Issued March 7, 1914.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS—MILTON WHITNEY, Chief.

SOIL SURVEY OF BARNWELL COUNTY, SOUTH CAROLINA.

BY

WILLIAM T. CARTER, JR., RISDEN T. ALLEN,
J. E. LAPHAM, FLOYD S. BUCHER,
AND J. H. AGEE.

HUGH H. BENNETT, INSPECTOR IN CHARGE SOUTHERN DIVISION.

[Advance Sheets—Field Operations of the Bureau of Soils, 1912.]

WASHINGTON:
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1914.

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., July 22, 1913.

SIR: In the extension of the soil survey in the State of South Carolina during the field season of 1912 work was undertaken in Barnwell County.

I have the honor to transmit herewith the manuscript report and map covering this work and to request their publication as advance sheets of Field Operations of the Bureau of Soils for 1912, as authorized by law.

Very respectfully,

MILTON WHITNEY,
Chief of Bureau.

Hon. D. F. HOUSTON,
Secretary of Agriculture.

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SOIL SURVEY OF BARNWELL COUNTY, SOUTH CAROLINA.

By WILLIAM T. CARTER, Jr., RISDEN T. ALLEN, J. E. LAPHAM, FLOYD S. BUCHER, and J. H. AGEE.

DESCRIPTION OF THE AREA.

Barnwell County is one of the southwestern border counties of South Carolina and has an area of 874 square miles or 559,360 acres. It is bounded on the north by Aiken and Orangeburg Counties; on the east by Bamberg; on the south by Hampton; and on the west by the Savannah River, which separates it from Screven and Burke Counties, Ga. Barnwell, the county seat, is situated near the center of the county. It is about 50 miles by rail from Augusta and 90 miles from Savannah and Charleston.

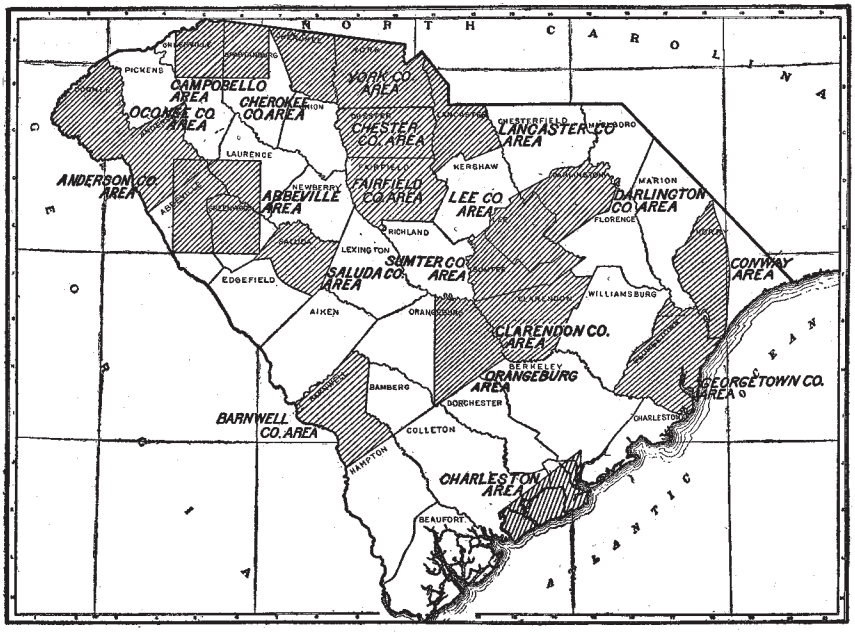

FIG. 1.—Sketch map showing areas surveyed in South Carolina.

All of the area lies within the Atlantic Coastal Plain, a flat or more or less eroded, undulating to rolling belt of country extending along the Atlantic seaboard. Pine and oak constitute the prevailing forest growth. The elevation is a few hundred feet above sea level.

The general surface configuration of the uplands is gently undulating to rolling. In some places extensive nearly level to gently undulating areas occur, while in others the surface is decidedly rolling.

The county as a whole is much dissected by stream courses. On the divides or interstream areas the surface is undulating and rolling. It becomes usually more rolling downstream. The larger streams have valleys ranging in depth from about 25 to 75 feet. The slopes are usually so regular and gentle that they may be cultivated easily.

Throughout the interstream areas of the upland occasional low depressions occur. As a rule these are poorly drained and contain more or less water throughout the year, particularly after heavy rains. Such areas often constitute the heads of the small streams which combine to make up the larger streams of the county. Extensive areas of deep sand having a level to undulating surface are found in the northern and eastern parts of the county. In the northwestern part there are comparatively rough areas due to deeply cut creek valleys which give a hilly appearance to the surface, but the topography is not such as to make cultivation impracticable.

Near the Savannah River bottoms in the northwestern part of the county a level terrace formation 2 or 3 miles wide is encountered which narrows toward the southeast, continuing along the river bottom throughout the county. It is more or less broken in places by the higher lands near the bottom. This terrace is flat, but for the most part has fair drainage. It lies from 10 to 30 feet above flood level or the bottom lands. Its boundary is clearly marked by a distinct bluff or abrupt rise. In places it is fairly well defined against the rolling uplands by a sloping or rather steep escarpment.

The general slope of the surface of the county is from northwest to southeast.

The drainage waters of the area are carried out of the county by the Savannah, Big Salkehatchie, and South Fork of the Edisto Rivers and Coosawhatchie Creek. The general direction of all the major streams is southeasterly.

The Savannah River is the most important drainage way of the county, and for a distance of nearly 50 miles forms its southwestern boundary. With its tributaries it drains most of the western and central parts of the area.

The Big Salkehatchie River is formed by the confluence of Buck and Rosemary Creeks, and marks the eastern boundary of the area for a distance of some 15 miles. Its principal tributaries are Turkey, Toby, Hercules, and Hurricane Creeks.

The South Fork of the Edisto River forms the northeastern boundary of the county and drains a considerable part of that section of the survey. It is fed by a number of tributaries. The head waters of Coosawhatchie Creek drain the central part of the county.

All of the rivers and creeks have carved out valleys with stream bottoms ranging from 100 feet to half a mile in width, depending upon the size and length of the streams. These bottoms are poorly drained and swampy throughout the year.

The streams which drain the county flow at all seasons, being fed by seepage waters and springs. The large areas of deep, loose, sandy soils have few streams flowing through them, but many small streams carrying mainly seepage water follow along the edges of these sandy areas. The stream bottoms are all swampy and covered with a heavy growth of forest, with a dense undergrowth of water-loving plants. The trees are mainly gum, tupelo, cypress, shortleaf pine, and water oak.

The county has a population of 34,209, of which 9,561 are white and 24,648 colored. The interests of the county are almost entirely agricultural, there being only about 5,000 people living in the small towns. The only manufacturing interests are two oil mills, one located at Allendale and one at Barnwell, and a number of sawmills scattered through the county. There are a great many cotton gins and small mills for grinding corn, but these are operated only at certain seasons.

