,729, while the maximum production within the last few years was 26,646 bales in 1904. Peanuts and Irish potatoes are also of considerable importance as money crops. Last year many carloads of peanuts were shipped from the county; about 10 cars from Greenville alone. These were the Virginia and Jumbo varieties and brought good prices. A few farmers are planting as many as 100 acres to peanuts and the acreage is increasing rapidly. Irish potatoes are grown for early shipment to the northern markets. Most of these are grown in the northern part of the county, particularly around Bethel, where 750 acres are planted. The yield varies from 25 to 70 barrels of 3 bushels each per acre, the average being 35 or 40 barrels. The cost of production per acre, including transportation to northern markets, is about $1.15 per barrel. Under normal conditions as to season, price, and yield a profit of $25 to $50 per acre can be made. For Irish potatoes the Norfolk soils are to be preferred, because they are better drained and warm up earlier in the spring. The tubers grown are smooth and the skins are clean. The profits from growing Irish potatoes, however, are more or less uncertain, because the price is so changeable and the yield depends so largely on the season. The

potatoes are usually planted in rows 3 feet apart, though the rows are sometimes 5 feet apart and cotton or corn is planted in the middle of the rows just before the potatoes are dug. Usually 1,500 pounds of high-grade fertilizer is used per acre on the potato fields.

Corn is one of the staple crops. Oats in considerable quantity are grown and fed in the sheaf, and some rye is also produced for feed. Cowpeas are grown extensively, being sown especially in the corn at the last plowing, and some of the crop is cut for hay. Only a few fields of wheat were seen, but it is the purpose of some farmers to grow more of it in the future. Several fields of crimson clover in a thrifty condition and a few patches of alfalfa, vetch, and rape were seen. Crimson clover and rape can be successfully grown if the soil is limed and fertilized. It must be inoculated for crimson clover, and this is best secured by getting soil from a field where it has been successfully grown. Cabbage, English peas, and cucumbers are grown in limited quantities for shipment. Sweet potatoes, watermelons, cantaloupes, pears, peaches, apples, and Scuppernong and James grapes are grown for home use and local markets. Some wine is manufactured from the grapes. A small apple and peach orchard is an accompaniment of nearly every well-kept farm. A little sorghum cane is raised for the purpose of making sirup for home use. Hogs and cattle are the principal live stock raised in the county. Goats and sheep are seen on some of the farms. In some places mulberry trees are planted in order to furnish berries for hogs. If the stock law extended over the entire county it would help to improve the grade of stock.

It is generally recognized by all that the Norfolk fine sandy loam and Norfolk sandy loam are the best soils in the county for the production of bright tobacco, Irish potatoes, and peanuts, and are also well adapted to cotton. The truck crops do best on the lighter phases of these types and the heavier phases of the Norfolk sand. Peaches and grapes find their best development on the sandy knolls and ridges, where the drainage is good. It is also known that the dark-colored and black Portsmouth soils, or "swamp lands," are best suited to corn. A careful selection of soils should be made in growing the various crops. Crimson clover and cowpeas are well suited to the soils in Pitt County and vetch can be grown to good advantage on the more sandy soils.

No specific or definite crop rotation is used throughout the county. Some of the best farmers plant corn, rest the land one year, and then grow tobacco the next year, while others rotate tobacco with peanuts and sweet potatoes. Around Bethel the following rotation is practiced by some: Cotton first, then corn, sowing cowpeas at last plowing, and the third year Irish potatoes with cotton between the rows. A good rotation to adopt would be tobacco followed by crimson

clover, cutting the clover in the spring, then corn, followed by clover in the fall, or sow cowpeas in the corn, and the next year plant cotton; for a longer rotation, plant peanuts after cotton and then tobacco after peanuts. It is good practice for tobacco to follow cowpeas on poor soil, but on a highly improved soil the tobacco does better following corn or cotton. Whatever rotation is practiced it should be the aim of every farmer to sow cowpeas at least once in three years and have a winter cover crop of crimson clover as frequently as possible.

The agricultural methods in Pitt County, generally speaking, are not in all respects as up-to-date as they might be. It is true that the tobacco, truck crops, and Irish potatoes are well cultivated. Some of the general farming is very well managed, the soils being improved, and larger yields secured annually. The lands planted to cotton, corn, and oats are generally plowed about 4 to 6 inches deep year after year. This shallow plowing has a tendency to pack the soil where the plowshare runs and to form a hard layer. The soils, except the sands, should be turned at least 8 inches deep and then loosened, but not turned, to a depth of 12 or 15 inches. Some of the most successful farmers are doing this and are being rewarded by increased yields. By deeper plowing the soils would not suffer so much from drought and would be better able to withstand excessive rains. It gives a larger field for the roots of plants to feed in and naturally they will secure more plant food. The soil should be harrowed and disked until finely pulverized before the crops are planted and the subsequent cultivation should be shallow, so as not to disturb the roots of the growing crops. The deep plowing commonly known as barring or siding-off corn injures the small roots of the plants. Labor can be saved and yields increased by using improved machinery. Much of the hoeing can be eliminated. One man with two horses and a cultivator can till more corn or cotton than two men with one-horse plows and two choppers with hoes. No land in the United States is better adapted to the use of all kinds of farm machinery than the soils of this level Coastal Plain region.

Most of the hired labor is drawn from the negro race, many women as well as the men being employed in the fields. The wage for men is $10 to $12 a month, with rations, house, wood, and garden patch. By the day the wage is 60 cents for men and 50 cents for women. During the tobacco season the men commonly receive 75 cents a day. Labor, such as it is, is plentiful in many parts of the county. What is needed is more skilled labor that can use machinery to good advantage.

Some of the large farms or plantations are operated by a manager, who superintends the tenants or hired hands, while others are operated directly by the owners. The tenant system is quite gen-

eral throughout the county, and many large landowners live in the towns. Under the most common system the landowner furnishes the land, stock, feed for stock, seed, implements, and one-half of the fertilizer, and receives one-half of all the crops produced. Some of the farms are rented for one-third of the crops, the landowner furnishing one-third of the fertilizer, while a few are rented for a stated cash rent or for so much cotton, etc. A large number of the farms, especially the smaller ones, are operated directly by the owner with the assistance of his family and some hired help.

The farms vary greatly in size, the larger ones containing from 500 to 3,000 acres, though not all under cultivation, and the smaller ones from 80 to 300 acres. These smaller farms were noticeable around Ayden, Stokes, Falkland, and Blackjack.

The value of land in Pitt County depends largely upon location, kind of soil, and improvements. Well-improved farm land near the towns is held at $30 to $100 an acre, farther away from town and railroad at $25 to $40, while virgin cut-over land is valued at $10 to $20 and pocoson land from $5 to $15 an acre.

