SOIL SURVEY OF COLUMBUS COUNTY, NORTH CAROLINA.

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DESCRIPTION OF THE AREA.

Columbus County is in the southern corner of North Carolina. It is separated from the Atlantic Ocean by Brunswick County, which bounds it on the southeast. It is bounded on the southwest by the South Carolina State line, on the northwest by Robeson County, and on the north by Bladen and Pender Counties. The county has an area of 910 square miles, or 582,400 acres.

The Atlantic Coast Line Railroad marks approximately the boundary between the very low country and the higher part of the county. The latter is high enough to cause the streams to cut shallow valleys of sufficient depth to allow the development, by lateral drainage ways, of a narrow belt of well-drained country on each side of the river valley. Such belts lie along both sides of White Marsh Creek and along Lumber River between Fair Bluff and Boardman and extend also across the extreme eastern end of the county. Between these belts the country is flat and poorly drained, though it is no lower than the better drained belts just described. Its poor drainage is due to the lack of dissection, which has not yet penetrated it. South of the Atlantic Coast Line Railroad the whole country, even along the streams, with very few unimportant exceptions, is so nearly flat that the drainage is poor. East of White Marsh Creek a large area lying in the flattish part of the country between the main streams is flat enough to permit the development of Green Swamp, similar in position to many other swamps developed in eastern Virginia and the Carolinas. They are typical features of extreme youth in topographic development.

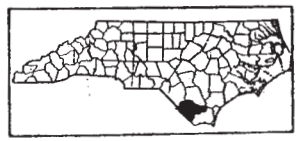

FIG. 14.—Sketch map showing location of the Columbus County area, North Carolina.

The regional drainage of the eastern end of Columbus County is effected through the Cape Fear River and its tributaries, the largest

of which are Livingston and Waymans Creeks. White Marsh, which enters the county from the north and flows southward into the Waccamaw River, receives the drainage of the north-central part of the county. The western part of the county is drained principally by the Lumber River and Porter and Gapway Swamps. Waccamaw River, which rises in Lake Waccamaw and flows southward across the South Carolina line, serves as a drainage outlet for the central and southern parts of the county. Grissett, Gum, Monie, and Beaverdam Swamps drain a large territory in the southwestern section. The extreme eastern part and the northwestern section of the county are fairly well drained. The central and southern parts are poorly drained. The streams are sluggish, and are not deepening their channels to any appreciable extent. The approaches or slopes to the swampy areas or first bottoms are gradual, and the upland lies about 5 to 20 feet above the first-bottom areas. On account of the flat surface of large areas many of the drainage ways are poorly established. As a result of this the regional drainage of many sections is inadequate. In the vicinity of Chadbourn a drainage district has been established. Within this district an artificial regional drainage system has been provided by constructing canals to near-by streams.

A similar system, comprising about 47 miles of canal, has been established in Green Swamp to the south and east of Bolton.

The first settlements in this region were made in the first half of the eighteenth century. In 1808 the county was established from parts of Bladen and Brunswick Counties. It was named in honor of Christopher Columbus. The first settlers were mainly of English parentage, and the majority of the present white population are descendants of the early inhabitants. In the census of 1910 the population of the county is reported as 28,020, or about 30 per square mile, all the population being classed as rural. A large part of the population consists of negroes. With the exception of the incorporated towns, the most thickly settled part of the county lies between Whiteville and the northern boundary line. In the Green Swamp section settlement is sparse, and a large area southeast of Bolton is practically without inhabitants.

Whiteville, the county seat and largest town, with a population of about 1,400, according to the 1910 census, is situated near the center of the county. Chadbourn, with a population reported as about 1,200, is 7 miles west of Whiteville, and is the center of an important strawberry industry. There are a number of smaller but locally important towns in the county. Boardman, Hallsboro, and Bolton are important lumber-manufacturing points. Fair Bluff, Tabor, and Whiteville are good tobacco markets. Lake Waccamaw, located near the lake of the same name, and Wananish, 1 mile farther

east, are popular among tourists. Acme is a fertilizer-manufacturing town, and Newberlin is the center of an important agricultural section. Wattsville is a strawberry-shipping point.

The transportation facilities of Columbus County compare favorably with those of the eastern counties of North Carolina. The Atlantic Coast Line Railroad, from Columbia, S. C., to Wilmington, crosses the county in practically a straight line. This road furnishes a direct outlet to Wilmington, an important railroad center. The Elrod & Conway branch of the Atlantic Coast Line furnishes transportation facilities for the western part of the county, connecting at Elrod, in Robeson County, with the main line to points north and south. The Charlotte & Wilmington branch of the Seaboard Air Line crosses the southern part of Bladen County near the northern boundary of Columbus County and traverses the eastern end of Columbus County. A branch of the Atlantic Coast Line from Newberlin to Acme affords a direct outlet for large quantities of fertilizer manufactured at the latter place. The Waccamaw Lumber Co. Railroad from Bolton into Brunswick County is an important means of transportation in the southeastern part of the county, and the Whiteville Lumber Co. Railroad does a large freight business in the south-central part. Some of the public roads have been graded, and are surfaced with sand and clay.

A large part of the agricultural products of the county, particularly strawberries, lettuce, beans, and cucumbers, is shipped to northern markets. Cotton and tobacco are sold at local markets.

CLIMATE.

The climate of Columbus County is typical of that of the southern Coastal Plain region. The mean annual temperature is about 63° F. The winters are short and comparatively mild, with little snowfall. The mean winter temperature is about 48° F., and the mean temperature for the summer months about 78° F. The annual precipitation is about 51 inches. The rainfall is well distributed throughout the year, being greatest in June, July, and August, when most needed by the growing crops.

The average date of the first killing frost in the fall is November 15, and of the last in the spring, March 27, giving a normal growing season of 233 days. The date of the earliest killing frost recorded at Wilmington is October 16. The latest date of killing frost recorded in the spring is May 1. The climate is such that a wide variety of crops can be grown, and two or three crops can be made annually. Winter cover crops do well.

There is no Weather Bureau station within Columbus County, but the data in the following table, compiled from the records of the station at Wilmington, are fairly representative of local conditions:

Normal monthly, seasonal, and annual temperature and precipitation at Wilmington, N. C.

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.
	°F.	°F.	°F.	*Inches.*	*Inches.*	*Inches.*
December	48.3	78	10	3.08	3.26	7.13
January	46.7	80	9	3.48	1.39	2.37
February	48.3	80	5	3.43	3.29	1.65
Winter	47.8	80	5	9.99	7.94	11.15
March	54.8	94	20	3.58	3.61	4.52
April	61.3	90	28	2.74	1.62	6.61
May	70.1	97	38	3.98	2.33	2.36
Spring	62.1	97	20	10.30	7.56	13.49
June	76.6	100	51	5.65	3.17	7.48
July	79.6	103	58	6.81	2.98	9.35
August	78.8	99	56	6.95	2.35	10.46
Summer	78.3	103	51	19.41	8.50	27.29
September	74.0	96	42	5.10	3.57	20.10
October	64.0	92	32	3.76	3.18	6.68
November	55.0	83	20	2.31	3.83	4.94
Fall	64.3	96	20	11.17	10.58	31.72
Year	63.2	103	5	50.87	34.58	83.65

AGRICULTURE.

The first settlements in the present territory of Columbus County apparently were made on the highlands overlooking the valley of the Cape Fear River. The first crops were corn, oats, rye, flax, barley, wheat, potatoes, pumpkins, and peas, with a number of garden vegetables and fruits. Tobacco was grown for home use. Cattle, hogs, sheep, and poultry were brought in by the early settlers, and these were raised in greater numbers each year until about the time of the Civil War. Native grasses were abundant and cattle and sheep could be kept at little expense. All the stock grazed on open range.

Wilmington was the first market for the produce of the county. Tallow, hides, wool, and grain were rafted down the Cape Fear River and exchanged for coffee, sugar, salt, and agricultural imple-

ments or for iron for making implements at home. Cotton was grown to a small extent and made into clothing at home. The first cotton marketed from Columbus County was shipped down the Cape Fear River and sold in Wilmington in 1815.

By 1840 the turpentine industry had grown to considerable importance, and from this time until 1880 turpentining constituted the chief industry of the county. After 1880 this industry began to decline, and by 1900 it had become of little importance, though a few stills are yet in operation in the Green Swamp section of the county. With the development of the turpentine industry, lumbering became important. Large quantities of pine lumber, including staves, were manufactured and transported by water to Wilmington and Southport. The railroad from Wilmington to Florence was built about 1850, and subsequently most of the transportation was by rail. With the construction of this railroad the sale of crossties became an important source of revenue, and this industry is still of considerable importance. Lumbering began in the Green Swamp section about 1840 and is still the principal industry in this part of the county.

An idea of the status of agriculture in the county in 1850 may be had from the census of that year, which reports a production of 13,066 bushels of wheat, 79,155 bushels of corn, 725 barrels of turpentine, $10,864 worth of lumber, 24,035 pounds of cotton, and 6,724 pounds of wool.

The agriculture in Columbus County at present consists of the production of cotton, tobacco, and, to a less extent, of strawberries as the money crops. Corn is the most widely grown of any crop, but it is used principally for feeding stock, fattening hogs, and as meal for making bread.

In 1898, after cotton had been selling at a very low price for a few years, the farmers were eager to introduce other money crops and began to grow bright-yellow tobacco on a commercial scale. The census of 1900 reports 802 acres in this crop, with a yield of 490,020 pounds. By 1909 (census of 1910) the acreage had increased to 1,854 and the yield to 1,506,201 pounds. In 1914 there was sold on the Fair Bluff market alone 2,500,000 pounds. Some of this, however, was grown in Robeson County and in Horry County, S. C. The price in 1914 ranged from 1 cent to 25 cents per pound, and the prices since that time have been satisfactory. Most of the tobacco is grown by the small farmers, those who live on the farm and superintend the work. Its production is not general over the county, but is confined to the sections around Fair Bluff, Tabor, and Whiteville.

Strawberry growing in Columbus County on a commercial scale began in 1897. At first this industry was confined to the territory

about Chadbourn, but it spread rapidly, and now strawberries are grown for market around Chadbourn, Tabor, Whiteville, Vineland, and Cerro Gordo. The census of 1900 reports 479 acres in strawberries, with a yield of 851,290 quarts. The growing of this crop proved so profitable that by 1910 the acreage had increased to 2,548 and the yield to 4,828,828 quarts. An idea of the relative importance of the strawberry-growing districts may be had from the figures giving the 1914 shipments from various points. For this year there were shipped from Tabor 152 cars, from Chadbourn 133 cars, from Clarendon 36, from Vineland 31, and from Cerro Gordo 9. As Tabor is located near the South Carolina State line, it is probable that a considerable part of the berries shipped from this point come from South Carolina. Chadbourn is the largest shipping point for the berries grown wholly within Columbus County. The principal varieties grown in the county are the Missionary, Klondike, and Lady Thompson. The price received ranges from $5.50 down to $1 per crate, depending upon the season at which the berries are put on the market.