According to the last census Allendale had a population of 1,453. Barnwell, the county seat, had a population of 1,324, and Blackville, in the northeastern part of the area, 1,278. Williston and Fairfax are smaller towns.

A number of important railroad lines traverse the county, offering good transportation facilities. There are sections 10 miles or more from railroads, but throughout the greater part of the county the distance to railroads is much less. As a rule the most thickly settled sections are those adjacent to railroads. The Charleston & Western Carolina Railway traverses the western part of the county, passing through the towns of Allendale and Fairfax. The Southern Railway has two lines in the area, the main line extending from Savannah northward, passing through Allendale, Barnwell, and Blackville. Another line extends from Charleston through the towns of Blackville, Elko, and Williston. The Seaboard Air Line crosses the extreme southeastern corner of the county. The Atlantic Coast Line touches Barnwell, Snelling, and Dunbarton. A number of villages and shipping points are located along these roads.

There are a large number of public roads throughout the county and considerable attention has been given to improving some of them. During periods of wet weather, however, many of them are in such poor condition that travel is difficult.

There are many churches and schoolhouses throughout the county and practically all the rural districts are reached by rural free delivery mail service.

The local markets utilize only a small part of the farm products. Truck is shipped to the larger northern markets going to Washington, New York, Boston, Philadelphia, Pittsburgh, Cincinnati and other points. Columbia, Augusta, Charleston, and Savannah are but a few hours distant from points in Barnwell County and are the leading markets for the cotton.

CLIMATE.

Barnwell County lies entirely within the region of mild winters and long, warm summers. The mean winter temperature is 46° F. with a minimum of 3° F. Every winter has a few days of cold weather and some ice. Sometimes these cold spells are frequent, but snow is seldom seen. The central part of the county is about 80 miles from the seacoast, and the winter cold is modified by the ocean influence though rather high humidity makes the cold disagreeable.

The summers are hot, but the heat is also modified to some extent by breezes from the seacoast. The mean summer temperature is 81° F., the maximum being 104° F.

The average date of the first killing frost in the fall is November 17 and the last in spring is March 13. Thus the growing season is long, extending over a period of eight months and giving ample time for the maturing of a wide variety of staple and special crops.

The annual precipitation is about 48 inches, with a fairly even distribution through the year, the heaviest rainfall occurring during June, July, and August. There is a considerable range in precipitation between the driest and wettest years. The climate is well suited to the production of many kinds of early truck crops.

The following table gives the normal monthly, seasonal, and annual temperature and precipitation at Blackville, in the northeastern part of the county:

Normal monthly, seasonal, and annual temperature and precipitation at Blackville.

Month.	Temperature.			Precipitation.			
	Mean	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.	Snow, average depth.
	°F.	°F.	°F.	Inches.	Inches.	Inches.	Inches.
December	46	80	14	3.7	4.7	2.6	0.1
January	46	80	12	3.1	2.4	5.0	0.2
February	46	79	3	5.0	8.3	6.5	0.1
Winter	46	.....	.....	11.8	15.4	14.1	0.4
March	57	91	19	3.7	1.6	2.0	Trace.
April	62	95	29	3.5	2.1	2.4	.....
May	73	102	42	3.7	1.5	1.7	.....
Spring	64	.....	.....	10.9	5.2	6.1	Trace.
June	80	103	42	5.5	5.6	8.6	.....
July	82	105	57	5.2	6.7	3.4	.....
August	80	104	54	5.9	2.7	7.9	.....
Summer	81	.....	.....	16.6	15.0	19.9	.....
September	75	100	42	4.0	1.1	2.5	.....
October	64	95	30	3.1	0.4	9.6	.....
November	56	85	19	2.0	1.4	2.5	.....
Fall	65	.....	.....	9.1	2.9	14.6	.....
Year	64	105	3	48.4	38.5	54.7	0.4

AGRICULTURE.

The area was originally covered with a heavy growth of longleaf pine and several varieties of oak. The low-lying swampy areas along the streams were grown up to gum, shortleaf pine, and water oak. About 1850 a railroad was built from Charleston to Augusta and lumbering and turpentining were carried on extensively for many years until much of the timber was removed.

The county was settled before the Revolutionary War by pioneers from Virginia and other of the older English Colonies, and the present inhabitants are mainly their descendants. The early settlers grew only sufficient crops for their own use but shipped some live stock on the hoof to outside markets, principally those along the Atlantic seaboard.

Cotton did not become an important crop until the advent of the railroad in 1850, the principal crops up to that time being corn, oats, wheat, and sweet potatoes, grown for home consumption. The acreage devoted to agriculture has constantly increased until now a large proportion of the arable land of the area is in cultivation. In 1910 the improved land in farms amounted to 260,596 acres, or more than one-half the total acreage of the county. Cotton is the money crop, while corn, oats, cowpeas, sorghum, and rye are grown to feed the work stock.

Short-staple cotton is grown entirely, the Toole and Peterkin varieties being most generally planted. In 1899, as reported by the census of 1900, 35,973 bales of cotton were grown on 83,499 acres, and the same authority in 1910 reports 98,376 acres, with a production of 47,978 bales, an average yield for the county of slightly less than one-half bale per acre.

The crop is planted from April 1 to May 1 on beds usually $3\frac{1}{2}$ to 4 feet apart. The stalks are thinned down to 15 to 18 inches apart in the rows, by chopping out the intervening plants with hoes. Several cultivations are given the growing plants with plows and cultivators, and they are also hoed about three times.

The acreage in corn is considerably less than that in cotton, the census of 1910 reporting 70,157 acres devoted to this crop, yielding 766,621 bushels, an average of about 11 bushels per acre. Only enough corn is produced for feed for stock and to provide meal for family use. Often, however, the supply is not sufficient to meet the home demand and importations are necessary.

In preparing corn ground the land is sometimes "flat broken" to a depth of about 4 or 5 inches and then ridged up into beds about 5 feet apart. The seed is planted in hills from 18 to 20 inches apart. Corn is also planted in the "water furrow" and the soil gradually

worked to the plants with subsequent cultivation. With this method the cultivation is more nearly level. Planting usually takes place from March 1 to May 1, depending on the season. When the crop is laid by, cowpeas are often sown between the rows, to be cut later for hay or plowed under in the fall.

Oats are grown quite extensively, though individual fields are not large. There were 9,193 acres planted in 1909, producing 176,438 bushels. The acreage devoted to oats has been increasing during the last few years. Formerly they were cut and fed green to the stock, but now some farmers are thrashing them. They are sometimes pastured during the early spring and late winter. The average yield is about 20 bushels per acre, but some farmers have obtained as much as 40 to 60 bushels in good seasons on the better soils.

The crop is usually sown in the fall, the seed being broadcasted and the fertilizer drilled in. They are harvested ordinarily from May 20 to June 10. In many cases cowpeas are sown after oats and cut for hay.