There seems to be a tendency to produce more corn, hay, and meat on the farms. This should be done by all means. No county like Pitt County will ever enjoy that prosperity which should be hers until all the corn, hay, meat, and other foodstuffs needed for home consumption are produced within its limits. Instead of buying hay and meat at high prices, shipped from the North and West, the money thus expended should remain in the farmer's pockets. In this county cowpeas, crimson clover, and vetch can be easily grown and cured for hay. There is an abundance of fertile soil to produce all the corn needed in the county and even a large surplus for outside markets. Peanuts, chufas, and rape can be cheaply grown and the hogs allowed to feed on them, and after that only a little corn is necessary to fatten or harden the meat. The cowpea vines and clover make an excellent feed for work stock. Peanuts could be introduced into the crop rotation to a greater extent, thus taking the place of a part of the cotton and tobacco. Peanuts are an easy and inexpensive crop to cultivate, costing only about $8 to $10 per acre for all cultivation and harvesting and an additional cost of 30 cents per sack of 4 bushels for thrashing. Money can be made growing peanuts. The vines after being run through a machine make good feed. More manure should be saved and applied to the tobacco land. The turning under of green manuring crops, such as cowpeas and crimson clover, enriches the soil and keeps it in a productive state. All the nitrogen for crops could be secured from the air by these leguminous crops and deposited in the soil. One-third of the fertilizer bill could be saved. Not enough attention has been paid to the needs of the soil as regards the kinds and quantities of fertilizer applied,

TOBACCO.

Pitt County is decidedly the largest tobacco-producing county in the State of North Carolina. This important industry was first started in Pitt County in the year 1886, when 8 men planted 4 acres each in tobacco. Its success was marked from the very beginning. The acreage was increased in 1887, with still a greater increase in 1888. These crops consisted of a large amount of beautiful wrappers, which sold for fancy prices, some acres selling for as much as $300. With the assurance that the soil and climatic conditions favored the production of this lemon-leaf tobacco in this part of the State, and in view of the high prices paid for the previous crops, the people became enthusiastic on the subject and as a result the acreage was greatly increased in 1889 and 1890. This industry spread over the county and into adjoining counties. The increase in acreage continued till 1902, when the largest crop in the history of the county was grown, approximating 20,000,000 pounds.

Prior to 1891 practically all of the tobacco was shipped to Oxford and Henderson, N. C. Greenville became a tobacco market in 1891, when one warehouse was built and 250,000 pounds of tobacco were sold. In the following year another warehouse was opened and more than a million pounds were sold. In 1894 another warehouse was built and at this time more than 4,000,000 pounds were marketed in Greenville. There was a gradual increase to 1900, when 9,000,000 pounds were sold, and in 1901, 13,000,000 pounds. In the meantime other warehouses were built and 17,600,000 pounds were sold in 1902. The prices from 1892 to 1898 were low compared to prices of previous years. Prices were again low in 1903 on account of the extremely large crop of 1902. Owing to these low prices the production in 1904 and 1905 was reduced considerably, but since that time has remained around 11,000,000 pounds annually. In 1908 between 12,000,000 and 15,000,000 pounds were marketed in Greenville, in Farmville 3,000,000 pounds, and in Ayden 1,500,000 pounds. The average yield per acre in normal seasons is about 750 to 800 pounds and the average price is near 10 cents a pound. The tobacco is known as the lemon-leaf, and is of a bright, yellow color. The principal varieties are the Orinoco, White Stem, Warnh, and Willow Leaf, while a few other varieties of minor importance are grown. The cured leaf as put on the market is classed as wrappers, cutters, English strips, and smokers. Lucky is the man who can so handle his crop as to get a fairly even division of these grades. Some years there will be practically no wrappers in a crop, while again a considerable quantity may reach that grade. About 75 to 80 per cent is classed as cutters and English strips, and the remainder, not included in wrappers, is classed as smokers. The wrappers usually average be-

tween 40 and 60 cents a pound, cutters from 10 to 35 cents, English strips from 8 to 30 cents, and smokers from 5 to 12 cents. The reason that the average price for the entire crop is no higher is on account of the large percentage of low-grade strips and cutters, which sell at the lower prices.

The best soil in eastern North Carolina for the production of the lemon-leaf tobacco is the Norfolk fine sandy loam. The gray or yellowish-gray fine, mellow soil, having a depth of 12 to 20 inches and underlain by a yellow, friable, sandy clay, is the best suited to tobacco. There are some areas of Norfolk sandy loam which produce as good a quality of tobacco as the fine sandy loam. The Norfolk sand and Norfolk fine sand occasionally produce a good grade, but generally the leaf is thin and chaffy, lacking in body and having an inferior texture.

The preparation of the seed bed is usually begun in January. A plat of virgin soil is selected on the south side of a slope or forested area, and some wood and brush are placed on the ground and burned in order to kill the seeds of grasses and weeds. A few farmers, however, do not burn the land, but simply select a spot which appears to be free from grasses. After all trash is removed from the soil it is finely pulverized and to it is added 1¼ pounds of 8–4–4 or 8–3–3[a] fertilizer, with a moderate quantity of cotton-seed meal, per square yard. The transplanting is done between April 15 and May 5, about 5,000 plants being set to the acre. The work should be done by tobacco transplanters and not by hand. The level and gently rolling surface of the land, together with the texture of the soil and its freedom from stones and stumps, invites the use of transplanters and other kinds of machinery. The farmers should readily see the advantage of using labor-saving and time-saving machinery.

The field in which tobacco is to be planted should be plowed well and finely pulverized; in fact, it should be thoroughly prepared before the plants are set. The first plowing of the tobacco should be deep and after that it should be frequent and shallow. High hilling with the hoe is unnecessary labor and expense. The flat to ridge cultivation will answer every demand. About the only advantage in the hilling is that the plants will not blow down quite so badly during a storm. Much of the hoe work can be dispensed with.

The planting of tobacco year after year on the same land causes the soil to deteriorate, becoming deficient in potash, and in a way poisoned to the crop. The first crop does well, the second not quite so well, and the third one is decidedly less than the first, provided the same fertilization is used each year. However, by adding more pot-

[a] The formulas in this report are stated in the order: Phosphoric acid, nitrogen, potassium.

ash each year the yield and quality can be maintained for a period of years. Crop rotation and resting the land occasionally are necessary in order to keep the soil in a condition to maintain its yields and give body to the leaf. Peanuts, sweet potatoes, and tobacco make a good rotation. Some plant tobacco on rested land, following it with corn, and then after resting the land one year repeat the course. Cowpeas should not immediately precede tobacco, except on poor soil. On land devoted to tobacco barnyard manure is very beneficial, especially so in connection with a fertilizer high in potash and low in nitrogen. Tobacco is a heavy potash feeder, and this fact should not be overlooked in buying or preparing fertilizers.

The topping of tobacco gives the plant strength, texture, and body, and this is done with best results when there are indications of buttoning. No good tobacco can be grown without its being topped, as the stalk would be tall and the leaf flimsy. The mistake most commonly made is in not topping sufficiently low to give proper body. Suckering is absolutely essential, as failure to perform this duty results in a thin, chaffy, and almost worthless leaf.