From the earliest time corn has been the most extensively planted crop over the county as a whole, and it still holds this position. The census of 1880 gives the total acreage in corn as 15,723, with a yield of 136,546 bushels, or an average yield per acre of nearly 9 bushels. In 1889 there were 23,841 acres in corn, yielding 209,775 bushels. The acreage in 1899 is reported by the census of 1900 as 28,439 and the yield as 278,430 bushels, the average being a little more than 9 bushels per acre. By 1909 the area devoted to corn had increased to 29,755 acres, from which 398,871 bushels were harvested, or an average of over 11 bushels per acre.

Cotton is next to corn in acreage, and is the principal money crop. Relatively little cotton is produced in the eastern and southeastern parts of the county. The census reports the acreage in 1879 as 2,113, with a production of 930 bales, the average yield per acre being about two-fifths bale. In 1889 the acreage is reported as 7,659 and the yield as 2,342 bales, the average yield being only about one-third bale per acre. The census reports the total area in 1899 as 7,366 acres and the total yield as 2,939 bales. In 1909 there were 9,305 acres in this crop, giving a yield of 5,464 bales, or an average of more than one-half bale per acre.

The production of sweet potatoes is of considerable importance. The acreage in this crop has increased steadily from 2,242 acres, reported in the 1880 census, to 3,506 acres, reported in 1910. The yield reported in 1910 is 324,163 bushels.

Cowpeas are grown to some extent in nearly all sections of the county for soil improvement and hay rather than for the seed. Many farmers sow the peas broadcast in corn at the last cultivation

or plant them between the corn hills. A few years ago a considerable acreage was planted to peas for seed. In 1909, 6,683 acres in cowpeas produced 26,005 bushels.

Oats are grown in all parts of the county for feed, but only a small part of the crop is thrashed. In 1901, 1,591 acres were in oats, yielding 27,277 bushels.

In some sections of the county peanuts are grown in a small way for market. The 1910 census reports 670 acres in peanuts, yielding 12,653 bushels.

Around Vineland and Chadbourn, and in a few other localities snap beans and Irish potatoes are grown to some extent by truck growers. Around Chadbourn some cucumbers are also grown. Beans yield about 200 baskets per acre, but ordinarily only about 150 baskets per acre mature early enough to reach market before the drop in price makes shipment unprofitable. About 300 to 500 barrels of Irish potatoes are shipped from Vineland each year. Both beans and Irish potatoes are sold f. o. b. at Vineland when possible, but it frequently is necessary to consign them to commission houses at the markets. Beans bring 50 cents to $2 per basket, or an average of about 85 cents per basket.

Within recent years lettuce has been grown around Bolton and Newberlin, both in the open and under cover, for shipment to northern markets.

In a few localities rice is grown in small patches for home use. Sorghum is grown throughout the county and made into sirup for home consumption. Considerable sugar cane also is grown for the same purpose. Garden vegetables are grown for home use and to some extent for local markets.

Summer fruits are grown in all parts of the county for home use, and around Chadbourn a few peaches are grown for market.

Dairying is not practiced commercially in Columbus County. In those parts of the county covered by the stock law one or two milch cows are kept on each farm to supply milk for home use. There are but few purebred cows. In the free-range parts of the county cattle and hogs are of inferior stock, and hog cholera is prevalent. Sheep and goats are numerous in these sections.

Many farmers recognize in a general way the adaptation of certain soils to particular crops. Corn is best suited to the heavy sandy loams or loams, and when available these types usually are selected, provided the drainage is favorable. Some areas of Portsmouth loam, Myatt fine sandy loam, Coxville fine sandy loam, and Portsmouth fine sandy loam are admirably adapted to the production of corn, and this is generally known. Cotton makes a good growth on nearly all the soils of the county in favorable seasons, but it matures best on the Norfolk soils. Nearly all the tobacco

is grown on the Norfolk and Ruston types. This crop makes a bigger growth on the Coxville and Portsmouth soils, but the farmers recognize the inferior quality of leaf produced on these soils. The Coxville fine sandy loam and very fine sandy loam are considered the best soils for strawberries, but on account of the large acreage devoted to this crop the Norfolk soils frequently are used in its production. Truck crops do best on the Norfolk and Ruston soils. Sugar cane is grown on the Norfolk fine sandy loam, Coxville fine sandy loam, and Plummer fine sandy loam.

One of the most serious drawbacks to the agriculture of Columbus County is the inadequate farm equipment. A few large 2-horse and 3-horse plows are found in each community, but the use of these is by no means general. Most of the breaking is done with the "dixie" or a similar plow. Riding plows are very scarce. Disk harrows have been introduced in the county, but they are not in common use. Mowing machines and rakes are becoming numerous, and a few corn planters are in use in the county. Tobacco is still transplanted by hand. Traction engines are not employed in farm work, though a few are used for cutting lumber. Gasoline engines are found on only a small number of farms.

Deep plowing is practiced by the more progressive farmers. In the flatter parts of the county winter plowing is impracticable on account of moisture conditions. Little effort is made to grow winter cover crops, and only in a few instances are green-manure crops grown.

Tobacco, cotton, strawberries, and truck crops are cultivated mainly with 1-horse plows and sweeps. Corn on the light sandy soils also is cultivated with sweeps, but on the heavier soils it frequently is necessary to employ the turning plow or shovel plow. On many of the terrace soils and also on the flat and poorly drained uplands it frequently is necessary to ridge the crops. As a general rule, strawberries are planted on a flat surface or on very low ridges. On well-drained soils the best yields of cotton and corn are obtained where the crop is cultivated in such a way as to leave the surface level at the last plowing. On account of the diversity of soils and the wide range of crops grown, cultural methods vary widely.

Rotation of crops is not general, and in many sections of the county it receives almost no attention. Where tobacco and strawberries and other truck crops are grown some rotation is necessarily followed, but the crops are not always rotated in such a way as to obtain the best results. In some parts of the county tobacco frequently follows cotton, and the third year cotton, tobacco or corn may be planted. If corn is the third-year crop, peas are sometimes planted between the hills or sowed broadcast at the last cultivation. Corn frequently is followed by spring-sowed

oats, and the oats by cowpeas sowed in June or July. Strawberries never occupy the land more than three years. This crop usually is followed by corn or cotton. Snap beans and early Irish potatoes generally are followed by corn, which receives no additional fertilizer.

Methods of fertilization vary greatly in different sections of the county and with different planters. As a rule corn receives light applications of low-grade fertilizer, about 200 to 400 pounds per acre of 8–2–2, 8–2½–3, or 8–3–3 mixtures.[1] In some areas of the Hyde loam, Bladen clay loam, Myatt fine sandy loam, and Portsmouth loam no fertilizer is used on corn land. A few farmers use home-mixed fertilizers for this crop, a popular mixture consisting of 800 pounds of cottonseed meal, 1,100 pounds of phosphoric acid, and 200 pounds of kainit. This is applied at the rate of 200 to 400 pounds per acre. An application of 200 to 800 pounds per acre of this mixture frequently is used for cotton. Around Fair Bluff many farmers use 600 to 1,200 pounds per acre of a 9–2¾–3, 8–2½–3, or 8–3–3 mixture for tobacco. In the north-central part of the county and near Whiteville an 8–2½–3, 8–2–2, or 8–3–3 mixture frequently is applied to tobacco and cotton at the rate of 200 to 800 pounds per acre, and a few farmers use an 8–3–10 or 8–5–7 mixture. For strawberries a fertilizer analyzing from 8–2–2 to 6–5–7 is used, and an application of 1,000 pounds of 4–4–8 per acre, in two applications, one-half in the fall and one-half in February, has proved successful. For beans and Irish potatoes the most general custom is to apply 400 to 800 pounds per acre of an 8–3–3, 8–4–4, 8–3–10, 8–4–5, or 8–6–6 mixture. On deep sandy lands an extra application of kainit frequently is given to prevent corn from "frenching." The census reports the total expenditure for fertilizers in this county in 1909 as $189,020.

There is a good supply of labor throughout the county. The greater part of the tobacco crop is handled by the individual farmer with the help of his family. Negroes are employed in large numbers for picking strawberries around Chadbourn. One cent a quart is paid for picking berries. Negro men receive 75 cents to $1 or $1.25 for heavy farm labor, while negro women are paid 50 to 75 cents per day for such labor as hoeing cotton. The price paid for picking cotton ranges from 40 cents to 75 cents per 100 pounds. In the vicinity of Old Dock much of the labor is white. Where hired by the month, laborers receive from $15 to $20 per month, with a house, garden, and potato patch. The 1910 census reports a total expenditure of $168,785 for labor in 1909.

About 56 per cent of the county is reported in farms, and of the farm land about 22 per cent is reported improved. The farms vary

[1] The formulas are stated in the order, phosphoric acid, nitrogen, potash.

in size from 40 acres to 2,000 or 3,000 acres. The 1910 census reports the average size of the farms as about 98 acres.[1] According to this authority, 83 per cent of the farms are operated by the owners and practically all the remainder by tenants. Under the tenant system the landowner furnishes the stock, feed for stock, and implements and receives one-half the crop. Some landowners furnish the land and all the fertilizer and receive one-half the crop produced; in this case the tenant performs the labor and furnishes the stock and implements. In some instances the landowner furnishes the land only and receives one-third the corn and one-half the cotton.

The value of agricultural land in Columbus County varies from $6 to about $50 an acre. In places land can be bought for less than $6 an acre, but such land has practically no agricultural value. On the other hand much land near the towns sells for more than $50 an acre, but only in rare instances is this bought for agricultural use exclusively. The average value of good farming land is between $15 and $35 an acre.

SOILS.

Columbus County lies in the flat seaward part of the Coastal Plain province, and its soils have been derived from the unconsolidated beds of sands and clays of this region and from cumulose deposits. Geologically, these materials belong to the Sunderland, Wicomico, and Chowan formations of the Columbia group.[2] They came originally from the Piedmont Plateau and the Appalachian Mountain and Plateau Provinces, having been brought down by streams and deposited on the floor of the ocean which covered this part of North Carolina. The coarser particles were deposited in shallow waters near the shore line, while the finer materials were deposited in deep or quiet waters.