Practically no wheat is grown now, though formerly a little was produced. The yield was not large and the crop was unprofitable, as the soils are not well adapted to it.

Many farmers grow a small patch of rye for winter and spring pasturage and find it a valuable crop.

Cowpeas are grown extensively, the vines being cut for hay or plowed under to improve the land. Velvet beans are also grown but they do not fruit well.

Peanuts in small patches are grown for home use, most of the soils being well adapted to this crop. Sweet potatoes do well, but are grown only in a limited way for local consumption.

Small areas of sugar cane, many of them not exceeding an acre, are planted by many of the farmers. The sirup is made on the farm and there is a surplus for sale. A profitable extension of this industry is possible. Small areas of sorghum are grown, generally for stock feed.

Some pecans are grown, though as yet only very small groves have been planted. The soils and climate are well adapted to this nut. Fig trees of considerable size and Scuppernong grape vines are found on many farms. Some apples and pears are grown but the trees suffer somewhat from blight. Peaches do well but there are few orchards of any considerable size in the county. Wild blackberries and dewberries grow in abundance. Strawberries grow well but are produced only for home use and by few farmers.

Some improvement in cultural methods has taken place in the last few years, though many still adhere to the old methods. Improved farm implements have been introduced and their use is extending. Most of the land is still plowed with small one-horse plows. Level

or nearly level cultivation, flat-breaking the fields before bedding or furrowing for the crops, is coming to be a general practice. Little contour cultivation is necessary owing to the gentle slopes, though it is sometimes done on the steeper slopes.

Fertilizers are used on all crops to some extent, cotton receiving the heaviest applications. Besides the fertilizer used at time of planting, cotton, corn, oats, and truck crops are given later applications during their growth, consisting usually of 100 to 200 pounds per acre of nitrate of soda. The fertilizers are of various formulas. Many use mixtures of phosphoric acid, nitrogen, and potash analyzing from 8–2–2 to 8–4–4 for the general farm crops. Higher grades are used for the truck crops.

Barnyard manure, compost, cotton seed, and cottonseed meal are used in conjunction with other fertilizers by a great many farmers. But little barnyard manure is made on the farm, although where available it is saved and applied to the fields. Many of the larger farmers mix their own fertilizers. A considerable saving results from this practice, which is growing steadily among those who can afford to buy the material in large quantities.

The quantity of fertilizer used varies considerably. For cotton 200 or 300 pounds per acre is the ordinary application, though some planters use as high as 500 pounds per acre. For corn 500 pounds per acre is not considered excessive in some cases, though much less is generally applied. Sugar cane is fertilized heavily, though no kainit is used for this crop, as it is said to affect the quality of the sirup.

The quantity of fertilizer used is increasing. The expenditure for this purpose in the area for 1909, as reported by the census of 1910, was $643,800 as compared with $177,540 in 1900.

Seed selection has received little attention except in case of cotton. More care in this respect would doubtless increase the yields. Where practiced on the farm it would doubtless develop strains or varieties especially suited to local conditions and soils and give better results than where seed is bought in other sections in which the soil and climatic environment may differ from local conditions.

A few cattle and hogs are found on every farm. The cattle are grown to supply milk solely. There are not enough hogs raised in the county to supply the local demand, though some of the larger farmers fence pastures and raise a few for market. The greater part of the land is not fenced, as there is now a law to prohibit stock running at large.

The work stock consists almost entirely of mules, which are best suited for farm work in this region. Some horses and a few oxen are also utilized as draft animals.

Crop rotation is not practiced extensively, though many of the farmers recognize its importance. Cotton, the important crop, is

often grown on the same piece of land continuously for a number of years. This has resulted in a general decline in the natural productiveness of the soil, yields being maintained by the increased use of fertilizers. Some of the progressive farmers alternate cotton with corn or oats, and a few follow a rotation consisting of oats, cowpeas cotton, and corn. After the oats are harvested cowpeas are sown on the stubble. In the fall the cowpeas are harvested and hay made from the vines. The following spring cotton is planted, followed the next year by corn. Cowpeas are also sown in the corn at the time of laying by for the summer, the vines being plowed under after the peas are picked in the fall. This gives a three-year rotation, with cowpeas as a catch crop for two years. It improves the land greatly, and while better systems of rotation may be worked out, this proves fairly satisfactory under existing conditions. The soil is greatly in need of organic matter, and by turning under cowpea vines or other vegetable matter this could be easily supplied.

A systematic rotation would improve the soils and insure larger yields without the use of such large quantities of commercial fertilizer and also serve to diversify the farming and make the planter less dependent on one crop than is now the case. A great many of the planters realize this and are developing some system along the line suggested, although cotton will doubtless continue to be the main money crop for some years.

Variations in the crop adaptation of the different types is generally recognized, though practically the same crops are produced on all the soils of the area.

Cotton ordinarily does best where clay comes within 12 or 18 inches of the surface, though other soils may give better results under certain seasonal conditions. The crop on the shallow soils suffers most during very dry seasons. The Tifton coarse sandy loam and Tifton sandy loam seem to be best adapted to cotton, with Norfolk sandy loam ranking next.

Corn also does best on soils where the clay subsoil is found at a depth of about 12 to 18 inches from the surface. The best corn soils, the Portsmouth silty clay loam and sandy loam, are practically uncultivated. Drainage is necessary before these soils can be used for crops.

Oats if fertilized do well on the sandy loams of the Norfolk, Tifton, and Orangeburg series, but the crop seems to attain its best growth along the margins of the dark Portsmouth soils where natural drainage is fairly good. It is probable that the Portsmouth soils if well drained would produce exceptionally good yields of this crop. Sugar cane thrives on the sandy soils along low gentle slopes or in depressions where the soil is moist. This crop would yield heavily on the drained Portsmouth soils, although these types make a dark sirup of somewhat inferior quality.

The early truck crops give the better results on deep sandy soils, asparagus being best suited to the Norfolk, Kalmia, and Orangeburg sands and the sandy loams. For cucumbers the Coxville, Tifton, and Norfolk sandy loams are best, especially where they occupy low positions and are very moist. This crop also seems well adapted to drained Portsmouth soils. Cantaloupes do best on Orangeburg sandy loam, the quality being especially fine when produced on this type. The Tifton and Norfolk sandy loams are also well adapted to the crop. Watermelons do well on the light sandy soils.

The earliest truck crops can be obtained on the deep sands, but the yield and quality is somewhat better on the sandy loams. Most of the soils of Barnwell County are well suited either to the production of general farm crops or truck crops. The special adaptation of the individual types is brought out in more detail in subsequent pages.

The census of 1910 classed over half the land in farms in Barnwell County as improved. The farms vary greatly in size from small tracts of 40 acres to individual farms of several hundred acres. There are numerous holdings of several thousand acres, much of it improved. The greater part of the land is subdivided into what is called one-horse or one-plow farms and rented to tenants. These tenant farms vary from 20 to 30 acres in size.