Until about twelve years ago it was the common practice to cut the stalk containing all the leaves and hang it in the barn to be cured. Priming, or stripping the leaves from the stalks as they ripen, is now general throughout the county. The advantages in this are that more uniformity is had in the tobacco, it takes less time to cure, and saves expense, whereas cutting the stalk necessitates a considerable sacrifice of both bottom and top leaves, since the former will be overripe and the latter immature. The fields are usually gone over three times for the tips. The leaves are strung on wires or strings which are attached to sticks and then hung in the barn.

The proper curing of tobacco is quite an art. It requires skill, experience, and judgment. Lack of attention for a few hours may ruin an entire barn. No definite rule can be laid down, much depending on the character of the tobacco. The process of curing can entirely change the quality of the leaf. The heat is started at a few degrees above normal and allowed to remain there for a few hours, then it is raised to 108° or 110°, which temperature is maintained till the leaf is as yellow as desired. The heat is then raised to 130° and stands there until the leaves begin to dry, then to 135° till dry, and finally raised to 140° or 150° to dry out the stems. When cured it is taken from the barn and stored in a pack house. It is then graded, tied in small bundles, and made ready for market.

The average acre of tobacco will sell for about $75, though some farmers receive more than $100 an acre for their crop. The average cost of production per acre varies from $45 to $60. Tobacco is the small farmer's crop. He can make more profit to the acre than the large planter who hires all labor. The small farmer with help

from his family can do most of the work, except planting and harvesting. Quite a number of farmers grow 50 to 100 acres in tobacco and a few as much as 150 acres.

SOILS.

Pitt County lies in the central part of the Atlantic Coastal Plain. Its entire area is covered by the Columbia formation, which is composed of materials brought down from the Piedmont and mountain sections of North Carolina and Virginia and deposited while the present area was a part of the sea floor and covered with water. These sediments have since been more or less changed by stream and organic agencies. Evidences of this fact are noticeable along the Tar River and other streams where areas of sand have been thus deposited as ridges and bars. Underlying many areas, particularly along Tar River and the smaller streams, are extensive beds of shell marl at from 4 to 50 feet below the surface. (See p. 415.) Throughout the county there are large flat areas of table-land where natural drainage has not yet been established.

The soils derived from the sediments are sands, sandy loams, sandy clays, and clays, of varying degrees of texture. Practically all of the coarser textured soils occur north of Tar River, though a few bodies lie south of the river and a large body east of Grifton. The fine sandy loams predominate throughout the county south of the river, except in the southeastern part where the very fine sandy loams and clays occur.

The soils of Pitt County are in the main typical of the South Atlantic and Gulf Coastal Plain. They have been classified into two distinct series, the Norfolk and the Portsmouth, with small areas of Coxville silt loam, two spots of Muck, and large bodies of Swamp. The Norfolk series comprises the light-colored upland soils with yellow sand and sandy clay subsoils. The Portsmouth series comprises the dark-gray to black soils of the depressions and flat uplands, with gray, mottled with yellow or brown, sandy clay subsoils.

The Norfolk soils occupy the greater proportion of the county and have been classified according to their texture into five types, viz, sand, fine sand, sandy loam, fine sandy loam, and very fine sandy loam.

The soils of the Portsmouth series are derived from the same character of material as the Norfolk series, but contain more organic matter. Occupying as they do lowlands near streams and flat upland areas, they have been for a long time in a semiswampy condition which has favored the accumulation of large quantities of vegetable matter. This gives them their dark color and mainly distinguishes them from the Norfolk series. These soils have been mapped as sandy loam, fine sandy loam, and clay. In many places, espe-

cially in the southeastern part of the county, around Shelmerdine and Coxville, the types gradually merge into each other and no sharp boundary lines can be drawn. Probably no county in the Coastal Plain section of North Carolina shows a greater variation and intermingling of soil types than Pitt County.

The following table gives the name and extent of each of the several types of soil mapped:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Norfolk fine sandy loam	161,920	38.9	Coxville silt loam	16,192	3.9
Portsmouth fine sandy loam	56,320	13.5	Norfolk very fine sandy loam	13,888	3.3
Swamp	51,328	12.3	Norfolk fine sand	8,448	2.0
Norfolk sand	35,520	8.5	Muck	128	.1
Norfolk sandy loam	33,472	8.1	Total	416,000	.....
Portsmouth sandy loam	22,272	5.4			
Portsmouth clay	16,512	4.0			

NORFOLK SAND.

The surface soil of the Norfolk sand is a light-brown or yellowish-gray medium sand to a depth of 6 inches. In some places there is a sufficient quantity of fine gravel and coarse sand to make the soil a coarse sand, while in other places the finer particles predominate and give a medium to fine sand. In the river bottoms and some of the forested areas the brown color is more noticeable. In areas of the type there are many small spots of light, deep sandy loam, and also very small strips of dark-gray to black sand with gray coarse sand subsoil, occupying the depressions not included in the Portsmouth sandy loam.

The subsoil to a depth of 36 inches is a yellow to reddish medium to coarse sand, loose and incoherent in the ridges and dunelike areas. In many places along the river and near New Belden is a light, loamy, sticky, reddish sand containing more clay than true sections of sand.

The type occurs on the north side of Tar River in extended strips varying in width from one-half mile to 1½ miles and follows the river throughout its course in the county. On the south side of the river there are a few small bodies north of Grimesland, and at other places, especially opposite Falkland and along some of the small streams near it. Large bodies occur in the southern extremity of the county to the east of Grifton.

The Norfolk sand occupies slightly rolling areas, ridges and knolls, and level areas, with a few depressions. The more level bodies are found at the lowest elevations near the mouth of Grindle Creek.

Some of it would be termed "second-bottom land." The type varies in elevation from about 40 feet down to 10 feet above sea level. It possesses excellent natural drainage, due both to its surface features and the open, porous character of soil and subsoil. It warms up very early in the spring, and on account of the free passage of water through it the soil can be cultivated immediately after a rain. This sand is the coarser material of the Columbia formation, and has been laid down and modified by stream action. Shallow plowing serves every purpose, but green crops and coarse manures are required to improve its productiveness.

This was one of the first soils in the county to be cultivated, owing probably to the fact that it lies adjacent to the navigable streams which furnished the only means of transportation at that time. The greater part of the type is now under cultivation and the few forested areas are covered by shortleaf and loblolly pine, oak, dogwood, and holly.

The soil is well suited to early truck crops, such as English peas, beans, asparagus, sweet corn, watermelons, and cantaloupes, and to Scuppernong grapes, peaches, and berries. On the areas where the reddish sticky sand or sandy loam is encountered in the subsoil Irish potatoes, peanuts, tobacco, and general farm crops do fairly well. Cotton yields per acre from one-fourth to one-third bale without fertilizer, and from one-half to two-thirds bale with 600 to 800 pounds of 8–3–3 fertilizer; corn from 5 to 10 bushels, and with 300 pounds of 8–2–2 fertilizer on improved land about 15 or 20 bushels; tobacco about 600 pounds with 800 to 1,000 pounds of 8–3–3 fertilizer; peanuts from 30 to 60 bushels, the yield depending upon the quality of land and amount of fertilizer; Irish potatoes from 30 to 40 barrels with 1,500 pounds of 7–5–7 fertilizer. Cucumbers, cabbage, and other truck crops are grown to some extent on this soil, and a few mulberry and peach orchards were seen. Scuppernong grapes do well. Rye, vetch, and cowpeas should be grown more generally on this soil.