A series of uplifts and depressions finally left this part of North Carolina above the level of the ocean, and since that time the soil-forming materials have been subjected to still further changes, both mechanical and chemical. In many places the finer particles in the surface layer have been carried away in the drainage waters and deposited in lower situations, forming heavy soils, leaving a surface layer of coarse material. Other changes have been brought about as a result of drainage conditions. For instance, in depressed situations with poor drainage there has been a tendency toward deoxidation, as shown by the gray, white or mottled appearance of the subsoil material, and the luxuriant growth of vege-

[1] The census classes each tenancy as a farm.

[2] See report of North Carolina Geological and Economic Survey, Vol. III, 1912, on the Coastal Plain of North Carolina.

tation has added large quantities of organic matter, causing the dark color of the surface. On the other hand, the good aeration existing along slopes and ridges, where the drainage conditions have been nearly perfect, has resulted in the formation of lighter colored surface soils and of subsoils more uniform in color. Thorough oxidation induced by good aeration has in many places given rise to yellowish-red, reddish-yellow or red subsoils.

Since its emergence from the water the old sea floor has been more or less altered by erosion and the cutting of stream channels, while the original materials have been replaced in a measure by materials from outside sources deposited in the stream bottoms. The Columbia surface formation of Columbus County is underlain by beds of the Peedee formation, consisting of marine sands and clays. Between the Peedee sands and clays, in the northeastern part of the county, there is a thin stratum of Miocene or Pliocene sands, clays, and shell marls.[1] This marl outcrops on the north shore of Lake Waccamaw along the bank of the Cape Fear River, and in numerous road cuts near small streams. Marl is also encountered in many wells, and the bottom land along Dans Creek is underlain by both "blue" and shell marl. It also appears that a considerable part of Green Swamp is underlain at 8 to 15 feet by marl, it having been encountered at many points in recent dredging operations in this locality. None of the marl beds lie close enough to the surface to affect the overlying soil, though in places a noticeable quantity of the material has been incorporated in the alluvial soil by overflow waters.

The soils of the county have been classed into types according to the texture of the material, and these grouped together into series according to similarity in origin, color, structure, and topography.

The soils which have been formed under the best drainage conditions include the Norfolk and Ruston series. The Ruston soils as mapped in this county include many areas with subsoils as thoroughly oxidized as those of the Orangeburg series. These soils probably represent the extreme in oxidation of Coastal Plain material in the county.

The soils which appear to have been deposited in deep or quiet waters and later subjected to poor drainage include the Plummer, Coxville, and Bladen series, together with some areas of the Portsmouth soils. The greater part of the Portsmouth soils, however, has been formed under poor drainage conditions, and for the most part in situations conducive to the accumulation of organic matter. The Hyde loam, Muck, and Peaty muck were formed under even

[1] Report of North Carolina Geological and Economic Survey, Vol. III, 1912, on the Coastal Plain of North Carolina.

less favorable conditions and in depressions more conducive to the accumulation of vegetable matter. Muck and Peaty muck, particularly the latter, are cumulose deposits; that is, they represent the accumulation and decay of vegetable matter and show only a slight admixture of mineral matter. The plant remains are fairly well decomposed, and the deposits in many places attain a depth of several feet.

Old-alluvial deposits have given rise to the Myatt and Leaf soils, while from more recent alluvium have been derived the Ochlockonee, Johnston, and Congaree soils and Swamp.

The Norfolk series is characterized by the light-gray to grayish-yellow color of the surface soils and by the yellow color and friable structure of the sandy or sandy clay subsoils. The soils of this series occupy level to rolling uplands and are derived from sedimentary sands and clays of the Coastal Plain. As a rule they constitute the best drained soils in the county. This series is represented in Columbus County by four types, the sand, fine sand, sandy loam, and fine sandy loam, the last-named type having a deep and a flat phase.

The surface soils of the Ruston series are gray to brown and are underlain by reddish-yellow or dull-red, moderately friable sand or sandy clay. The subsoils of this series are intermediate in color between those of the Norfolk and Orangeburg series, and in structure between the Norfolk and Orangeburg soils on the one hand and the Susquehanna on the other. Two types of this series, the sand and fine sandy loam, are mapped in Columbus County.

The Leon series includes types with light-gray to gray surface soils, underlain at 2 to 24 inches by a brown or black, compact sand, commonly called "hardpan" or "sand rock." This hardpan is almost impervious to water. It ranges in thickness from 2 to 10 inches, and usually becomes less compact and lighter colored with depth. The lower part of the 3-foot section is frequently a gray to white fine sand or sand. The soils of the Leon series occupy low, flat ridges and level areas. The fine sand is the only type of the Leon series mapped in Columbus County.

The St. Lucie series is characterized by white sand soils and subsoils, there being no change in color, texture or structure within the 3-foot section. The soils of this series occupy low ridges and knolls lying between swampy areas or lakes. The accumulation of the material is doubtless due to wave action or wind. Only one type, the sand, is mapped in Columbus County.

The surface soils of the types included in the Plummer series are gray to dark gray, and the subsoils gray to mottled brownish and yellowish gray. The physiographic position of these soils is intermediate between that of the Norfolk and Portsmouth series. The members of the series occur in close association with the Coxville soils, from

which they are separated chiefly because of the absence of red mottlings and the character of the subsoil. Their surface is flat and artificial drainage is necessary. The Plummer fine sandy loam is the only type mapped in this series.

In the Coxville series are included types with gray to black soils and gray or mottled gray and yellow or gray, yellow, and bright-red subsoils. The subsoil material is a tough, and in some places plastic, clay or sandy clay. The bright-red mottlings appear in the lower part of the 3-foot section. The physiographic position of the series is intermediate between that of the Norfolk and Portsmouth series. The topography is prevailingly flat and natural drainage is poor. This series is represented by three types, the fine sandy loam, very fine sandy loam, and loam.

The Bladen series includes types with brownish to black soils and mottled gray, brownish, and yellow, heavy, plastic clay subsoils. The members of this series occupy flat depressions and are poorly drained. One type, the Bladen clay loam, is mapped.

The Portsmouth series includes types with dark-gray to black surface soils and light-gray to mottled gray and yellow subsoils. The soils of this series are high in organic matter. These soils occupy depressions or broad, flat areas in the Coastal Plain and are poorly drained. Four types, the coarse sand, fine sand, fine sandy loam, and loam, are mapped.

The Hyde series includes black soils having a high content of thoroughly decomposed vegetable matter. These soils occur in depressed or flat situations and are poorly drained. Only one type of this series, the loam, occurs in Columbus County.

The types grouped in the Myatt series have gray to dark-gray soils and gray to mottled gray and yellow, rather sticky subsoils. These soils occupy terraces in the Coastal Plain and are subject to overflow. The surface is for the most part flat, though a hummocky appearance is not uncommon. Artificial drainage is necessary before these soils can be used for agriculture. In this series the fine sandy loam is the only type mapped.

The surface soils of those types belonging in the Leaf series are light gray to gray. The subsoil consists of gray or mottled gray and yellow, compact silty clay, grading into mottled red and gray or red and yellow, dense, plastic clay. These soils are developed on stream terraces in the Coastal Plain. The fine sandy loam is the only type mapped in Columbus County.

The Ochlockonee series includes alluvial soils having dark-gray to brownish soils and grayish or mottled brownish-gray and yellow subsoils. These soils occur in the first bottoms of Coastal Plain streams and are subject to frequent overflows. They are formed of

sediments washed from the upland of the Coastal Plain and deposited in their present position by overflow waters. In this series only one type, the loam, is mapped.

The surface soils of the types in the Johnston series are chocolate brown to black and are underlain by brown to black, plastic subsoils. These soils occupy the first bottoms of streams in the Coastal Plain and are subject to frequent overflows. The soil material is of alluvial origin. In Columbus County only one type in this series, the loam, is mapped.

The soils and subsoils of the types in the Congaree series are brown to reddish brown, there being comparatively little change in texture, structure, and color from the surface downward, though occasionally grayish and yellowish mottling is encountered in the subsoil of the poorly drained areas. These soils are developed in the overflowed first bottoms of the streams of the Piedmont region and in similar positions in the Coastal Plain along streams issuing from the Piedmont. The Congaree silt loam is the only type of this series mapped in the present survey.

The following table gives the names and the relative and actual extent of the soils found in Columbus County:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Norfolk fine sandy loam	128,000		Portsmouth coarse sand	9,152	1.6
Flat phase	33,344	32.2	Johnston loam	8,576	1.5
Deep phase	26,304		Hyde loam	7,104	1.2
Coxville fine sandy loam	69,120	11.9	Norfolk sandy loam	5,760	1.0
Ochlockonee loam	53,824	9.2	Swamp	5,504	.9
Portsmouth fine sandy loam	48,064	8.3	Myatt fine sandy loam	4,288	.7
Portsmouth loam	37,120	6.4	Plummer fine sandy loam	4,096	.7
Peaty muck	35,648	6.3	Leaf fine sandy loam	3,392	.6
Shallow phase	768		Coxville loam	3,008	.5
Norfolk fine sand	29,760	5.1	Bladen clay loam	1,856	.3
Muck	3,072	2.8	Leon fine sand	1,664	.3
Shallow phase	13,632		Ruston sand	1,600	.3
Coxville very fine sandy loam	12,864	2.2	St. Lucie sand	1,088	.2
Portsmouth fine sand	11,840	2.0	Congaree silt loam	960	.2
Ruston fine sandy loam	10,624	1.8			
Norfolk sand	10,368	1.8	Total	582,400	

NORFOLK SAND.

The Norfolk sand consists of a light-gray to light-brown, incoherent, medium sand, 2 to 8 inches deep, underlain by a pale-yellow sand. In the vicinity of Fair Bluff the surface soil to a depth of 2 to 8 inches is decidedly darker than typical, and in spots the subsoil blends with the subsoil of the Ruston sand to the extent of becoming orange yellow in color.

The Norfolk sand is comparatively inextensive. The largest areas occupy the bluffs overlooking the lowlands along the Cape Fear River in the northeastern part of the county and along the swamp areas in the northwestern part. The type occurs for the most part on knolls and ridges and is well drained.

In the eastern part of the county only a small percentage of this type is under cultivation. The characteristic forest growth consists of scrub oak and scattered longleaf pine, together with some hickory and dogwood.