According to the census or 1910 only 27 per cent of the farms are operated by the owners. The farms are rented to tenants, most of whom are negroes, and worked on shares. The general practice is for the owner to furnish the land, house, seed, and half the fertilizer used. The tenant and his family do all the work. The owner of the land takes one-half the crop as rent. Under this system the owner exercises supervision of the growing of the crop and often secures credit for the tenant through the year. Variations of this system are used in many cases, but this is the general practice. Sometimes the tenant furnishes the work stock, while again the landowner furnishes the work stock and the implements. Some labor is hired by the month, and many extra hands are hired during cotton chopping and picking time. Regular labor is paid $12 to $18 a month and board, while day labor is paid from 75 cents to $1. Chopping cotton (hoeing and thinning) is paid on an acreage basis and picking by weight, 100 pounds being the unit.

Land values in the county range from $5 or $10 an acre for the least desirable swampy land to $50 or $60 an acre for the best land. Little good land in the county is for sale. The development of the region has been gradual and land values have risen steadily, without speculation. Cotton farming has long been the dominant form of agriculture and will doubtless continue so, though the trucking industry has made rapid progress in sections along the railroads, and its extension over other areas near shipping points may be safely predicted.

TRUCK FARMING.

During the past few years trucking has become an important industry in certain parts of the area. At present it is being carried on most extensively in the northern part of the county along the Southern Railway. The principal crops grown are asparagus, cucumbers, cantaloupes, string beans, and watermelons. Asparagus is grown most extensively around Williston, Hattieville, Blackville, Elko, and Barnwell. It has been grown for a number of years with good success. It does best on a light sandy soil from 12 to 18 inches or more in depth. Yields range from 20 to 35 crates of 24 bunches per acre. The shipping season starts about March 1 and continues into May, April being the busiest month. The land is heavily fertilized with high-grade mixtures. Some use a fertilizer analyzing about 7–7–7, in applications of 1 ton to the acre, adding about one-half ton of kainit per acre when the land is laid by just before the asparagus begins to appear above the surface. This crop requires considerable labor and expense to prepare for market. Some farmers grow a crop of cotton between the rows of asparagus plants.

Cucumbers are grown most extensively around Blackville, though some are also grown around Williston, Elko, and Barnwell. This has proven a very profitable crop and is gathered in time to allow a crop of corn, cowpeas, or cotton to be grown on the same land. Marketing starts about May 25 and continues for 3 or 4 weeks. While yields of 200 or 300 one-bushel crates have been obtained, 150 crates per acre is considered a good average. Cucumbers do best on rather low, heavy, sandy soil, compact and moist. Areas of the Coxville loam, Coxville coarse sandy loam, and low-lying areas of Norfolk sandy loam produce the best cucumbers around Blackville. The crop is heavily fertilized, about 1,000 pounds of a 10–3–10 mixture being used by many, with a top dressing of 200 pounds of nitrate of soda after the vines begin to run. Nitrate of potash is also used, many farmers considering it better for a top dressing.

Large quantities of cantaloupes are shipped from Blackville, Williston, Elko, and Barnwell, and other parts of the county. The shipping season starts about June 25 and continues for about a month. Yields of 150 to 200 crates per acre are not unusual, but it is reported that the average for good marketable cantaloupes is about 75 standard crates per acre. A standard crate holds 45 cantaloupes. After the fruit is marketed the land may be sowed in cowpeas to make a hay crop in the fall. Cantaloupes do best on a rather heavy, sandy loam, underlain by clay, the Orangeburg sandy loam producing exceptionally fine fruit. The Tifton and Norfolk sandy loams also produce good yields. About 1,000 pounds of fertilizer, analyzing 10–3–10, and a top dressing of 100 pounds of nitrate of soda per acre are used.

Watermelons are grown in large quantities in many parts of the county and yield an average of one-half car of good marketable melons per acre. Shipping begins about July 4 and continues for several weeks. Watermelons do well on all the lighter sandy or sandy loam soils. The Eden and Watson varieties are the principal ones grown for shipping.

Beans are grown, but not so extensively as the other truck crops already mentioned. They yield about 75 bushels per acre and are shipped in 3-peck crates, the season beginning the middle of May and lasting about 3 weeks.

Some cabbage and Irish potatoes are grown, but these are not shipped in any considerable quantities.

The trucking industry has been growing steadily for a number of years and has proved quite profitable, especially with cucumbers, cantaloupes, and asparagus. The shipping season for truck here is said to be nearly as early as it is near the coast. The length of the season depends on prices, which in turn are governed by the arrival of shipments from more northern points. Trucking could be carried on much more extensively in this county with good results, as the climate and soils are well adapted to these vegetable crops. Lettuce, when handled expertly by experienced growers, could doubtless be grown successfully and profitably here. More attention might be given to this crop.

SOILS.

The soils of the area are all typical of the Atlantic Coastal Plain, more or less sandy on the surface and underlain at various depths by sandy clay. They have been formed by the weathering of unconsolidated sands and clays consisting of transported sedimentary materials, laid down as offshore deposits when the sea covered this region. These materials belong to several Coastal Plain formations, the materials of which were removed by erosion from the Piedmont Plateau.

According to the South Carolina geological survey,[1] Barnwell County is composed principally of deposits of the Pleistocene period represented by the Hampton clays and Columbia sands, with a small amount of the Cheraw cobbles. There are also Tertiary deposits in parts of the county consisting of marl and sands that are, so far as found in the field, not exposed to any extent on the surface.

The soils of the area may be grouped into the following divisions: The upland soils, which cover by far the greater proportion of the county; the first-bottom alluvial soils, consisting of material deposited upon flood plains of the streams; and the stream-terrace soils, comprising flat terraces bordering the Savannah River and representing

[1] Earle Sloan, Catalogue of the Mineral Localities of South Carolina.

material deposited by stream water or influenced by stream action at a time when the Savannah River was flowing at a higher level than at present.

The upland soils have all been derived from old sedimentary (Coastal Plain) material. The variation in the soils represents differences that existed in the original deposits at the time of emergence and those which have resulted subsequently through agencies of weathering and drainage.

The soils of the area have been grouped into series on the basis of origin, color, drainage condition, and structural characteristics. The series have been further separated into types as determined by the relative content of the various grades of sand, silt, and clay.

Seven soil series are represented in the Coastal Plain: The Orangeburg, Norfolk, Ruston, Coxville, Portsmouth, Tifton, and Scranton. These embrace 24 individual types ranging from coarse sand to fine sandy loam and loam.

The Norfolk series is characterized by the grayish color, loose structure, and sandy texture of the surface soils, and by the gray to yellow color, friable structure, and sand to sandy clay texture of the subsoils. The surface features of the soils of this series vary from undulating to gently rolling and drainage is well established.

The Tifton soils are similar in color and structural characteristics to the corresponding members of the Norfolk series. The essential difference between them is the presence in the Tifton of a conspicuous quantity of small reddish-brown iron concretions or pebbles.