NORFOLK FINE SAND.

The soil of the Norfolk fine sand in forested areas is a light-brown, occasionally whitish, fine mellow sand, and in cultivated areas a yellowish-gray or whitish fine sand to a depth of 6 inches. The subsoil is yellow or light-gray to whitish fine, mealy sand, loose and incoherent. There are spots where the subsoil is a reddish-yellow, sticky fine sand or sandy loam at 30 to 36 inches.

This type of soil is encountered in many small bodies throughout the county south of the river, particularly along Little Contentnea Creek, to the north of Grifton, east of Ayden, southeast of Greenville and Simpson, and in the western end of the county.

The Norfolk fine sand generally occupies ridges, knolls, and slopes, though some of it is found in flat areas near the streams, especially along Contentnea Creek. Excepting a few places where it is wet and soggy, the type is excellently drained.

Only a small percentage of the type is under cultivation at present. Some of it was once farmed, but has since been "turned out" and has grown up to old-field pine. Part of the type is forested to longleaf and shortleaf pine, but most of it to loblolly pine.

The soil is too light textured for general farming, but when properly managed it is adapted to early truck crops, peanuts, peaches, Scuppernong grapes, and melons. By the use of marl and commercial fertilizers peanuts would be a good crop. The yields of the few crops now grown are corn, from 5 to 15 bushels; cotton, one-fourth to one-half bale; tobacco, 500 to 600 pounds per acre. The tobacco leaf is thin and is commonly called "slazy," but it has a pretty yellow color. The cotton, corn, and tobacco are fertilized. Some rye is grown. This soil, like the Norfolk sand, only requires shallow plowing. Humus should be supplied by growing cowpeas, crimson clover, and vetch, and by using coarse manures. Commercial fertilizers soon leach out. The Norfolk fine sand is not highly prized as a farming soil and has a lower value than the surrounding soils.

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

Mechanical analyses of Norfolk fine 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.*	*Per cent.*
20646	Soil	0.1	1.5	3.6	73.2	10.7	6.0	4.7
20647	Subsoil	.0	1.0	2.5	74.9	12.9	5.2	3.2

NORFOLK SANDY LOAM.

The surface soil of the Norfolk sandy loam consists of gray to yellowish-gray, sometimes brown, medium to coarse sandy loam, varying in depth from 8 to 24 inches. In the wooded areas the soil for the first few inches is slightly darker because of organic matter. Where the soil is more than 8 inches deep a yellow medium sandy loam is encountered and extends to the sandy clay. On some of the slopes in sand areas and on second bottoms the deep, loose-textured phase of this type is found.

The subsoil is usually a yellow friable sandy clay; reddish-yellow to brown friable sandy clay is sometimes encountered in the better drained areas. Spots occur around Bethel and in places along the

river where the subsoil is brown in color, while in other small areas the subsoil is heavy, approaching a clay in texture.

This type of soil occurs mainly in the northern half of the county. It is particularly noticeable east of Hill, around Bethel, near Oakley, along the Atlantic Coast Line Railroad by Pactolus, in the vicinity of House, near Falkland, Fountain, Redalia, and in other places in the county.

The surface of the Norfolk sandy loam varies from level to rolling. The more rolling bodies are found on the slopes near small streams. Practically all of the soil has good surface drainage and only a few open ditches are necessary to carry off the rain water. In origin this soil is closely related to the Norfolk sand and Norfolk fine sandy loam and represents some of the coarser materials which have undergone very little weathering, except on slopes, where the finer particles have been washed out and carried away by heavy rains, thus leaving a loose, light, coarse soil.

Most of this type is cultivated, and the remaining areas are covered with a growth of loblolly pine or have been cut over and now have a scattering growth of pine and scrub oak. The soil is well adapted to cotton, tobacco, peanuts, Irish potatoes, crimson clover, cowpeas, vetch, melons, peaches, Scuppernong grapes, and a great variety of truck crops. In the vicinity of Bethel a large acreage of this type is devoted to the production of Irish potatoes for early shipment. By applying from 1,000 to 1,500 pounds of high-grade fertilizer—either 7–7–7, 7–6–5, or 7–5–5—the yield of potatoes is from 40 to 60 barrels per acre. On this soil tobacco yields from 800 to 1,000 pounds per acre with 800 to 1,000 pounds of 8–3–3 or a home mixture of about the same composition; corn from 10 to 30 bushels, usually fertilized with 200 to 300 pounds of 8–2–2; cotton from one-half bale to 1½ bales with from 300 to 600 pounds of 8–3–3 fertilizer; peanuts from 30 to 100 bushels with light applications of commercial fertilizers or 300 to 400 pounds of land plaster. Oats make fairly good yields. Sweet potatoes, cabbage, and cucumbers are also grown to a limited extent. By growing legumes frequently and applying manures, less commercial fertilizer would be required in the production of the many crops.

The Norfolk sandy loam where cleared and improved is held at from $25 to $50 an acre, while the virgin soil can be had for $15 to $20 an acre.

The results of mechanical analyses of soil and subsoil of the Norfolk sandy loam 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.*	*Per cent.*
20648	Soil	2.5	17.3	15.4	19.0	6.3	29.5	9.8
20649	Subsoil	1.8	11.4	10.7	14.7	3.1	28.3	30.0

NORFOLK FINE SANDY LOAM.

The soil of the Norfolk fine sandy loam consists of a gray to yellowish-gray fine mellow sandy loam, having a depth of 12 to 18 inches for typical areas. Usually underlying the surface soil below 6 inches is a layer of yellow fine sandy loam. In the thickly wooded areas the first few inches is darker colored, owing to the presence of organic matter. Throughout the areas of the type are local variations in the texture and depth of soil, the most noticeable being the loose, deep, light sandy loam to a depth of 18 to 24 inches, which lies just east of Greenville, and in places along the road to and around Grimesland, also along the Edgecombe County line to the north of Fountain, and spots in the vicinity of Winterville and in places near the boundary of the Norfolk fine sand. Along the river road, about 2 or 3 miles from Greenville, toward Falkland, the surface soil is very shallow in places and often a brown clay is exposed. In the southeastern part of the county, where it joins with Coxville silt loam, the surface soil is shallow and the subsoil a heavy clay loam. In this type there are many spots of Portsmouth fine sandy loam occupying slight depressions which were too small to be shown on the soil map.

The subsoil in the more uniform areas of the type is a yellow friable fine sandy clay to a depth of 36 inches. In some places a soft, mushy, sandy clay is encountered. On the flatter and the more poorly drained areas there is a slight mottling of brown and gray, while in certain localities on the slopes near the streams a reddish sandy clay or brown clay loam is encountered.