Near Fair Bluff the type is used for the production of tobacco, cotton, corn, and, to a limited extent, of oats, peanuts, and various garden vegetables. Tobacco yields 300 to 800 pounds, corn 10 to 25 bushels, and cotton one-fourth to 1 bale per acre.[1]

On account of its porous structure, this soil warms up early in the spring and dries out quickly after rains, and crops mature early. As a rule, the soil is broken broadcast in March or April with a 1-horse plow. Subsequent preparation of the seed bed depends largely upon the crops to be planted. For tobacco and cotton the rows are usually laid off with a shovel or bull-tongue plow about 40 inches apart, and the fertilizer is put into this furrow. Two furrows are then turned back on the fertilizer and the crops put in as soon as convenient, the tobacco plants being put in by hand and cotton with a planter. Corn is usually dropped with a planter. Subsequent cultivations are made with sweeps and 1-horse cultivators. Fertilizer practices vary greatly. In general, 200 to 1,000 pounds per acre of an 8–2–2, 8–2½–3, or 8–3–3 mixture is used for tobacco, cotton, and corn, the smallest quantities being applied to corn.

The value of the Norfolk sand depends largely upon location and improvements. In the eastern part of the county land of this type can be bought for $10 to $20 an acre, while in more favorable situations it is worth from $20 to $50 an acre.

The greater part of this type is deficient in organic matter and is greatly benefited by turning under such crops as cowpeas, vetch, rape or soja beans.

NORFOLK FINE SAND.

The Norfolk fine sand in its typical development consists of a gray to yellowish-gray fine sand, 6 to 10 inches deep, underlain to a depth of 36 inches or more by a grayish-yellow or pale-yellow loamy fine sand. In the vicinity of Dothan, Guide, and Wattsville and in a few other localities there are included small areas in which the surface 4 to 6 inches consists of a dark-gray to black fine sand carrying a high percentage of organic matter. These areas would

[1] Crop yields given in this report are based on statements of farmers and on field observations.

have been mapped as the Scranton fine sand had they been of sufficient extent. There are also included spots of Ruston fine sand too small to show on a map of the scale used, as well as several spots in which the surface soil to a depth of 3 to 5 inches is almost white, changing to brown and then back to white or pale yellow.

The Norfolk fine sand is an extensive and widely distributed type. The largest areas occur northeast of Whiteville, between White Marsh Church and the Bladen County line. Other important areas occur near Newberlin and Acme in the extreme eastern part of the county, east and southeast of Cherry Grove Church, and immediately north of Porter Swamp Church. Smaller bodies are scattered over the greater part of the county. The largest bodies occupy broad interstream areas, with a gently undulating to rolling surface, becoming somewhat hilly along a few of the streams. Drainage is generally excellent, except in the areas with a dark surface soil occurring near Dothan, Guide, and Wattsville, which have a nearly flat surface and are poorly drained.

The Norfolk fine sand is fairly productive, and as a result of this, together with its wide distribution and prevailingly good drainage, it is one of the most important agricultural soils of the county. A relatively large part of it is cleared, while the remainder is forested mainly to longleaf and shortleaf pine, red oak, white oak, and round and forked leaf blackjack oak, with a few dogwood, hickory, and persimmon trees. The flat, poorly drained areas usually have a thick undergrowth of gallberry.

Cotton, corn, tobacco, strawberries, sweet potatoes, Irish potatoes, and oats are the most important crops, in the order named. The soil is also well suited to such early truck crops as snap beans, lettuce, radishes, and onions.

Cotton yields one-fourth to 1 bale, corn 15 to 25 bushels, tobacco 500 to 1,000 pounds, and Irish potatoes 20 to 75 bushels per acre. Strawberry yields vary considerably, depending upon the age of the plants. The summer setting usually yields 80 to 100 crates per acre the following spring, while the spring setting yields from 100 to 140 crates. Two-year-old plants frequently yield as much as 200 crates per acre.

Systematic crop rotations and the planting of green-manure crops are not generally practiced on this type. Tobacco usually is grown in the same fields for several consecutive years, each crop being highly fertilized. In sections where cotton and corn are the principal crops they are usually alternated, and in most instances cowpeas are planted in the corn at the last cultivation. Strawberries are nearly always followed by cotton, corn or Irish potatoes. Cowpeas and velvet beans are practically the only legumes grown, and these generally follow oats or are planted in the corn. More

or less fertilizer is used on all crops. The composition of the fertilizer used and the size of the applications vary widely. For corn the most general application consists of 250 to 600 pounds per acre of low-grade mixtures. In the vicinity of Hallsboro and in some other localities corn and cotton have a tendency to "french" and wilt on this soil, and an extra application of potash is nearly always given to counteract this. Cotton land receives about the same fertilizer mixture as corn land, the applications ranging from 400 to 1,200 pounds per acre. Tobacco is in most instances given an acreage application of 600 to 1,000 pounds of fertilizer, the brands ranging from the ordinary corn and cotton mixtures to those containing considerably higher percentages of nitrogen and potash. The fertilizer applied to strawberries ranges in composition from 8–2–2 to 8–5–7, the higher grades being used in comparatively few instances. For Irish potatoes an application of 500 to 1,000 pounds per acre of 8–2–2, 8–3–3, 8–4–4, or 8–3–10 is made.

The value of the Norfolk fine sand varies considerably, depending upon improvements and location with reference to towns, railroads, and highways. Near Whiteville, Fair Bluff, and Chadbourn this type occurs for the most part in small areas and is usually sold in connection with other soil types. In this way it brings $60 to $75 an acre. In the more remote sections it can be bought for $10 to $25 an acre.

The Norfolk fine sand is deficient in organic matter, but this can be remedied by following the suggestions offered for the improvement of the coarse members of the series. The well-drained portions of this type are sufficiently porous for aeration and the free downward passage of water, and therefore deep breaking is not especially necessary for the structural improvement of the type. It will be found, however, that a much deeper soil can be formed by breaking an inch or two deeper each succeeding year until a depth of 10 inches is reached. This statement is borne out by observations upon this type in Orangeburg County, S. C., and Pender County, N. C. In the latter locality the type is used profitably for the production of peanuts, watermelons, cantaloupes, and cucumbers, and there is apparently no reason why these crops should not attain commercial importance in Columbus County. In growing peanuts liming will be necessary. In Orangeburg County, S. C., pecans are of some commercial importance on this type, as well as on the Norfolk fine sandy loam.

NORFOLK SANDY LOAM.

The Norfolk sandy loam consists of about 6 to 8 inches of a gray to yellowish-gray, medium sandy loam or loamy sand, underlain by a pale-yellow, light sandy loam, which passes into a yellow, friable

sandy clay at a depth of about 15 to 24 inches. In places the yellow clay is absent, and the subsoil between 10 and 36 inches is a pale-yellow sandy loam, becoming heavier with depth. There are included in this type a few spots with a dull-red or reddish-yellow, friable sandy clay subsoil, which would have been mapped as Ruston sandy loam had they been of sufficient size to show on the soil map. There are also included inextensive areas of Norfolk coarse sandy loam.

The Norfolk sandy loam is confined almost entirely to the northwestern part of the county, between Leonards Crossroads and Williamson Crossroads. Small, isolated bodies occur in other parts of the county. The largest areas occupy broad, level to undulating areas, becoming rolling as the streams are approached. The smaller spots occupy low knolls and ridges. As a result of its favorable topography and porous structure this soil is well drained.

The Norfolk sandy loam is a desirable soil type, and the greater part of it is under cultivation. Originally it supported a heavy growth of longleaf pine, with some hardwoods, but all the merchantable timber has been removed. This type is held in high esteem for the production of corn, cotton, tobacco, Irish potatoes, sweet potatoes, and all garden vegetables. Peaches, pears, and grapes also do well.

On account of its deep sandy loam surface mantle, this type warms up early in the spring, and crops mature almost as early as on the Norfolk sand. Corn yields 10 to 20 bushels, cotton one-third to 1 bale, and tobacco 500 to 1,000 pounds per acre. Irish potatoes yield 25 to 100 bushels per acre, 45 bushels being considered a good yield.

Very little attention is paid to the maintenance of productiveness on this type. Deep plowing has been introduced around Boardman and Evergreen, but is by no means general. There is a considerable variety in the crops grown in this section, and this necessitates some rotation, except in the case of tobacco. It is said that soils low in organic matter, when well fertilized, produce the best grade of leaf. In some instances, however, corn or cotton follow a leguminous crop, with tobacco the third year. In many cases Irish potatoes are planted in 5-foot rows with a row of cotton between, one application of fertilizer answering for both. Methods of fertilization vary greatly. In growing corn from 200 to 600 pounds per acre of an 8–2–2 or 8–3–3 mixture is generally used, all of it being applied at one time. Methods for the fertilization of tobacco land probably are more varied than for any other crop. On this type, however, it has been found by the most successful farmers that an acreage application of 800 to 1,200 pounds of a 9–2¾–3, 8–2½–3, 8–3–3 or 8–2–2 mixture gives best results. In a few instances as much as 2,000 pounds per acre of some of these mixtures has been applied.

The value of the Norfolk sandy loam depends upon its location and improvements. In general, it sells for $15 to $100 an acre. Improved land is worth on an average about $60 an acre.

The greater part of this type is deficient in organic matter, a condition which should be remedied by a systematic rotation of crops, including the legumes, and also by planting and turning under green cover crops such as rye or vetch. A rotation that has been tried a few times with good results consists of winter or spring oats, followed in June by cowpeas, with cotton the second year and tobacco the third. If the green manuring crops are thoroughly cut up with a disk harrow before they are turned under, the tendency toward souring the land will be greatly decreased.

NORFOLK FINE SANDY LOAM.

The surface soil of the Norfolk fine sandy loam consists of a gray fine sandy loam or loamy fine sand, passing into a yellowish-gray or pale-yellow fine sandy loam at a depth of about 6 to 10 inches. The subsoil, beginning at any point between 10 and 18 inches, is a yellow, friable fine sandy clay. In some of the better drained areas slight red mottlings occur in the lower part of the 3-foot section, and in the lower situations gray mottlings occur. Included with this type are some small areas of Norfolk very fine sandy loam occurring a short distance northeast of Mollie and near Cerro Gordo, and a few spots of Norfolk sandy loam near Cherry Grove Church.

The Norfolk fine sandy loam is the most extensive and widely distributed soil type in Columbus County. It occurs throughout the county, being least extensively developed in the section between Lake Waccamaw and Juniper Creek and southeast of Bolton. In the eastern part of the county, around Newberlin and Acme, and also between Whiteville and the Bladen County line, it is the prevailing soil type, the areas in these sections being broken only by narrow strips of alluvial soils.

The Norfolk fine sandy loam occupies the broadest interstream areas and its surface is gently undulating to rolling, becoming broken and slightly hilly along most of the larger streams. It is the most thoroughly drained soil in the county.