The Orangeburg types are characterized by the grayish to brown color and loose structure of the surface soil, and by the conspicuous red color, friable structure, and loamy sand to sandy clay texture of the subsoils. The topography is gently rolling to undulating, and the drainage is well established. The coloring of the subsoils of this series is not perfectly understood, but may be the result of an advanced stage of oxidation in the iron constituents of the material, the result of the thorough drainage.

The Ruston series includes only one type and is an intermediate series between the Norfolk and Orangeburg soils. The subsoil of this series is a little too red for the Norfolk and not sufficiently so to justify its classification as the Orangeburg.

The Scranton types are characterized by their dark-gray to black color in the surface soil, and by the yellow color of the subsoil. The material of the soil portion is quite similar to that of the Portsmouth series, while that of the subsoil is almost identical with that of the Norfolk series. The Scranton soils seem to occupy an intermediate position in degree of weathering between the Norfolk and Portsmouth series.

FIG. 1.—SAVANNAH RIVER TERRACES, SHOWING LEVEL SURFACE IN FOREGROUND AND SLOPE BETWEEN TERRACES AND ROLLING UPLANDS IN BACKGROUND.

FIG. 2.—CUCUMBERS ON WELL-DRAINED SANDY UPLAND.

The Portsmouth soils are dark gray to black in the surface portion and light gray to mottled gray and yellow in the subsoil portion, which varies from sand to impervious sandy clay. These are the poorest drained soils of the uplands. They occupy depressions where moisture conditions have favored the accumulation of black organic matter in the surface soils and prevented oxidation in the subsoils.

The material of the Coxville series appears to represent deposits originally distinct from any other of the upland soils. The subsoil contains much more clay than that of any of the other upland types. These soils are grayish or dark gray in the surface portion, while the subsoil is a plastic fine sandy clay of a peculiar shade of yellow which quickly grades into heavy clay, mottled gray, yellow, yellowish red, and bright red. The types occupy low situations where drainage is only partially established.

The most recently formed soils of the region are found in the first bottoms of the streams, the material representing deposits laid down from overflow water. The soils are still in process of formation, each overflow leaving a thin mantle of material upon the surface. The wide strip of bottom along the Savannah River was largely mapped as Swamp, as so little weathering has taken place in the material that uniform soils, such as those of the uplands, have not been formed and, furthermore, because new material is constantly being added by overflows. The material of the Savannah River Swamp has been derived largely from the Piedmont Plateau. In the main the soil is silty clay intensely mottled with gray, blue, reddish yellow, and rusty brown. Sandy strata of variable thickness are frequently encountered at irregular depths through the soil section.

The material of the first bottoms has not yet had an opportunity to shape itself definitely into textural soil types. Along the Big Salkehatchie River and the South Fork of Edisto River and along the tributaries of the Savannah River the Swamp material is somewhat different in character and in origin to that of the Savannah River proper. It consists entirely of wash from Coastal Plain soils and, according to the classification of stream bottom soils, represents Ocklocknee material, whereas that of the Savannah River bottoms is made up of the Congaree material. The Swamp of the South Fork of Edisto River probably includes some Congaree material, but the most of it is washed from Coastal Plain soils and therefore consists of Ocklocknee material. This smaller stream phase of Swamp, consisting largely of Ocklocknee material, is of a darker color than the Savannah River Swamp material, and differs somewhat in its textural composition, as appears in the chapter on Swamp.

The Congaree fine sandy loam occurs in narrow strips along the outer margin of the Savannah River bottoms, lying several feet above the Swamp proper. It is subject to overflow, but not so extensively as the Swamp. It has better drainage between overflows than the latter, which if not always covered by water is kept in an almost permanently soggy condition.

The soils of the Savannah River terrace occupy a position in point of weathering between the most recent or first bottom soils and the upland soils, the oldest in the county. The topography of these terrace soils indicates that they were formerly overflowed by the Savannah River. They occupy a flat terrace or bench 25 to 30 or 40 feet above the overflow bottoms. The outer margin is marked by an abrupt rise to the uplands. The soils of this terrace are more like the Coastal Plain soils than the first bottom soils. Four soil series are found on this terrace, the Cahaba, Kalmia, Myatt, and Leaf. These include gravelly sandy loam, coarse sand, sand, coarse sandy loam, sandy loam, and fine sandy loam types.

The Cahaba soils are characterized by a brown to reddish-brown surface soil with reddish-brown to brown color and friable structure of the subsoils. In some areas the material is quite similar in color to that of the Orangeburg soils, such areas representing the most advanced stage in drainage and oxidation. Prevalently, however, these soils have more of a brownish or reddish-brown color and loamy structure, particularly in the surface portion, than the related Orangeburg series of the upland.

The Kalmia soils are related to the Cahaba series in their physical properties in much the same way as the Norfolk series of the Upland is related to the Orangeburg series, having gray surface soils and yellow friable subsoils. There is more gray mottling however in the subsoils of the Kalmia series than in the subsoils of the Norfolk series. The material of the Kalmia series has not weathered as completely as that of the Norfolk series and the water table lies nearer the surface.

The Myatt types are the poorest drained of the terrace soils. They are quite similar to the Portsmouth soils of the upland, occupying flat and slightly depressed situations, with dark-gray to black surface soils and gray or mottled gray and yellow, friable but impervious subsoils.

The Leaf soils are quite similar to the Coxville group. They have a brownish or grayish-brown surface soil and mottled gray, yellow and red plastic subsoils.

The following table gives the name and extent of each type mapped in the county:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Norfolk sand	138,880	24.8	Myatt sandy loam	2,176	0.4
Norfolk sandy loam	113,920	20.4	Kalmia fine sandy loam	1,728	.3
Swamp	72,192	12.9	Congaree fine sandy loam	1,600	.3
Norfolk coarse sandy loam	39,552	7.1	Norfolk gravelly sand	1,600	.3
Tifton coarse sandy loam	31,360	5.6	Coxville coarse sandy loam	1,536	.3
Norfolk coarse sand	29,056	5.2	Ruston coarse sand	1,280	.2
Tifton sandy loam	15,360	2.7	Leaf fine sandy loam	1,280	.2
Norfolk fine sand	15,168	2.7	Scranton sandy loam	1,216	.2
Norfolk fine sandy loam	14,592	2.6	Coxville sandy loam	1,216	.2
Kalmia sand	11,904	2.1	Portsmouth coarse sandy loam	1,152	.2
Orangeburg sandy loam	11,584	2.1	Orangeburg coarse sand	832	.2
Orangeburg sand	6,720	1.2	Kalmia gravelly sandy loam	640	.1
Kalmia coarse sand	5,888	1.1	Kalmia coarse sandy loam	640	.1
Portsmouth fine sandy loam	5,824	1.0	Cahaba sandy loam	576	.1
Portsmouth silty clay loam	5,696	1.0	Myatt sand	576	.1
Orangeburg coarse sandy loam	4,608	.8	Myatt coarse sandy loam	384	.1
Norfolk gravelly sandy loam	4,224	.8	Coxville loam	384	.1
Cahaba sand	3,840	.7	Myatt fine sandy loam	256	.1
Kalmia sandy loam	3,584	.6			
Portsmouth sandy loam	3,520	.6	Total	559,360	.....
Scranton fine sandy loam	2,816	.5			

NORFOLK GRAVELLY SAND.