The Norfolk fine sandy loam is the most extensive type in the county, covering the greater part of the country south of the Tar River and west of a line from Grimesland to Grifton. Many bodies occur in the northern part, especially around Oakley and Stokes. The soil is typically developed around Falkland, Farmville, Greenville, Simpson, Ayden, along the Norfolk and Southern Railroad, and along the Atlantic Coast Line Railroad south of Greenville.

The type occupies level, undulating, and gently rolling areas. Bordering some of the streams and river bluffs the surface varies from gently rolling to rolling. The large interstream areas lying between Tar River and Little Contentnea Creek from Fountain to Cox Crossing consist of broad, level, and gently rolling uplands, which become more rolling as the small streams are approached. All the gently rolling and rolling and most of the undulating areas possess good natural drainage. The level areas in many places require open ditches to carry off the rain water and dry the soil. The ditch banks stand up well in the sandy clay. The flat, level areas, now wet and soggy, have sufficient elevation to be very easily drained by open ditches leading into the natural drainage ways, which are of frequent occurrence.

This soil has been formed by the weathering of the sands and clays of the Columbia formation. The soil is more uniform in the level and undulating areas, while on the slopes and knolls some of the silt and clay has been leached out and carried away by rain water, leaving a deeper loose soil. The soil as a whole is mellow and very easily tilled. Improved machinery can be used with the greatest ease. The soil, though naturally containing some organic matter, is susceptible of high improvement and responds readily to commercial fertilizers. The effect of manures and cowpeas is seen for several years. By proper rotation of crops, including cowpeas, crimson clover, and vetch, the soil can be brought to a high state of productivity. This fact has been demonstrated by farmers in various parts of the county. By far the greater part of this soil is under cultivation. Loblolly, shortleaf, and longleaf pine constitute the main forest growth. On the cut-over areas are scattering pine, sweet gum, dogwood, some scrub oaks, and occasionally large oaks.

For general farming purposes the Norfolk fine sandy loam is the best soil in the county. It is particularly suited to the production of bright tobacco, and the larger portion of the crop in Pitt County is grown on this soil. It is also an excellent soil for the growing of cotton, peanuts, Irish potatoes, garden vegetables, all kinds of late truck, cowpeas, crimson clover, vetch, etc. Cotton ranges in yield from one-third bale to 1½ bales per acre, tobacco from 700 to 1,200 pounds, corn 12 to 30 bushels, Irish potatoes from 30 to 75 barrels (3 bushels to the barrel), and peanuts 40 to 100 bushels. Oats give ordinary yields and crimson clover 1 to 2 tons per acre when the soil is inoculated. Sweet potatoes, beets, cucumbers, cowpeas, peaches, pecans, Scuppernong grapes, and rye do well. Commercial fertilizer is generally used in growing the main crops on this soil. For cotton, from 400 to 800 pounds to the acre of 8–3–3, or its equivalent, is usually applied; for tobacco, about 800 to 1,000 pounds of 8–3–3, some using 4–3–5; for Irish potatoes, 1,000 to 1,500 pounds of 7–6–5

fertilizer; for peanuts, 300 to 400 pounds of land plaster and sometimes 150 to 300 pounds of 10–4 acid phosphate and potash; and when corn is fertilized, about 200 pounds to the acre of an 8–2–2 compound. Some stable manure is used and is always beneficial.

Some farmers plow to a depth of 8 inches, but the majority plow only 4 to 5 inches deep, and have done so for many years. This soil should be plowed 8 to 10 inches deep, but this depth should be reached gradually, so as not to turn up too much raw material at one time. By breaking the land to proper depth the roots of the plants can reach more plant food and crops will suffer less from either excessive rains or severe drought, the result being increased yields.

The Norfolk fine sandy loam is the most highly prized soil in Pitt County. It ranges in price from $20 to $100 an acre, depending on locality and proximity to markets. Around Oakley and to the north of it it is held at $20 to $40, and near Ayden, Farmville, and Greenville, for well-improved land, $40 to $100 an acre.

The following table gives the results of mechanical analyses of 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.*	*Per cent.*
20650	Soil	0.3	2.1	4.0	59.7	6.7	20.9	6.3
20651	Subsoil	.1	1.1	2.9	45.7	3.6	17.0	29.5

NORFOLK VERY FINE SANDY LOAM.

The surface soil of the Norfolk very fine sandy loam is a gray to yellowish-gray very fine sandy to silty loam to a depth of 6 to 12 inches. There is commonly found a yellow silt loam lying between the surface soil and the subsoil. Immediately south of Bryan the soil contains a higher percentage of fine sand than the typical areas, while around Shelmerdine and to the east there is a relatively large amount of silt, giving the soil a velvety, smooth feel. The upper portion of the subsoil is usually a yellow loam or silt loam and then passes into a clay loam or fine sandy clay of yellowish or reddish-yellow color.

The main bodies of this type are found in the southeastern part of the county, south and west of Bryan, between Blackjack and Shelmerdine, and west of Shelmerdine. In the northern part of the county an important area lies a few miles south and another a few miles west of Bethel. A few other smaller bodies occur here and there in the county. The type occupies level, gently rolling, and

undulating areas. It varies in elevation from about 30 to 50 feet above sea level. The more rolling and undulating areas possess good natural drainage, while the flat areas can be drained by open ditches.

The Norfolk very fine sandy loam has been derived from the same materials as the Norfolk fine sandy loam, except there is a preponderance of the finer materials in this type. The amount of organic matter is small. The soil is easy to till if properly plowed, disked, harrowed, and pulverized before planting is done; otherwise it will clod and have a tendency to bake. It needs more humus, which is best supplied by turning under leguminous crops and by broadcasting manures. Around Shelmerdine and south of Bryan only a small part of this soil is cultivated, but in other localities where it occurs it is used to a greater extent. Perhaps more than half of the type is forested to loblolly pine, with some shortleaf pine, gum, and hardwoods in depressions and poorly drained areas.

This soil is suited to cotton, Spanish peanuts, corn, clover, and, on the best-drained areas, to tobacco. Corn yields from 15 to 20 bushels, cotton from one-half bale to 1 bale, and tobacco from 700 to 1,000 pounds per acre. Oats yield fairly well. The commercial fertilizer usually applied is an 8–3–3 brand. Cotton and tobacco receive the same mixture, 300 to 500 pounds per acre for the former and 800 to 1,200 pounds for the latter crop. For corn about 200 pounds of some 8–2–2 grade is sometimes used. The price of this land ranges from $20 to $50 an acre.

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

Mechanical analyses of Norfolk very 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.*	*Per cent.*
20656	Soil	0.0	0.4	0.8	23.0	32.6	32.3	11.0
20657	Subsoil	.0	.2	.6	16.1	21.4	32.8	28.7

PORTSMOUTH SANDY LOAM.