When properly handled and fertilized the Norfolk fine sandy loam is a productive soil. It is more extensively farmed than any other type in the county, from two-thirds to three-fourths of its area being under cultivation. Uncleared areas support a forest growth consisting mainly of longleaf and shortleaf pine, red oak, and white oak, with scattered hickory, dogwood, sassafras, and persimmon.

The Norfolk fine sandy loam is devoted to the production of both subsistence and income crops on a large scale, and practically dominates the agriculture of the county. The most important subsistence

crops are corn, sweet potatoes, and various garden vegetables. The chief income crops are cotton, strawberries,[1] and tobacco. Irish potatoes, snap beans, and cucumbers are grown to a small extent near Evergreen, Boardman, Chadbourn, and Whiteville for market. Like the Norfolk sand, sandy loam, and fine sand, the Norfolk fine sandy loam is an early soil. The potato crop, though of comparatively little importance, goes on the spring market.

According to farmers' estimates, corn yields range from 15 to 80 bushels per acre, but the average yield in 1909, as given by the census, was only about 13 bushels per acre.[2] Sweet potatoes yield 75 to 300 bushels per acre. According to information obtained in the field, cotton yields one-fourth to one and one-half bales per acre. The 1910 census reports the average yield as a little more than one-half bale. Tobacco warehouse men and farmers state that tobacco yields range usually from 600 to 1,200 pounds per acre, with yields of 1,400 pounds per acre in a few instances. From 80 to 250 crates per acre represents the range in the yield of strawberries. In 1909 the average acreage yield for the county as a whole was 60 crates per acre. This difference may be in part accounted for by the fact that only about 75 per cent of the strawberry crop is gathered, or there may have been adverse seasonal influences in the single year covered by the census.

The Norfolk fine sandy loam is handled and fertilized in practically the same way as the Norfolk fine sand.

There is a wide range in the value of this type, depending upon proximity to markets, railroads, and highways. Usually it sells at $10 to $75 an acre. Near Whiteville and Chadbourn, however, it can not be bought for less than $100 to $200 an acre. Near Tabor the price ranges from $15 to $60 an acre.

The Norfolk fine sandy loam responds to the same methods of treatment that have been suggested for the improvement of the other members of the Norfolk series.

Norfolk fine sandy loam, deep phase.—The Norfolk fine sandy loam, deep phase, differs from the main type chiefly in the depth of the surface soil. This consists of a grayish-yellow or pale-yellow fine sandy loam or loamy fine sand, from 18 to 30 inches deep, underlain by a yellow fine sandy clay or heavy fine sandy loam. In some places the surface material to a depth of 18 to 36 inches is a yellow fine sand.

The Norfolk fine sandy loam, deep phase, is almost as widely distributed as the typical soil, but the areas are much smaller. The topography is rolling to somewhat hilly and drainage is good.

[1] The Coxville fine sandy loam is the most important strawberry soil of the county.

[2] Seasonal conditions may have operated to lower the yield to the average here stated.

Broadly speaking, the agricultural value of the Norfolk fine sandy loam, deep phase, is intermediate between that of the typical soil on the one hand and that of the Norfolk fine sand on the other. This phase is used for the production of the same crops as the fine sandy loam and fine sand. Peanuts and bright tobacco are crops especially well suited to this soil.

Norfolk fine sandy loam, flat phase.—The Norfolk fine sandy loam, flat phase, differs from the typical soil mainly in its prevailingly level to flat surface and poorer drainage, but also in the somewhat darker color of the surface material. In a few places, also, the yellow subsoil changes to gray at a depth of about 24 to 30 inches, and in other places the lower part of the 3-foot section is mottled with bright red.

The Norfolk fine sandy loam, flat phase, is extensive and some of the individual areas are relatively large. The most important of these are located north and northwest of Tabor, between Pireway and Mollie, and in the vicinity of Bolton.

Artificial drainage is necessary before this phase can be successfully farmed, and only a comparatively small percentage of it is under cultivation at present. Where artificial drainage is established good yields are obtained.

RUSTON SAND.

The Ruston sand consists of a gray or brown, medium sand, underlain at a depth of about 6 to 10 inches by a dull-red, brownish-red or reddish-yellow sand, or in local areas by a loamy sand.

This type is confined mainly to the northwestern part of the county, the largest area occurring in the vicinity of Macedonia Church. Small areas occur on the south side of Porter Swamp about 4 miles northeast of Fair Bluff, in the vicinity of Leonards Crossroads, and near Pireway in the southern part of the county. The type occupies slopes adjacent to streams, and is well drained.

The Ruston sand is inextensive. It is considered a good soil, however, and the greater part of it is utilized for the production of corn, tobacco, cotton, Irish potatoes, and oats. Various garden vegetables and certain fruits do well. The soil is fertilized in practically the same way as the Norfolk sand and produces similar yields.

The value of land of this type ranges from $15 to $75 an acre.

RUSTON FINE SANDY LOAM.

The Ruston fine sandy loam consists of a gray to brownish-gray fine sandy loam, underlain at a depth of 6 to 18 inches by a brownish-red to reddish-yellow, rather heavy fine sandy clay. There are a few included areas of Orangeburg fine sandy loam which were too small

to map. In these the subsoil, beginning at any point between 6 and 20 inches, is a bright-red, friable, medium to fine sandy clay. About 1 mile east of Whiteville and bordering the swamp, as well as in a few other localities, spots of Susquehanna fine sandy loam were encountered, which, owing to their extremely small extent, could not be shown on the map. The surface soil of the Susquehanna fine sandy loam is similar to that of the Ruston fine sandy loam, but the subsoil is a tough, plastic clay with a mottled gray, yellow, and red color. The agricultural value of this soil is only slightly lower than than that of the Norfolk and Ruston soils.

The Ruston fine sandy loam occurs in small areas thoughout the greater part of the county. The most important areas occur along the Waccamaw River, from Reeves Ferry to the South Carolina boundary. Other prominent bodies occur west of Grists, near Clarendon, south of New Hope Church, and along Beaverdam Swamp, near Stanley Ford and Wards. Narrow strips lie along the east and west side of White Marsh, between the Atlantic Coast Line Railroad and the Bladen County line. The type occurs on knolls and on the bluffs overlooking the lowlands along the largest streams. Its topography is rolling to hilly and natural drainage is well established.

The Ruston fine sandy loam is considered a good general-farming soil and about 75 per cent of it is under cultivation. Forested areas support a growth of longleaf and shortleaf pine and hardwoods. Not much of the merchantable timber remains.

Commercial fertilizer is applied in about the same proportions on this type as on the Norfolk fine sandy loam, and the yields are equally good, if not better.

Farm land of this type sells for $15 to $75 an acre. The few very small areas occurring in and near Whiteville are valued at $100 to $200 an acre.

LEON FINE SAND.

The Leon fine sand consists of a gray fine sand from 8 to 12 inches deep, underlain by a brown fine sand, which in many instances is indurated to such an extent as to give rise to the local term "sand rock," or hardpan. Apparently this "sand rock" consists of sand particles loosely cemented by iron oxide. Between the surface soil and the true subsoil there is in many places a 2 to 4 inch stratum of light-gray to nearly white fine sand. In many places there is encountered at a depth of about 24 to 30 inches a thin layer of gray fine sandy clay, below which there is usually a gray fine sand. There are included with this type a few areas of Leon sand that are too small to indicate on the map.

The Leon fine sand is confined to small areas mostly to the south and southeast of Lake Waccamaw. One of the largest areas occurs

west of Shady Grove Church, near the northern county line. The type occupies low ridges and knolls lying between swampy areas, and the water table is rarely more than 12 inches below the surface. Not infrequently the type is saturated with water almost to the surface. None of this type is at present under cultivation, but some of it is being cleared within the Bolton drainage district, and an attempt will be made to utilize it for agriculture. It is not considered a desirable agricultural soil. The forest growth consists principally of small longleaf pine, with an undergrowth of wire grass.

The value of the Leon fine sand at present depends upon its proximity to the drainage district. Within this district a small percentage of the type has sold during recent months for $30 an acre. Before the establishment of the drainage district it sold at $5 or less an acre. Areas outside the drainage district are held at $10 an acre, but not much of this land changes hands, except when sold in conjunction with other types or for timber privileges.

ST. LUCIE SAND.

The St. Lucie sand consists of a loose, incoherent, medium to coarse white sand, 36 inches or more in depth. In places the surface inch or two is slightly grayish, due to an admixture of vegetable matter.

This type is very inextensive, occurring only in the section between Porter Swamp and Lumber River. It occupies undulating to gently rolling knolls and ridges and is well to excessively drained.

None of the type is under cultivation, and no agricultural importance is attached to it. Scattered longleaf pine of small size, together with forked-leaf blackjack oak and an occasional patch of wire grass, constitute the vegetation.

PLUMMER FINE SANDY LOAM.

The Plummer fine sandy loam consists of a gray to dark-gray fine sandy loam, underlain at a depth of 6 to 8 inches by a gray fine sandy clay. In places yellow mottlings are quite noticeable in the subsoil, and in a few instances faint red mottlings appear in the lower part of the 3-foot section. There are included with this type some very small spots of the Portsmouth and Coxville fine sandy loams and the Plummer very fine sandy loam.

The Plummer fine sandy loam is confined to inextensive areas principally in the eastern part of the county. Some of the largest areas are situated in the vicinity of Bolton and at Vineland. A number of smaller areas occur along the highway between Bolton and Clear Branch, and a few spots are found along the north side of Juniper Creek. The included areas of Plummer very fine sandy

loam lie along the Waccamaw Lumber Co. Railroad south of Bolton and in the northern end of Green Swamp.

The Plummer fine sandy loam forms low knolls and ridges lying between swampy soils and flat areas in close proximity to swamps. The greater part of the type is found in a section where regional drainage is poorly established and there are no adequate channels to which artificial drains may be led. A few acres of the type have been partly drained by means of open ditches.

A small percentage of this type is cleared, and the remainder supports a scattered growth of longleaf pine. Corn is the principal crop. Small patches are also planted to Irish potatoes, sweet potatoes, and various garden vegetables for home consumption. Corn yields are small.

The value of this type depends upon its location and improvements. Outside the Bolton drainage district and away from highways cleared land can be bought for $10 or less an acre. Within the drainage district it has sold recently (1915–16) for $30 an acre. On account of its location, the land near Vineland could not be bought for less than $100 an acre.

The improvement of this soil depends primarily upon drainage. The type as a whole is acid, as shown by litmus tests, and this should be corrected by liming. Uncleared areas have been grazed by stock for so many years that the soil has become decidedly compact and has a tendency to return to this condition even after clearing, unless it is deeply plowed and well pulverized. The physical condition of the soil can be improved without decreasing yields by plowing an inch or two deeper each succeeding year until a depth of 10 or 12 inches has been reached. Yields can be greatly increased by growing and turning under leguminous crops.