The Norfolk gravelly sand consists of a coarse to medium sand the surface few inches of which are gray. Below this the color is yellow or pale yellow to a depth of 36 inches or more. Numerous small rounded quartz gravel are found throughout the soil mass.

This type is found in only a few small areas in the western part of the county not far from the Savannah River. These areas are widely scattered and the largest, slightly over a square mile in extent, is located just west of Lyndhurst.

The Norfolk gravelly sand is occasionally found on ridges and slopes where the finer material has been washed out by the surface waters. It has good drainage throughout and is a porous, leachy soil. The material consists of the coarser grades of Coastal Plain deposits.

The type is not a very good soil for agriculture, though such crops as watermelons and cantaloupes would do well. Cotton and corn give small yields. The soil is loose and porous and fertilizers leach out readily. Owing to its slight extent it is a very unimportant soil type.

NORFOLK GRAVELLY SANDY LOAM.

The surface soil of the Norfolk gravelly sandy loam consists of a loose sand to loamy sand from 18 to 30 inches deep, gray in the first

few inches and yellow or pale yellow in the lower portion. The subsoil to a depth of 36 inches is a yellow friable sandy clay. Throughout the soil and subsoil there are a large number of small waterworn quartz gravel.

Only a few small areas of this type are found, and these are in the western part of the county. They are widely scattered, occurring on ridges or slopes surrounded by the Tifton or Norfolk coarse sandy loam, or other Norfolk types. The areas occupying high and sloping positions are well drained throughout.

This type represents the coarser materials of the sandy mantle of the Coastal Plain, deposited by sedimentation from streams emptying into the sea which at one time covered the region. The agricultural value of this type is about the same as that of the Norfolk coarse sandy loam. The principal crops grown are cotton and corn. Owing to its small extent it is an unimportant type.

NORFOLK COARSE SAND.

The Norfolk coarse sand consists of a gray coarse sand from 4 to 8 inches deep, underlain to a depth of 36 inches or more by material of practically the same texture which grades from grayish yellow into yellow or pale yellow with depth. The bulk of the soil mass consists of coarse quartz fragments, sharp and angular, with considerable medium and some fine sand. Some small rounded quartz gravel is found in places throughout the soil. The texture is loose and incoherent and the content of organic matter low.

The type is not very extensive, though widely distributed in areas ranging in size up to several square miles. It occurs mainly throughout the western and northern part of the county in close association with other members of the Norfolk series.

The topography is undulating to gently rolling, with good surface and under drainage. The soil is rather loose and porous permitting a rapid downward percolation of moisture. The material is of marine origin, and probably represents the remnants of old shore lines or beaches.

The Norfolk coarse sand is a thin soil and is not considered very good farming land. It is adapted to the production of early truck, but is not utilized very extensively for that purpose. Some of the type is in cultivation, the crops grown being principally cotton and corn with small areas of sorghum and cowpeas. The cotton is fertilized and some barnyard manure, compost, and cotton seed are also used. Cotton yields vary from one-fourth to one-half bale per acre. Corn gives from 10 to 20 bushels per acre and fair yields of sorghum, sugar cane, and peas are obtained.

The forest growth consists of blackjack and other varieties of oak and some longleaf pine.

Much of this land is not cultivated and where utilized for cotton and corn the yields are low and generally unsatisfactory. The soil is deficient in humus, and responds readily to applications of manure and additions of organic matter. Cowpeas and other legumes when plowed under cause marked improvement in the soil. The type warms up quickly and with fertilization will produce early crops of all kinds of truck, especially cantaloupes, watermelons, asparagus, sweet potatoes, and beans. Land values range from $10 to $20 an acre depending on location and improvements.

NORFOLK SAND.

The surface soil of the Norfolk sand consists of a light-gray to light-brown medium sand grading into a pale yellowish color below the first few inches and varying in depth from 4 to 12 inches. The surface is usually slightly darkened by accumulations of organic matter. The subsoil consists of a yellow to pale-yellow sand similar in texture and structure to the surface soil and continuing to a depth of 36 inches or more. There is no well-defined line of demarcation between soil and subsoil. Occasionally the lower few inches of the 3-foot section is slightly sticky and very yellow, but generally the yellow clay which underlies all the Norfolk type lies at depths of several feet below the profile limit.

The Norfolk sand is derived from sand beds often 20 feet or more in depth but never less than 3 feet deep. The soil particles consist principally of quartz and the greater proportion of the sand is of medium texture. Structurally the type is loose and incoherent. When first cleared the small content of organic matter in the surface soil causes a slight coherency, but this soon disappears if organic matter is not supplied by turning under vegetation. Throughout large areas of the type, small depressions occur where organic matter has accumulated. Such areas are noticeable because of their darker color.

The Norfolk sand is an extensive soil type. Some very large areas are found in the northern and northeastern parts of the county and many smaller tracts are found east and northwest of Barnwell and just west of Williston.

Over the larger areas of the type the surface is gently undulating to nearly level. The smaller areas are undulating and gently rolling. The larger areas are found on divides and have few streams flowing through them, although many small streams fed by seepage waters from the sand beds find their source in these areas. Numerous small areas are found on the long and gentle slopes of the divides, some being too small to show on the map.

The type has good drainage owing to the porous structure of the soil mass, which allows water to pass readily downward. However,

the clay substratum is found at no great depth and this prevents the soil from drying out very deeply where the land is cultivated.

The Norfolk sand is sedimentary in origin and represents the deep superficial sandy covering of the Coastal Plain. Subsequent weathering has had slight effect on the material as laid down though wind and water action has somewhat changed the present topography in places where the surface is slightly rolling. Much of this original sandy covering has been removed by erosion.

The greater part of the type is under cultivation, especially in small areas where it is found in conjunction with better soils. The principal crops grown are cotton and corn with some sorghum, cowpeas, oats, rye, and sugar cane. Cotton is grown to good advantage with commercial fertilizers, the kind and quantity used varying considerably. Yields range from one-fourth to one-half bale per acre although as much as 1 bale per acre is sometimes reported. It is claimed that in seasons of light rainfall the yields of cotton are highest, probably owing to the fact that much of the fertilizer is leached out of the soil during seasons of considerable rainfall. Some compost, barnyard manure, cotton seed or cottonseed meal is also used in conjunction with commercial fertilizers. Applications of commercial fertilizer generally range from 200 to as much as 400 or 500 pounds per acre. A low-grade mixture analyzing 8–2–2 is the most popular.

Corn is grown to some extent, the yields ranging from 10 to 25 bushels per acre. This crop is not fertilized as generally as cotton, and it is possible to produce much higher yields with proper fertilization and soil management.