The soil of the Portsmouth sandy loam is a dark-gray to black medium to coarse sandy loam to an average depth of 12 to 14 inches. It varies throughout the county from a loose coarse sandy loam to a compact medium sandy loam. The subsoil to a depth of 36 inches is a gray to mottled yellow, and sometimes reddish-brown, medium to coarse sandy clay, often grading at 25 to 36 inches into a heavy, stiff sandy clay.

Mapped with this type of soil and occurring east of Grifton, around New Belden, and west of House, is a black loamy sand or light sandy

loam grading into a coarse sand to sandy loam. Small bodies of wet dark-gray to black coarse sandy loam grading into a gray to mottled yellow sticky sand occur north of Grimesland, west of Whichard and Oakley, and north of Pactolus.

The main bodies of the Portsmouth sandy loam occupy flat uplands of irregular shape to the north and west of Pactolus, southeast and west of Whichard, west of Stokes and Oakley, near Bethel, and northeast of Hill, while east of Grifton, west of House, near New Belden, and north of Gardnerville it occurs as depressed areas. The type requires artificial drainage, all of it being sufficiently elevated to be drained by cleaning out the natural drainage courses, supplemented by canals and lateral ditches.

The soil is composed of the coarser materials deposited during the Columbia age, and the large content of black organic matter has accumulated during the subsequent swampy condition of the areas. The drier phases of the type support a growth of loblolly and shortleaf pines, but the lower wet sections are covered by sweet and black gums, a few water oaks and maples, with an undergrowth of alders, reeds, and gallberry bushes. Little merchantable timber remains and that is owned by lumber companies.

When properly drained, and also limed so as to counteract its acidity, caused by the decomposition of the organic matter, the soil is especially adapted to growing corn, oats, and certain truck crops. Cotton, Spanish peanuts, sorghum cane, and field peas also do well. Corn is the chief crop grown, and yields from 20 to 50 bushels per acre. Not much fertilizer is used other than an application of marl, though some apply moderate quantities, 150 to 400 pounds, of brands analyzing 8–2–2. Cotton is grown on the better drained areas and yields from one-third to 1¼ bales, averaging about three-fourths bale per acre. The fertilizer application for this crop is usually 300 to 600 pounds of a somewhat better grade than for corn, usually the 8–3–3 grade. East of Grifton some Irish potatoes and excellent crops of wheat are grown. The soil should be plowed deeper. It is easily tilled after being properly broken and does not clod when sufficiently pulverized and limed. The undrained areas are valued at $5 to $20, and the sections under cultivation at $30 to $75 an acre.

PORTSMOUTH FINE SANDY LOAM.

The soil of the Portsmouth fine sandy loam is a dark gray or black, fine to very fine, though occasionally medium to fine, sandy loam, having an average depth of 12 inches. The wet uncultivated soil usually contains large amounts of organic matter, particularly at the head of small swamps. In the higher, better drained areas the soil is lighter in color, contains higher percentages of sand, and is mellow and easily

tilled. The subsoil to a depth of 36 inches is a gray, more or less mottled yellow, fine sandy, often silty, clay to sandy loam, usually becoming heavier from 20 to 36 inches below the surface.

North of Grifton the type occurs as a black, wet, sandy soil containing large amounts of organic matter, underlain by a gray sand and at times by a brown, mucky, sandy loam. A heavy, compact, silty phase is found southwest of Staton, south of Bethel, north of Oakley, southwest of Ayden, and in places along the smaller streams. Northwest of Frog Level and to the east of House a loamy black soil is found in small spots.

The largest bodies of the type occur north of Tar River in Grindle Pocoson. From near Bethel southeast to the county line east of Pactolus irregular bodies and strips occur. Other bodies of irregular outline occur between Tar River and Little Contentnea Creek, the principal ones lying southeast from Fountain, and near California and Frog Level. Smaller bodies are found southwest of Tugwell and Ayden, near Hanrahan, south and west of Farmville, and elsewhere in the county. All of the larger bodies occur as flat upland where the drainage systems are not well established. The smaller bodies or strips occupy depressions, forming part of the drainage courses in the low, undulating, or almost level areas.

The type generally requires artificial drainage by means of canals and ditches leading into the natural drainage ways. The drier sections have a growth of loblolly and a few short and longleaf pines and sweet gum. The lower lying, wet sections have a tree growth of sweet and black gums, some poplar, maple, and oak, with an undergrowth of gallberry bushes, alders, reeds, and bays. Much of the pine has been cut, but some sections have good hardwood.

When drained and sufficiently limed the soil is well adapted to corn, cotton, oats, Spanish peanuts, cabbage, and certain varieties of strawberries. Onions and celery would be profitable crops on the black loamy phase. No extensive bodies of this type are under cultivation, but many of the small strips and the better drained parts of the large areas are planted to corn and to some extent to cotton and oats. Corn yields from 15 to 50 bushels per acre. Very little commercial fertilizer is bought for this crop, though some farmers use from 150 to 400 pounds of some 8–2–2 mixture. Cotton yields from one-third to 1¼ bales, averaging about three-fourths bale per acre. From 300 to 600 pounds of fertilizer analyzing 8–3–3 is the usual application per acre for cotton. Oats are fall sown and yield 10 to 30 bushels per acre. Deeper plowing, better drainage, and rough manures would add greatly to the productiveness of this soil. The wet pocoson land is valued at $5 to $15 and the cultivated areas from $20 to $60 an acre.

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

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.*	*Per cent.*
20664, 20666.....	Soil.....	0.2	1.2	1.6	47.4	16.4	23.0	10.1
20665, 20667.....	Subsoil	.0	.3	1.3	42.2	17.0	19.2	20.0

PORTSMOUTH CLAY.

The soil of the Portsmouth clay is a dark-gray or brownish-gray to black silty loam to clay loam, heavy and compact on the higher, better drained areas, and ranging in depth from an inch or two to about 8 inches, averaging about 5 inches. In the wet or semiswampy areas the soil is generally a rather dark gray to black, smooth silty loam having a depth of from 10 to 14 inches. The subsoil is a stiff, impervious, mottled gray and yellow silty clay. Northwest of Staton it contains more fine sand. The heavy phase is found northeast of House, south of Elmira Crossroads, near Johnsons Mills, and in the better drained portions north of Coxville.

Most of the type occurs in the southeastern part of the county east of Swift Creek to the Beaufort County line. Two considerable bodies, however, are found to the north of Tar River, both being near Staton. The areas generally have topographic features similar to those of the other Portsmouth soils, but this type does not have as much elevation, the highest being not more than 40 feet above sea level. The surface drainage is poor, and the soil requires artificial drainage and liming before being cultivated.

The soil, when drained, is generally compact, and clods and bakes if plowed when too wet. Lime liberally applied, together with frequent cultivation, greatly improves the texture. Very little of the type is under cultivation. It is adapted to clovers, oats, and corn. The strips cultivated are used for corn, oats, and cotton, and near Bryan vetch and crimson clover are important crops.

The forest growth consists of pine and sweet gum and a few other hardwoods. More longleaf pine is standing on this type than upon the other Portsmouth soils. The undergrowth is composed largely of bays, scrubby sweet gums, and gallberry bushes.