COXVILLE FINE SANDY LOAM.

The surface soil of the Coxville fine sandy loam is a gray to almost black fine sandy loam ranging in depth from 6 to 10 inches. It is underlain by a mottled yellow and gray fine sandy clay, which passes into a mottled yellow and gray, heavy, sticky fine sandy clay, showing mottlings or streaks of bright red. In places the subsoil is a heavy, plastic clay.

The Coxville fine sandy loam is one of the most extensive soils in the county. It is widely scattered over the county, but many of the areas are small. The largest areas lie immediately north of Lake Waccamaw, east and southeast of Evergreen, near Chadbourn, southwest of Pireway, southwest of Cerro Gordo, and between Tabor and Beaverdam Swamp. The topography is flat, and natural surface drainage is poor.

The Coxville fine sandy loam is considered a strong soil, but owing largely to the high cost of establishing artificial drainage probably not more than 10 per cent of the type is under cultivation. Chadbourn lies in a drainage district, and in this section a large percentage of the type is farmed.

This soil is well suited to the production of strawberries, which are the principal crop in the vicinity of Chadbourn and Tabor. It is also considered a good soil for corn, cotton, oats, and garden vegetables, including cabbage, snap beans, beets, onions, English peas, radishes, peppers, turnips, squash, and okra. Garden vegetables, with the exception of snap beans, are grown only for home consumption and for local markets. Sweet potatoes, Irish potatoes, and cucumbers do well, but when grown for market these crops are more frequently planted on the Norfolk soils.

Strawberry yields vary considerably, depending upon the age of the plants and the methods of fertilization and cultivation. Plants set out in the summer usually yield from 75 to 100 crates per acre the following spring, and the spring setting yields 100 to 200 crates per acre. The whole of the strawberry crop never goes on the market, for the reason that the price toward the close of the season drops too low. It is estimated that only about 50 per cent of the crop was marketed this year (1915). Corn yields ordinarily from 15 to 25 bushels, but with special fertilization and careful cultivation as much as 80 bushels per acre has been obtained in a few instances. Cotton yields one-fourth to 1 bale per acre. All crops are fertilized to a greater or less extent. The fertilizer applications do not differ materially from those used on the Norfolk fine sandy loam.

The price of the Coxville fine sandy loam varies widely in different sections of the county. Near the larger towns improved land sells at $60 to $75 an acre, while uncleared areas in remote localities can be bought for $5 to $25 an acre.

Although most of it is naturally cold and sour, there is no reason why this soil can not be built up to a high state of productiveness. It is in need of better drainage, liming, deeper plowing, and better preparation of the seed bed. The growing of winter cover crops and the application of coarse manures are beneficial.

COXVILLE VERY FINE SANDY LOAM.

The surface soil of the Coxville very fine sandy loam consists of a gray to almost black very fine sandy loam, ranging in depth from 6 to 10 inches. The subsoil is a mottled yellow, yellowish-brown, and gray clay to silty clay, becoming intensely mottled with bright red at any point between 18 and 36 inches. West of Jones Crossroads the surface soil of this type approaches a loam in texture, and small areas in other localities resemble a silt loam.

The Coxville very fine sandy loam lies mostly in the southern part of the county, large areas occurring between Simmons Bay and the South Carolina boundary. Several smaller areas were mapped near Cerro Gordo. The topography is flat, and natural drainage is inadequate.

When properly drained, this is considered a productive soil and is used for general farming. At present about 10 per cent of the type is under cultivation, the remainder being forested to longleaf and shortleaf pine, oak, and dogwood. Most of the cultivated land is included in the area between Reeves Ferry and Jones Crossroads. Drainage is established by means of open ditches.

The principal crops are corn, cotton, and cowpeas. In the vicinity of Cerro Gordo strawberries are grown to a small extent. Sweet potatoes, Irish potatoes, cabbage, beans, onions, turnips, collards, English peas, beets, and okra are grown only for home use. Ribbon cane and sorghum cane are produced on small patches and manufactured into sirup for home consumption.

Corn yields from 12 to 30 bushels and cotton from one-fourth to 1 bale per acre. All crops are fertilized, though corn receives only small applications.

The value of this type depends chiefly on its location. In the southern part of the county it can be bought for $5 to $20 an acre, and near Cerro Gordo it brings from $15 to $60.

With proper management the Coxville very fine sandy loam can be built up and maintained in a high state of productiveness. It responds to the same methods of improvement as suggested for the Coxville fine sandy loam.

COXVILLE LOAM.

The Coxville loam consists of a dark-gray to black, heavy loam, 6 to 10 inches deep, underlain by a mottled yellow, brown, and gray, plastic clay, showing bright-red colorations at a depth of 20 to 36 inches. There are included with this type spots of heavy fine sandy loam and clay loam.

The Coxville loam is of small extent. Some of the most important areas occur about 2 miles southeast of Shiloh Church, near New Hope Church, 3 miles southeast of Oakdale Church, 2 miles southeast of Fruit Ridge, east and northeast of Mollie, and northeast of Tabor. Smaller areas occur in the vicinity of Armour.

This type occupies depressions or basinlike areas and drainage is poor. Some of the basins hold water for several months in each year.

In its present condition this type is of little agricultural importance, only a small part of it being cultivated. A few of the depressions surrounded by well-drained soils are cleared and used for the

production of corn, cotton, and oats, and in favorable seasons good yields are obtained. The soil is fertilized in the same way as the adjoining soils.

Land of this type is usually sold in connection with that of other types.

BLADEN CLAY LOAM.

The Bladen clay loam consists of a dark-gray, brownish or nearly black, heavy loam to clay loam, 6 to 12 inches deep, underlain by a tough, plastic clay of a prevailingly bluish-drab color, with yellow or brownish iron stains. In places reddish-brown mottlings occur. In spots the surface few inches consists of a heavy fine sandy loam.

This type is confined to several bodies lying on the north and south of the Bolton drainage district. The topography is flat and both surface drainage and underdrainage are poorly established.

A considerable proportion of the Bladen clay loam has been drained by canals and is under cultivation. It is naturally one of the strongest and most productive soils in Columbus County, and is held in high esteem for the production of corn, hay, and oats, and is also well suited to the production of cabbage, onions, and beets, although these are grown only for home consumption. The forested areas support a heavy growth of maple, ash, elm, sweet gum, water oak, black gum, and cypress, together with some beech and holly.

On account of the heavy nature of both soil and subsoil and the poor drainage conditions tillage operations are delayed until March or April and crops therefore mature later than on most of the soil types of the county.

Corn yields 40 to 50 bushels, oats 30 to 70 bushels, and cowpeas 1 to 3 tons of hay per acre.

In the preparation of this soil for crops two-horse plows, disk harrows, and rollers are used. Subsequent cultivations are done by means of one-horse cultivators, sweeps, and turning plows. It is stated that some portions of this type have been under cultivation for a period of 30 years without the addition of commercial fertilizer. Land of this type can be bought for $10 to $50 an acre.

For the improvement of this type drainage is the first requisite. The soil should be plowed deeper, more thoroughly pulverized, and limed.

PORTSMOUTH COARSE SAND.

The Portsmouth coarse sand consists of a dark-gray to black coarse sand, passing at about 8 inches into a brownish-gray or gray coarse sand. In some places the subsoil is a gray, coarse sandy loam. Included with this type there are some areas of Portsmouth coarse sandy loam and Portsmouth sand which were too small to separate on the map. About a mile and a half southwest of Fair Bluff, at a

point locally known as Homes Bay, there is an included area of Hyde sand having a surface covering of 2 to 4 inches of Muck underlain by a brown or black medium sand which extends to a depth of 36 inches or more.

The Portsmouth coarse sand is comparatively inextensive. The largest areas lie in the northwestern part of the county, southwest of Evergreen, near Boardman, and in the vicinity of Fair Bluff. Smaller areas occur in the vicinity of Leonards Crossroads, 1 mile north of Old Dock, and around Crusoe School.

The greater part of this type occupies flat, depressed, basinlike areas, locally called "bays." As a whole, it is poorly drained and much of it is saturated with water throughout the greater part of the year. The areas near Old Dock and Crusoe School constitute the best drained portions of the type.

The Portsmouth coarse sand is of little importance agriculturally and none of it is under cultivation except a few small areas occurring within well-drained soils. It is used mainly as a range for stock. Bay pine, bay bushes, bamboo briers, gallberry and huckleberry bushes, and a variety of ferns and mosses constitute the vegetation.

The value of the Portsmouth coarse sand is low. Some of it has sold recently for $3 to $5 an acre.

PORTSMOUTH FINE SAND.

The surface soil of the Portsmouth fine sand consists of a dark-gray to black, loamy fine sand, about 8 to 12 inches deep, underlain by a 1 or 2 inch stratum of white fine sand, which passes into a gray, brown or black fine sand. Immediately underlying the white fine sand in many places there is a thin layer of brown fine sand loosely cemented with iron oxide, which is almost impervious to water and is known as "hardpan" or "sand rock." In some places the subsoil is a jet-black fine sand, 36 inches deep, and in others a black or gray, sticky fine sand or fine sandy loam.

Many small areas of Portsmouth fine sand are mapped in the northern part of the county between Sandy Plains and Shady Grove Churches. It is also mapped in Cypress Creek Bay, Big Bay, Camp Bay, and in the vicinity of Old Dock and Roseland. This type occupies low-lying basins and bays, many of which are covered with water the entire year. All the type is naturally poorly drained. Only a few spots have been reclaimed, and these are surrounded by well-drained soils. The forest growth consists of swamp pine and bay trees, with a dense undergrowth of bamboo briers, gallberry and huckleberry bushes, ivy, and a variety of water-loving ferns and mosses. Most of this type lies in a section not covered by the stock law and cattle, hogs, goats, and sheep range at will.

PORTSMOUTH FINE SANDY LOAM.

The surface soil of the Portsmouth fine sandy loam consists of a dark-gray to black fine sandy loam carrying a high percentage of organic matter. The subsoil is a gray and yellow mottled, heavy fine sandy loam, passing at a depth of about 20 inches into a mottled yellow and gray fine sandy clay. In areas which have been under cultivation for a number of years the surface soil is rather light gray in color owing to the loss of organic matter. In places the subsoil is a light-gray, sticky fine sand or fine sandy loam, mottled with yellow, and extending to a depth of 36 inches. In other places it is a tough, plastic clay or fine sandy clay, gray in color, with yellow or brown mottlings.