Rye is grown for winter pasture and oats for pasturage or for feeding to the stock. They are not thrashed, but fed green. The soil is not adapted to the production of a high yield of the small grains.

Sorghum is a good forage crop. Small patches of sugar cane are grown, yielding well when fertilized. The crops are made into sirup on the farm.

The Norfolk sand is a warm, well-drained soil, and is especially adapted to the production of early truck crops, with which heavy applications of commercial fertilizers should be used to secure the best results. But little of the type is used for trucking, as the greater part of it is not near the railroads, and even with shipping facilities convenient many prefer to grow cotton. The principal truck crops are asparagus, cantaloupes, and watermelons. Asparagus yields from 25 to 35 crates per acre, cantaloupes 75 to 150 crates or more, and watermelons one-half carload or more per acre. The type is also well adapted to sweet potatoes and other vegetables. Peaches, plums, and all kinds of berries do well on this soil.

The type is naturally deficient in organic matter, which should be added by turning under a crop of cowpeas or some other legume

which also would add nitrogen to the soil. This could also be done by liberal applications of barnyard manure, compost, and cottonseed meal.

The original forest growth consists of blackjack and other varieties of oak, longleaf pine, and hickory. The longleaf pine is not so abundant nor so large as on some other types. Blackjack oak is a characteristic growth.

Land values range from $10 to $20 an acre, depending upon location and improvement.

NORFOLK FINE SAND.

The surface soil of the Norfolk fine sand consists of a loose, incoherent, gray, grayish-yellow, or pale-yellow fine sand 4 to 8 inches deep. The subsoil is pale-yellow or yellow fine sand, which continues to a depth of 36 inches or more. A yellow clay is often found underlying the lower portion of the 3-foot section. The sand content of this soil is largely quartz, the grains being rather sharp and irregular or subangular in shape.

There are only a few small areas of this type in the county. Several of these are found in the southeastern part of the county and near Barnwell.

The topography is gently undulating, the type often forming nearly level upland areas. Surface drainage is usually good, except in case of occasional small depressions. Owing to its loose structure, subsurface drainage is thorough. Where the clay lies but 3 or 4 feet below the surface the leachy condition of the soil is not so pronounced and the moisture-holding capacity is good.

The native timber growth consists of blackjack oak, longleaf pine, and other vegetation similar to that found in the Norfolk sand.

The Norfolk fine sand is cultivated to some extent. Cotton, corn, sorghum, cowpea , and some of the truck crops, and sugar cane are grown. The type is especially adapted to such crops as asparagus, watermelons, cantaloupes, and beans for the early markets. Practically all the crops are fertilized with various commercial mixtures and with some barnyard manure and compost. The soil is especially in need of organic matter, which should be added by applications of barnyard manure, composted material, and by turning under cowpea vines or other vegetation.

The type is slightly more productive than the Norfolk sand. Corn yields ordinarily from 10 to 20 bushels and cotton one-fourth to one-half bale per acre with fertilization.

Land values range from $10 to $25 an acre, depending on location and improvements.

NORFOLK COARSE SANDY LOAM.

The surface soil of the Norfolk coarse sandy loam consists of a light-gray coarse sand, sometimes slightly loamy in texture, from 3 to 4 inches deep, and below this a grayish yellow coarse sand or loamy coarse sand, with a depth of about 14 to 24 inches. The subsoil consists of a yellow coarse sandy clay extending to a depth of 36 inches or more. Medium to fine sand is usually present in considerable quantity throughout the soil mass. The characteristic mottled red, yellow, and gray clay substratum is found at a depth of 3½ to 5 feet.

This type strongly resembles the Norfolk sandy loam, except that it is composed of coarser material. Cultivation is easy and the soil fairly productive. The type is found in areas of considerable size throughout the western part of the county, with some smaller tracts in the northern section of the area.

This soil is of sedimentary origin, formed partly by the washing out of the finer surface material of the slopes.

The topography is rolling to undulating, the type being found on slopes where it has been subjected to slight but not destructive erosion. It is well drained and the moisture holding capacity is rather low, except where the sandy clay subsoil comes near the surface. It has about the same agricultural value as the Norfolk sandy loam and is adapted to the production of practically the same crops. Cotton yields from one-third to three-fourths bale per acre and corn from 20 to 35 bushels. The same methods of fertilizing the crop are used as on the Norfolk sandy loam and other soils. Sorghum, oats, sugar cane, and cowpeas are grown in a small way by all the farmers. Some truck is produced. Asparagus, cucumbers, cantaloupes, and watermelons, to which the type is well adapted, are the more important of this class of products.

The soil is deficient in organic matter, which can be added by plowing under winter cover crops, such as rye or oats, or a legume, such as soy beans, cowpeas, or velvet beans. Applications of barnyard manure and compost are also of great help in building up the soil.

The native forest growth consists of longleaf pine and oak of different varieties. The type is valued at $20 to $35 an acre.

NORFOLK SANDY LOAM.

The surface soil of the Norfolk sandy loam varies in depth from 14 to 30 inches. The first 4 to 8 inches consists of a friable gray medium sand, and below this, pale yellow somewhat loamy sand. The subsoil is a yellow friable sandy clay extending to a depth of at least 3 feet. At a depth of 3 to 6 feet, usually about 4 feet, a mottled red, yellow, and gray compact sandy clay is reached. Occasionally on steep slopes this mottled clay has been brought near the surface by erosion, but such areas are not large.

The Norfolk sandy loam is widely distributed. It is found in all sections of the county in rather large areas being most extensively developed in the southern part. It occurs in close association with the Norfolk sand, and small areas of the latter type where too small to map were included.

The topography is gently undulating to gently rolling. Near the larger stream valleys the slopes are often occupied by the Norfolk sandy loam, the topography in places being rather steep, though generally the slope is long and gentle, with slight evidence of erosion. Some of the larger areas of the type are nearly level. Drainage as a whole is good. Occasional wet depressions having a darker surface owing to accumulations of organic matter, occur throughout the type. Such areas need ditching as water sometimes stands in them. Where the slopes are rather steep it is sometimes necessary to cultivate with the contour and occasionally to resort to terracing.

The Norfolk sandy loam is similar in origin to the other soils of the series. The native timber growth consists mainly of longleaf pine, red oak, white oak, and other varieties of hardwood.