The results of mechanical analyses of soil and subsoil 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.*	*Per cent.*
20660	Soil	0.3	1.5	2.7	14.6	9.9	32.8	37.9
20318, 20661	Subsoil	.3	2.1	1.9	17.2	10.3	29.9	38.5

COXVILLE SILT LOAM.

The surface soil of the Coxville silt loam is a silt loam to loam of light-gray to dark-gray color, having a depth of 5 to 8 inches. The more uniform areas contain a high percentage of silt, while on some of the gently rolling areas the first few inches is a fine sandy loam. The subsoil to a depth of 36 inches is a plastic, tough, and impervious clay, mottled yellow, reddish-brown, and red. On the flattest areas a subsoil of brown clay with red spots is frequently found.

This type is confined largely to the southern and southeastern parts of the county. It is well developed around Coxville, Calico, and east of Shelmerdine and Blackjack. The surface of a large portion of the type is level to gently rolling and undulating, while a part is very flat and slightly depressed. On the more gently rolling areas the surface drainage is fairly good, but in the flattest areas open ditches are necessary. The impervious character of the subsoil hinders the passage of underground waters, making drainage a little difficult without frequent ditches.

The Coxville silt loam has been derived from the deposition in rather quiet water of the finer materials of the Columbia formation, which, on account of the poor drainage, has not weathered to the same extent as the materials forming the Norfolk soils. Owing to the relatively large quantities of silt and clay and the small percentage of organic matter the soil when not plowed deep and properly pulverized clods and bakes on cultivation. It needs to be plowed at least 6 or 8 inches deep, well pulverized and limed, and should have considerable vegetable matter in it to make it more porous and open. Coarse barnyard manure, cowpeas, and clovers will be very beneficial if turned under, and if only the stubble of the crops is incorporated in the soil some improvement will result.

A large part of this type is forested to longleaf, shortleaf, and loblolly pine on the drier areas, and to gums and a few oaks and pines on the wetter areas.

The crops best adapted to this soil are grasses, corn, and cotton. It would make good grazing land if properly seeded. Corn yields from 10 to 20 bushels, and cotton one-third to two-thirds bale per acre. Oats give small yields. Tobacco is grown only on the more sandy ridges and fairly good yields are secured. Certain varieties of strawberries would do well. Fertilizers are generally used for the staple crops. Land of this type sells for $5 to $25 an acre.

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

Mechanical analyses of Coxville silt 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.*
20319, 20640, 20642..	Soil.....	0.5	2.9	3.1	11.6	7.0	56.6	18.1
20320, 20641, 20643..	Subsoil...	.2	1.1	1.3	5.5	4.8	32.2	44.9

MUCK.

Muck is a black, mellow soil about 18 inches deep composed largely of decayed vegetable matter, below which to a depth of 30 to 36 inches is a brown, soft, mucky or peaty material. Most of it is underlain by sand at 3 feet.

Only two very small bodies of Muck were mapped in the county, though possibly it may be found in spots elsewhere in some of the swamps. The two areas mapped occur about 4 miles northwest of Greenville, lying at the foot of the bluff line as the second bottom is reached. These were originally ponds and have been filled in by the growth and decay of reeds, grasses, leaves, and trees. The surface is flat and can be easily drained by open ditches. Some of the type has been ditched and cultivated.

The Muck is admirably suited to the production of onions, cabbage, celery, and corn. If properly drained, heavily limed, and fertilized with a little acid phosphate and potash, very large yields may be produced.

SWAMP.

The soil of the Swamp has no definite textural classification and consists of a variety of soil classes and conditions. Along Tar River the soil in some places is a black loam or sandy loam, and in others a brown silty loam to a depth of 3 feet or more. In some localities it is a dark, mucky sand grading into a light-gray, coarse sand. Along Grindle Creek some of it is a black sandy loam underlain by a sticky gray sand. Much of the Swamp if drained would be classed with soils of the Portsmouth series. Most of it is highly charged with organic matter.

Swamp is quite general over the county along streams. The largest areas, varying in width from one-fourth to 1 mile, occur along Tar River, Grindle Creek, Swift Creek, Little Contentnea Creek, Tranters Creek, Clayroot Swamp, and in Grindle Pocoson. The Swamp is all forested. The growth consists chiefly of black, sweet, cotton, and pawpaw gums, cypress, poplar, ash, and oak. Much valuable timber can be cut from these areas.

The elevation of the Swamp varies from 20 to 30 feet in the northern and western parts of the county to near sea level in the extreme eastern and southern sections. A considerable part of it is covered with water, except in very dry periods in late summer and early fall. The higher parts could be drained, especially along Grindle and Swift creeks. Drainage of the lower parts would be impossible except by diking and pumping.

When drained and limed the soil will produce large yields of corn and oats. Some of it is the most fertile land in Pitt County, and needs only to be reclaimed to be made valuable farming land. At the present time its chief value lies in its timber, which is now being used to some extent in the manufacture of veneer.

MARL.

The marl deposits of Pitt County are formed of the shell remains of marine life belonging, it is believed, to the Neocene period of the Cenozoic era. During that period the ocean extended inland as far as the present site of Raleigh, and Pitt County was entirely submerged. The deposits, which vary in thickness from 2 or 3 feet to 20 feet, are found throughout the county at depths varying from a few feet to 50 or 60 feet below the surface.

Only the deposits that lie near the surface can be worked economically. Most of the marl is dug from pits in the low, swampy stream areas. Considerable trouble is experienced from the pits filling with water. The marl from such places is a dark bluish-gray color and is composed of what is called blue mud with well-rotted shells throughout, the amount of shells increasing with depth. There is a great variety of shells in the same deposit and the different deposits throughout the county show many variations in the species of shell contained, ranging from exceedingly small shells to shells 5 or 6 inches across.

Some deposits near the surface along the banks of the Tar River can be mined without any trouble from water. They are composed largely of shells and in some places are colored red from an admixture of clay. To the east of Grimesland and in bluffs close to the streams emptying into the river other shallow deposits of red shell marl occur. It contains a high percentage of lime and is used in

compost to good effect. West of Hanrahan, near Little Contentnea Creek, quite an extensive deposit of the same character can be mined without much trouble from water. It is particularly rich in lime, being composed of well-compacted shells with very little foreign matter. Marl beds were also noticed east of Farmville and Winterville, west and south of Falkland, and in other parts of the county.

The different deposits and different strata of the same deposit vary greatly in their content of lime and sand. The percentage of carbonate of lime ranges from 2 per cent to as high as 70 or 80 per cent, but the average is about 35 to 50 per cent, equal to 16 to 26 per cent of quicklime. Some of the beds near Pactolus, north of Grifton and near Contentnea Creek, contain some phosphate, which makes them more valuable, especially when used on the Portsmouth soils or for composting.