The fine sandy loam is the most extensive of the Portsmouth types mapped in Columbus County. It is widely distributed and many of the areas embrace as much as 2 square miles. Some of the most important bodies are encountered in Big Bay, Cattail Bay, Mark Pine Bay, near Chadbourn, north and northwest of Freeman, northeast of Bolton, and southeast of Fair Bluff. The topography is level and natural drainage is poor. Some of the areas occupy basins and are covered with water for long periods.

Only a small percentage of this type is used for agriculture. Most of the forested areas support a growth of longleaf and shortleaf pine, black gum, sweet gum, and tupelo gum. The bay areas have a conspicuous growth of swamp pine, with a few bay bushes and an undergrowth of bamboo briers and gallberry and huckleberry bushes. North of Freeman and about 3 or 4 miles northeast of Bolton there are broad, level stretches with no vegetation except broom sedge. These are referred to as "savannas." The largest cultivated areas of this type occur in the Mark Pine Bay, Cattail Bay, and around Chadbourn.

Where cleared and drained this type is utilized almost exclusively for the production of corn. Around Chadbourn a small area is devoted to the production of strawberries. Corn yields range from 20 to 40 bushels per acre without the use of fertilizer. It is stated that as much as 75 bushels per acre has been obtained without the use of fertilizer for the first two or three years after the reclamation of the land.

Cleared land of the Portsmouth fine sandy loam is held at $30 to $50 an acre, while uncleared and undrained land can be bought for $3 to $15 an acre.

The Portsmouth fine sandy loam is inherently a strong soil, but artificial drainage and liming are necessary to bring it into cultivation. Deep breaking and thorough pulverization of the soil are decidedly beneficial.

PORTSMOUTH LOAM.

The Portsmouth loam consists of a dark-gray to black loam or heavy fine sandy loam, about 8 to 12 inches deep, underlain by a bluish-gray, heavy, sticky clay, sometimes showing brown or yellow mottlings in the lower part. Not infrequently there is a considerable quantity of fine to medium sand present. There are included with this type a few areas of Portsmouth fine sandy loam too small to show on the soil map, as well as small areas of Portsmouth clay loam, or a very heavy variation of the loam. The most important of these occur about 1 mile west of Pireway, 1 mile southwest of Reeves Ferry, and north and west of Dothan. In places in some of the largest areas of this type there is a surface covering of black organic matter closely resembling Muck and 10 or 12 inches deep.

The Portsmouth loam is one of the most extensive of the Portsmouth types, and is scattered throughout the county. It has its largest development in Simmons and Briery Bays, and also covers a large total area in the western part of the county, in Huggins, Big, Button, and Rough Horn Bays. A large strip extends from Pireway nearly to Dothan.

The Portsmouth loam occupies depressions, locally known as bays, swamps, and ponds. The topography is flat and natural drainage is poor. In places artificial drainage has been established by means of open ditches and canals.

Only a small proportion of the type is under cultivation, and that is used almost exclusively for the production of corn. Yields range ordinarily from 20 to 60 bushels per acre. On some of the better drained, heavier areas, however, as much as 80 bushels per acre has been obtained.

For the successful handling of the Portsmouth loam heavy draft stock is necessary, especially in the preparation of the seed bed. After the land has been thoroughly broken and disked, cultivation can be carried on by means of one-horse plows and sweeps. This is naturally a strong soil and as a rule corn is not fertilized.

The value of land of this type depends altogether upon its improvement. Uncleared and undrained areas can be bought for $3 to $10 an acre and reclaimed land for $3 to $30. Not much of the reclaimed land changes hands.

The greater part of this type requires artificial drainage and liming before it can be successfully cultivated.

HYDE LOAM.

The surface soil of the Hyde loam to a depth of 12 to 18 inches consists of a brownish to black loam, carrying a high percentage of organic matter. The subsoil is a black, sticky clay loam, passing into

a bluish, tough, sticky clay at an average depth of 30 inches. There are a few included areas of clay loam and silt loam too small to separate on the map. The Hyde loam is developed in small, widely separated areas in the eastern, southern, and western parts of the county. Bodies embracing about 1 square mile each occur 3 miles southeast of Honey Hill, 2 miles north of Wattsville, 4 miles southwest of Evergreen, and along the southern border of the Bolton drainage district northeast of Roberts School. The type occupies depressions or "bays," some of which resemble old lake basins. The topography is flat and drainage is poor. Water is invariably encountered within 3 feet of the surface and frequently the ground is saturated to the surface. A part of the type has been drained by means of open ditches, but owing to the small size and scattered occurrence of the areas in which it occurs the cost of draining the greater part of it is prohibitive.

It is estimated that about 5 per cent of the type is under cultivation. Corn, hay, and cotton are the principal crops. Ribbon cane, pumpkins, and various garden vegetables are also grown to a small extent.

This soil is naturally strong and productive and when first cleared it produces 40 to 60 bushels of corn per acre without the aid of fertilizer. Some areas which have been under cultivation for many years are still producing 25 bushels per acre without fertilizer. Cotton yields from one-half to one bale per acre. The value of land of the Hyde loam ranges from $10 to $40 an acre.

Litmus tests show that this soil is sour, and where artificial drainage is established liberal applications of lime will prove especially beneficial. In a few instances liberal applications of phosphoric acid have resulted in increasing the yield and in hastening the maturity of cotton.

MYATT FINE SANDY LOAM.

The Myatt fine sandy loam in its typical development consists of a dark-gray, heavy fine sandy loam, passing at about 6 to 10 inches into a gray fine sandy clay, frequently showing faint mottlings of yellow or brown. In a few places red mottlings appear in the lower part of the 3-foot section. At Juniper Creek Bridge the surface soil of this type to a depth of about 6 to 10 inches is a gray very fine sandy loam or fine sandy loam, underlain by a lighter gray loamy fine sand, which passes into a thin stratum of gray fine sandy clay. Between the mouth of Juniper Creek and Old Dock the greater part of the type consists of about 10 inches of a bluish-gray or black, heavy fine sandy loam carrying a considerable quantity of coarse quartz sand, underlain by a gray or drab, tough, plastic clay, mottled yellow and brown. There are included with the Myatt fine sandy loam a few spots of Myatt sandy loam and coarse sandy loam and

of Kalmia fine sandy loam. The last-named type consists of a gray or yellowish-gray loamy fine sand, underlain by a yellow, friable fine sandy clay. The largest area occurs near the confluence of Juniper Creek and Waccamaw River.

The Myatt fine sandy loam is a terrace soil of small extent occurring along nearly all the larger streams of the county, except the Cape Fear River. The largest areas are encountered near the confluence of Waccamaw River and Juniper Creek, on the east side of White Marsh, 3 miles northeast of Whiteville, and on the west side of this stream about 2 miles south of the Baden County line. A smaller area lies 2½ miles northwest of Kings Bridge on Waccamaw River and a narrow strip southwest of Fair Bluff, on Lumber River. The topography is nearly flat, there being only a slight gradient toward the streams along which the type occurs. When the streams are at their normal level surface drainage is fair, but practically the whole of the type is subject to inundation by every freshet. Underdrainage has been established in places by means of open ditches.

Only about 300 or 400 acres of the Myatt fine sandy loam are under cultivation, and nearly all of this lies directly east of Old Dock. Only the heavier textured soil is considered available for agriculture, even if the type as a whole were reclaimed by drainage. The principal crop is corn, to which the soil is very well suited. A little cotton is also grown. Corn yields from 25 to 60 bushels per acre. The value of land of this type ranges from $3 to $30 an acre.

LEAF FINE SANDY LOAM.

The surface soil of the Leaf fine sandy loam is a gray to dark-gray fine sandy loam having a depth of about 6 to 10 inches. The subsoil is a gray fine sandy clay, passing at 20 to 24 inches into a bluish-gray, tough, plastic clay, mottled with bright red. In spots the fine sandy clay subsoil extends to a depth of 36 inches. Spots of Kalmia fine sandy loam too small to map separately are encountered throughout this type, occupying knolls and ridges. In such areas the surface soil is a gray or yellowish-gray fine sandy loam, passing into a yellow fine sandy clay at an average depth of about 18 inches.

The Leaf fine sandy loam is a second-bottom soil occurring chiefly in the lowlands of Waccamaw River in the vicinity of New Britton Bridge and along Gapway Swamp, in the western part of the county. An area nearly a square mile in extent lies immediately north of West Prong Church. A number of small areas lie along the northern side of Seven Creeks, west of Reeves. The topography is nearly flat, and both surface and underdrainage are poorly established. The type lies at an average elevation of about 6 to 10 feet above

the normal level of the stream, and the greater part of it is subject to inundation at every high stage of water.

Owing to its poor drainage none of this type is used for the production of crops. The greater part of it lies in the section of the county which is not covered by the stock law, and stock ranges at will upon it. The forest growth consists of shortleaf pine, gum, and hardwoods.

The value of land of this type occurring along Waccamaw River ranges from $3 to $5 an acre. Near West Prong Church it is worth more.

By straightening and deepening the channel of Waccamaw River a large acreage of this type could be reclaimed and made into valuable agricultural land.

OCHLOCKONEE LOAM.

The Ochlockonee loam where typically developed consists of a dark-brown loam 8 to 10 inches deep, passing gradually into a grayish-brown, sticky clay, which extends to a depth of 36 inches or more. In texture and color this type is somewhat varied. In many places the surface soil to a depth of 6 to 10 inches is a dark-gray, medium to fine sandy loam, underlain by a gray or drab fine sandy clay with yellow or brown mottlings. In other places the surface soil consists of 8 to 14 inches of Muck. Along a few of the streams strips of a dark-gray to black clay loam are included in the type.

The Ochlockonee loam occupies the first bottoms of many of the streams. The largest areas occur along White Marsh as far south as the Atlantic Coast Line Railroad, and along Friar, Slap, Bogue, Porter, Dunn, Grissett, Gum, Beaverdam, and Monie Swamps, and Seven Creeks. The topography is flat and the greater part of the type is covered with water for long periods. It is overflowed by every freshet. None of the type has been reclaimed. Some areas are forested with cypress, juniper, black gum, tupelo gum, and water oak, with an undergrowth consisting of a variety of water-loving briers, shrubs, ferns, and mosses.

Nearly all the heavier portions of this type are very fertile, and if drained they would constitute some of the most valuable land of the county. At present the value of the type depends upon its forest growth.

JOHNSTON LOAM.

The Johnston loam consists of a chocolate-brown to black, heavy loam from 10 to 18 inches deep, underlain by a brownish-gray to black, sticky, silty clay. In Dans Creek bottom the subsoil of this type is underlain at a depth of 30 inches to 5 feet by marl beds.