Marl is not dug in as large quantities as formerly. Some of the landowners consider it more expensive to hire negro labor than to buy rock lime shipped from distant points. Most of the marl is dug now by a number of men digging together on shares, the owner receiving half and the diggers the other half. The largest amounts of marl and lime are used on new land, from 50 to 150 bushels of marl or 25 to 50 bushels of lime per acre, according to the organic-matter content of the soil. The dark Portsmouth soils require heavier applications than the light-colored Norfolk soils.

Crops, such as peas, vetch, and clovers, should be grown and turned under before marl is applied. By using marl in this way the decomposition of the organic matter of the plants is facilitated; the nitrifying bacteria, which can not live in an acid soil, are enabled to multiply better and increase the store of nitrates in the soil; the assimilation of potassium and phosphorus by the plants is rendered more easy; and the sandy soil becomes more coherent and retentive of moisture.

It is thus seen that marl on sandy soils is of great benefit when used after plenty of organic matter has been added. Organic matter is best supplied by growing the nitrogen-collecting legume crops, such as field peas, peanuts, crimson clover, vetch, soy beans, etc. In the heavy Portsmouth soils the organic matter is already present, so there is not the need, at first, of growing legume crops as there is on the Norfolk soils.

DRAINAGE.

Large sections, particularly in the northern part of the county, are poorly drained and require artificial drainage before successful farming can be carried on. These wet areas are all high, flat upland, or depressed areas along the obstructed drainage courses. To drain and open up these areas for cultivation would be too great an undertaking

for an individual or a small number of interested landowners, for the main creeks must be cleaned out for several miles and an extensive system of canals or ditches established to remove successfully the water. To meet such conditions the state legislature of 1909 passed a bill (chap. 442, Public Laws of North Carolina), whereby drainage districts may be established. Under this law drainage projects should be carried to great success in this as well as in other eastern counties of the State.

By providing a sufficient number of ditches or canals leading into the natural drainage ways and cleaning out the latter wherever necessary, important areas could be well drained and made valuable farm land. It may be well to mention here important areas in need of such drainage, with their elevation and the streams forming natural outlets for drainage. Grindle Pocoson, the highest section of country between Greenville and Conetoe, in Edgecombe County, is 50 feet above sea level and can be drained by Great Swamp and Johnsons Mill Run to the Tar River. East of Grindool it has an elevation of 50 to 60 feet and can be drained into Tar River by Grindle and Tranters creeks and their branches. Large bodies of land between Fountain and California, with 80 to 85 feet elevation, can be drained by Kitten and Tyson creeks into Tar River, or by Black Swamp and Old Woman Branch into Little Contentnea Creek. Between California and Frog Level, 80 feet elevation, by Harris Mill Run and Greens Run into Tar River, or by Pinelog Branch and other small runs into Little Contentnea Creek. Between Frog Level and Renston, 80 to 70 feet elevation, by Gum Swamp and Horsepen Swamp into Swift Creek, or by small runs into Little Contentnea Creek. Areas south of Tugwell, 90 to 95 feet elevation, by Jacob Branch and Little Contentnea Creek; north of Coxville, 35 to 45 feet, by Clayroot Swamp and Swift Creek; southwest of Ayden, 75 feet, and east of Hanrahan, 60 to 65 feet, into Little Contentnea Creek by small runs; north of Johnsons Mills, 30 feet, by Swift Creek; and "The Opening" east of Shelmerdine and the area northwest of Elmira Crossroads, 50 feet elevation, by Clayroot and Creeping Creek swamps into Swift Creek.

These wet areas are naturally rich and fertile, containing, as they do, large amounts of organic matter, and when drained and limed will prove very productive, especially for corn and oats and later for cotton and other staple crops.

SUMMARY.

Pitt County contains 650 square miles and lies in the central-eastern part of the State. With the exception of the swamps along streams, some areas of Portsmouth soils, and the pocosons, the county pos-

sesses good natural drainage. The Tar River flows across the county, and this stream with its tributaries and the creeks in the southern part of the county furnish good outlets for the drainage. The elevation of the county varies from 121 feet down to practically sea level, the average elevation being about 60 feet.

The county is well supplied with lines of transportation in all directions, most of the towns having good railroad facilities. Greenville, the county seat and principal town, is a large tobacco market, ranking third in the State. There are several other thriving towns which are markets for the products of the county.

The white population is mostly of English descent, and is well distributed throughout the county. There is a considerable negro population. The county offers inducements to settlers, and particularly invites a more intensive system of agriculture. Some of its most fertile lands have not been reclaimed; these can be drained, cleared, and easily cultivated. For unimproved land the value ranges from $5 to $20 an acre, and for highly improved land from $30 to $100. Pitt County could support many times its present population, if all of its arable soil were properly managed.

The county lies in the Coastal Plain region. Its soils have been derived from the weathering of the materials of the Columbia formation. Perhaps no county in eastern North Carolina possesses a greater variety of soils or soils suited to a wider diversity of crops.

Eleven distinct types were recognized and mapped. The soils of the Norfolk series are by far the most important and have been classed as sand, fine sand, sandy loam, fine sandy loam, and very fine sandy loam. Of these the Norfolk fine sandy loam is the most extensive and most valuable for farming purposes. It is a mellow soil underlain by a friable sandy clay, and is peculiarly adapted to the production of bright yellow tobacco. It is also well suited to cotton, peanuts, Irish potatoes, and various truck and fruit crops. The Norfolk sandy loam is also a valuable soil for tobacco, cotton, truck crops, and peanuts. The Norfolk very fine sandy loam gives fairly good yields of cotton, corn, tobacco, peanuts, and oats. The Norfolk sand is well adapted to early truck crops, grapes, peaches, and some other fruit, and the Norfolk fine sand, though not as productive, has about the same crop adaptations. The Portsmouth soils comprise a sandy loam, fine sandy loam, and a clay. Large areas of these soils are still undeveloped. More of the Portsmouth fine sandy loam is cultivated than any other soil in this series. These soils are adapted to corn, oats, and grasses. Where well cultivated, large yields of corn are secured. On well-drained areas of Portsmouth sandy loam and Portsmouth fine sandy loam cotton and some truck crops do well.

There are a large number of crops grown in Pitt County. It is the largest tobacco-producing county in the State, the average an-

nual yield being about 10,000,000 pounds. Cotton is a very important crop, more than 20,000 bales being annually produced. Corn, Irish potatoes, and peanuts are the next crops in the order of importance. Truck crops are grown to some extent. Sweet potatoes, garden vegetables, melons, grapes, and orchard fruits are grown for home use and in some cases for the local markets.

The mellow and easily tilled soils of this county, together with the level to gently rolling surface, invite the use of all kinds of labor-saving machinery.

The climate is mild. The summers are long and warm and the winters are short and only moderately cold. There is a long growing season, thus affording opportunity for the production of a wide range of crops. Two or more crops can be grown each year on the same land. Both soil and climate favor a highly diversified agriculture.

The farmers, as a rule, are an intelligent class and in comfortable circumstances. Some of them are very prosperous, as evidenced by their home surroundings and farm improvements.

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