This type occupies the first bottoms of streams, and all of it is subject to frequent overflows. The subsoil is saturated with water

throughout the year, and in places the surface is covered with water during the greater part of the year. A part of the type along Dans Creek has been reclaimed and is used for the production of corn. Yields range from 40 to 60 bushels per acre. If reclaimed, the entire type would be a valuable soil for the production of corn, oats, and many other crops.

The price of land of this type is dependent upon that of the adjoining upland soils.

CONGAREE SILT LOAM.

The Congaree silt loam consists of a chocolate-brown silt loam, from 8 to 15 inches deep, underlain by a compact silty clay or clay slightly lighter in color than the surface soil. Within this type there are a few streamlike depressions, locally called "sloughs," in which the soil is a silty clay loam or clay loam. Included with the Congaree silt loam are narrow ridges of Congaree fine sandy loam which were too small to be indicated on the map.

This type occurs only along the lowlands of the Cape Fear River, in the northeastern part of the county. The topography is nearly flat, there being only a gentle slope in the direction of stream flow. The type lies only a few feet above the normal level of the river and is subject to overflows during periods of high water. With the exception of the "sloughs," the type is well drained when the river is at its normal level.

This type is forested with ash, elm, sweet gum, water oak, holly, and cypress. None of it is under cultivation. A considerable proportion of the type is fenced and used as pasture land.

The price of land of this type depends upon that of the contiguous uplands, with which it is always sold.

Inherently the Congaree silt loam is a strong soil, and if reclaimed by dikes it would doubtless prove one of the most desirable soils of the county for the production of corn.

MUCK.

The material classed as Muck consists of vegetable matter which is fairly well decomposed and contains a high percentage of fine and very fine sand. It is uniformly black in color and ranges in depth from about 30 inches to 4 feet or more. The underlying material is a gray, sticky fine sand, locally known as "quicksand," or a light, sticky fine sandy clay of a gray or yellowish mottled color. In places a black, sticky fine sand occurs. Along the margins between the Muck and the other soils the surface material contains more sand and is much shallower than the typical areas.

Muck occurs in the southeastern part of the county on the eastern edge of Green Swamp. One large body and a few small spots are mapped.

The topography is prevailingly flat and level. Muck occupies the highest position of any of the mucky or peaty soils. Natural drainage has never been established throughout this material, but the canals which have recently been constructed will furnish ample outlets for lateral ditches, which will provide good drainage. The small hummocks or tufts distributed over the surface indicate that the Muck has been burned over in comparatively recent times. When this Muck is thoroughly drained and becomes dry it will burn out to the water table or to where the mineral matter predominates. It will be difficult to control the moisture supply.

The characteristic vegetation consists of bay pine—that is, small, gnarly pine trees having scraggy tops. There is a dense undergrowth of bay bushes and gallberry, with some ivy and huckleberry, all of which are interspersed with bamboo briers.

Throughout eastern North Carolina this material is generally recognized as "bay land" and is considered low in agricultural value. It is in all probability the least productive of the soils lying within the drainage district.

It would be difficult to state the value of this Muck in Columbus County, but in some of the adjoining counties land of this character can be purchased at a few dollars an acre.

Muck, shallow phase.—Muck, shallow phase, consists of a brown muck or black, mucky fine sand, 10 to 20 inches deep, underlain by a gray or dark-gray, sticky fine sand. In places the muck or mucky fine sand extends to a depth of 30 to 36 inches. In some places the subsoil at any depth between 20 inches and 3 feet is very incoherent and is called "quicksand." Thin layers of gray fine sandy clay are encountered occasionally at depths of 20 inches to 5 feet.

This soil is typically developed on the west side of the Waccamaw Lumber Co. Railroad between Lake Waccamaw and Juniper Creek, and also 8 miles southeast of Bolton, in the eastern part of the Green Swamp. An area of considerable size occurs north of the Atlantic Coast Line Railroad 2½ miles east of Bolton. The topography is flat, or nearly so, and natural drainage is poorly established. Some of the areas occupy depressions locally called "bays" and remain saturated throughout the year, except in excessively dry seasons. In these bays the water is perfectly stagnant, but in other places it flows sluggishly around on the surface and eventually reaches a drainage channel. Some of this soil lies within the Bolton drainage district or the Columbus drainage district No. 2 and is reached by canals.

None of this phase is under cultivation. It supports a scrubby growth of bay pines, together with a dense undergrowth of bamboo briers, bay bushes, gallberry, hardwood, shrubs, ferns, and mosses.

Outside the drainage district this land can be bought for $3 to $10 an acre.

PEATY MUCK.

Peaty muck consists of more or less thoroughly decomposed vegetable matter, mixed with a small percentage of mineral matter and varying in depth from about 3 to 8 feet or more. The color is prevailingly brown, although in places it is black. Except for the first few inches, the material is soft, smooth, and nonfibrous. Frequently at depths of 2 to 3 feet a brown or black muck is encountered. Underlying the peaty muck at varying depths between 3 and 8 feet there occurs a drab, bluish, brown or mottled yellow and gray, heavy, plastic clay or occasionally a fine sandy clay. Along the border of the Peaty muck the surface material becomes shallower, contains a greater admixture of mineral matter, and approaches a true muck or black loam in color and structure. The Peaty muck when exposed to the action of the atmosphere turns black on the surface and dries out hard, as was observed on the banks along the canals.

Peaty muck covers an area of 55.7 square miles in Columbus County. It is most extensively developed to the south and west of Bolton and to the southwest of Lake Waccamaw, along White Marsh and to the west of Crusoe Island.

The topography is uniformly flat. In places no definite stream channels have been established and the water meanders over the surface. All the Peaty muck areas remain in a saturated condition or are covered with water during the entire year. The areas lying within the drainage district to the south of Bolton will be drained by the canals. The material contains about 75 to 88 per cent of vegetable matter. Experiments have shown that similar material shrinks and settles to an astonishing degree where cultivated for a few years.

All the Peaty muck now supports a magnificent growth of merchantable timber. This consists principally of cypress and gum, although maple and ash are conspicuous here and there. A rather thick undergrowth of bay bushes, myrtle, bamboo briers, and other aquatic plants covers the surface. The cost of clearing such land and restoring it to a condition suitable for cultivation is exceedingly high.

None of this land has been reclaimed or cultivated. Comparing it, however, with other areas in the south, it is reasonable to assume that fair yields of cabbage, celery, onions, and Irish potatoes may be obtained. Corn will probably give a satisfactory yield for one or two years.

Peaty muck, shallow phase.—Peaty muck, shallow phase, to a depth of 18 to 24 inches consists of a black, mucky material carrying approximately 65 to 85 per cent of decayed vegetable matter. At an average depth of about 20 inches this material grades into a black, compact loam and this in turn passes into a gray or drab, sticky fine sand which extends to a depth of 3 to 5 feet.

Peaty muck, shallow phase, is inextensive, being confined to an area of 1.2 square miles lying 2½ miles southeast of Bolton. The topography is nearly flat and natural drainage is not developed. The phase lies within the Columbus Drainage District No. 2 and is traversed by one of the drainage canals, which affords an adequate outlet for lateral ditches.

Peaty muck, shallow phase, supports a forest growth of cypress, juniper, black gum, maple, and shortleaf pine, together with an undergrowth of vines and shrubs. The merchantable timber is being removed. None of this phase is used for crop production.

Since the establishment of the drainage district this land has been held at $30 an acre, according to local information.

SWAMP.

The material mapped as Swamp is so variable in character that it can not be separated into soil types. The surface soil of the greater part of it ranges in texture from a fine sandy loam to a coarse sand and in color from gray to black. The subsoil ranges from a bluish-gray, brown or black, plastic silty clay, through a gray, medium to fine sandy loam to a white coarse sand. Many spots of Johnston loam are included in Swamp, and so-called "islands" consisting of Kalmia and Myatt material alternate with lower lying "sloughs."

Swamp is encountered only in the first bottoms of Lumber River. The topography is prevailingly flat, there being only a gentle slope in the direction of stream flow. Over small areas there is a hummocky surface. All the Swamp is subject to frequent overflows, and a considerable proportion of it is covered with water during the greater part of the year. The "islands" are the last areas to be reached by high water.

In its present condition Swamp is valuable only for its timber and as a range for cattle and hogs. It is possible to reclaim this soil by straightening, broadening, and deepening the river channel, but this can be done only at great expense. If this were done, some areas would be especially valuable for the production of corn and oats.

SUMMARY.

Columbus County, embracing an area of 910 square miles, or 582,400 acres, is situated in the southeastern part of North Carolina.

The topography of the county varies from flat to gently rolling. Large areas in the southeastern part of the county are flat and poorly drained. The more rolling and better drained sections lie north of Whiteville and in the eastern part of the county. Drainage is effected through the Cape Fear, Lumber, and Waccamaw Rivers.

The census of 1910 gives the population of the county as 28,020, or about 30 persons per square mile. Whiteville, with a population of about 1,400, is the largest town and the county seat. Chadbourn, with a population of about 1,200, is an important strawberry-shipping point. There are many smaller towns throughout the county.

Columbus County is traversed by the Atlantic Coast Line Railroad and the Seaboard Air Line Railway, and also by two logging roads of the Waccamaw Lumber Co. and Whiteville Lumber Co.

Climatic conditions are favorable for general farming and trucking. The winters are short and comparatively mild. The mean annual temperature is about 63° F.

Corn is the first and cotton the second crop in point of acreage. Strawberries are grown on an extensive scale in the vicinity of Chadbourn, Tabor, and Whiteville. Around Fair Bluff, Tabor, and Whiteville tobacco is an important money crop. Truck crops of secondary importance are Irish potatoes, snap beans, cucumbers, and lettuce.

Commercial fertilizers are extensively used for all crops except corn.

The soils of Columbus County are varied in their origin, texture, and structure. Most of them are derived from marine sediments and consist principally of fine sands, silts, and clays. There are, however, extensive areas of cumulose soils or deposits of more or less thoroughly decomposed vegetable matter. In texture the soils range from coarse and medium sands to clay loams and in structure from loose, incoherent material to tough, plastic clay. A wide difference exists in drainage conditions. Some of the soils are well drained; others are permanently wet. The prevailing soils in the northwestern and extreme eastern parts of the county are light fine sandy loams, with yellow fine sandy clay subsoils. Such soils are very well suited to the production of cotton, bright tobacco, peanuts, and early truck crops. The heavier and darker colored soils in the southern part of the county are best adapted to the production of corn, strawberries, cabbage, and onions.

Columbus County contains large areas of cheap undeveloped land suitable for diversified farming.

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