The type is one of the most important soils of the county and is cultivated extensively. The loose, porous structure insures good drainage and aeration. It responds readily to fertilization and the heavy subsoil retains a good supply of moisture. Crops grow rapidly and under ordinary conditions of treatment good yields are obtained. Cotton and corn are most extensively grown though some truck is produced for market, consisting principally of asparagus, cucumbers, cantaloupes, beans, watermelons, and Irish potatoes. All crops except corn are fertilized. Mixtures ranging from 8–2–2 to 8–4–4 seem to be preferred, applications varying from 200 to 400 pounds per acre, the larger quantity being used in growing truck. Barnyard manure, compost, cotton seed, and cottonseed meal are also used in conjunction with commercial fertilizers. Cotton yields from one-third to one bale per acre, the average being about one-half bale. Corn gives from 15 to 35 bushels per acre. These yields can be greatly increased by the use of barnyard manure and other fertilizers, careful seed selection, and good cultivation. Some years ago in a test on a deep phase of this type where a 3-acre tract was well manured, fertilized, and carefully tended, slightly less than 140 bushels of corn per acre was produced. This was followed by cotton under the same careful management and 9 bales of cotton secured from the same tract. This case merely illustrates the possibilities of the soil under the best conditions. As a rule the soil needs a complete fertilizer, though it would be possible to do with less if the organic matter content was maintained, cowpeas, velvet beans, etc., were grown, barnyard manure and compost were liberally applied, and a systematic crop rotation followed.

Sorghum is grown and does well. Oats give good yields when fertilized, and during favorable seasons will produce as much as 40 or 50 bushels per acre. Sugar cane is grown in a small way and good yields of sirup obtained. In the northern part of the county where some truck is produced on the type with the aid of heavy application of commercial fertilizers, from 150 to 200 baskets of cucumbers, 75 to 200 crates of cantaloupes, and 20 to 35 crates of asparagus are produced per acre. Beans, cabbage, and Irish potatoes are also grown for shipment, the soil if fertilized being well adapted to these crops. Asparagus does best on the deep phase of the type.

Peaches, plums, pears, and other fruits grow well on this soil, though no fruit is produced on a commercial scale. Strawberries, blackberries, and other berries thrive. Lettuce would also doubtless prove a profitable crop.

Farms of this type are valued at $25 to $60 an acre, depending on location. Land near the towns is held at a much higher figure.

NORFOLK FINE SANDY LOAM.

The surface soil of the Norfolk fine sandy loam consists of about 15 to 30 inches of a loose fine sand, sometimes slightly loamy, but usually light and incoherent. The first 4 inches are light gray in color, while below this the material grades from pale yellow or yellowish gray to a yellow before the subsoil is reached. The subsoil to 36 inches or more is a yellow friable fine sandy clay. The substratum beginning at 3 to 6 feet is a mottled red, yellow and gray or drab, compact sandy clay. The soil is easily cultivated and can be improved readily.

The type is of limited extent in the county, although some small bodies are found north and east of Barnwell and east and south of Allendale. It is closely associated with the Norfolk sandy loam, and has practically the same characteristics and value as that soil, except for the finer texture of its surface soil.

It is largely undulating in topography, though some areas are nearly level. It has good drainage, but during continued rainy seasons the soil is sometimes very wet. Artificial drainage is not necessary for crop production.

The Norfolk fine sandy loam is sedimentary in origin, having been formed from the finer sands and clays of the Coastal Plain deposits.

Much of the type is in cultivation, the crops grown and yields being about the same as on the Norfolk sandy loam. However it is considered slightly more productive than the sandy loam.

The original forest growth consisted largely of longleaf pine and oak. Red oak, white oak, post oak and hickory are characteristic trees on this type, as on the sandy loam.

The principal crops are cotton, corn, oats, cowpeas, sorghum, and sugar cane. Cotton is grown with fertilizer, the yield varying from one-third to 1 bale per acre, depending on the season and methods of cultivation. Corn yields from 14 to 40 bushels per acre. Some compost, barnyard manure, and cotton seed or cottonseed meal are used also.

The soil is especially adapted to truck growing, though little is practiced at present. Applications of barnyard manure and compost and the turning under of green crops for the formation of humus would greatly improve the soil. The growing of cowpeas and velvet beans will prove beneficial, and especially so if the vines are turned under.

The type is valued at $25 to $40 an acre.

ORANGEBURG COARSE SAND.

The surface soil of the Orangeburg coarse sand consists of a gray to grayish-brown coarse sand, from 8 to 12 inches deep. The subsoil to a depth of 36 inches or more is composed of a red, coarse, loamy sand, sometimes slightly sticky at 24 to 36 inches and resting upon a red sandy clay at depths ranging from 3 to 10 feet. The soil is loose and incoherent and contains little organic matter. It is easily cultivated but is light and porous.

Very little of this type is found in Barnwell County. It occurs in small areas as low slopes adjacent to stream bottoms or as narrow bands along the foot of slopes of small valleys. The few areas mapped are widely separated in various parts of the county. One or two small areas are found in the vicinity of Meyers Mill in the western part of the county, while others occur in the northeastern part of the county.

Owing to its sloping position and loose, porous structure the type has good surface and under drainage.

The material has been formed through the weathering of the exposed reddish sands which underlie the superficial sands and clays of the region.[1]

The Orangeburg coarse sand is found in close association with the Norfolk sand, coarse sand, and sandy loam, and is cultivated in connection with these types. It is adapted to the production of truck crops such as watermelons, cantaloupes, beans, peas, asparagus, etc. Cotton and corn are about the only crops grown. With fertilization the soil yields from one-fourth to one-half bale of cotton and 10 to 20 bushels of corn per acre. It is not an important type, owing to its small extent.

[1] These sands probably represent the Barnwell buhr sands. See Catalogue of Mineral Localities of South Carolina, by Earl Sloan.

ORANGEBURG SAND.

The surface soil of the Orangeburg sand is a brown or grayish-brown to reddish-brown sand from 6 to 12 inches deep, loose and incoherent, and containing very little humus. The subsoil is a red sand becoming slightly sticky in places at a depth of 3 feet. In places the soil becomes quite coarse in texture at a depth of several inches. At depths of a few feet a stratum of red sandy clay is encountered.

This type is found in a number of small areas in various widely separated sections of the county. It generally occupies the lower slopes of gentle inclines adjacent to stream bottoms. The larger areas are found in the eastern part of the county along the Big Salkehatchie River, in the central part along Lower Three Runs and in various other areas in different parts of the county. It occurs along the outer borders of areas of the Norfolk sand, the latter type extending down the gentle valley slope until near the stream bottom, when it gives way to narrow strips of the Orangeburg sand. It also sometimes borders the flats or ponds which include areas of the Portsmouth series. The sloping position, though gentle, together with the loose, porous structure, give the soil thorough drainage.

This type is cultivated to a considerable extent. Locally it is called "mulatto sand" or "red sand," and is considered a more productive soil than the Norfolk sand. The principal crops are cotton and corn, with some oats, sorghum, sugar cane, and cowpeas. With fertilization the soil yields from one-third to three-fourths bale of cotton and 15 to 25 bushels of corn per acre.

The Orangeburg sand is well adapted to the production of truck, although much of it is too remote from good shipping facilities to be used at present for this purpose. Watermelons, cantaloupes, cucumbers, tomatoes, asparagus, and a number of other kinds of vegetables can be grown, as well as plums, strawberries, peaches, and pears.

The soil is deficient in organic matter, which should be supplied by applying manure and compost and by turning under pea vines or other vegetation. This will tend to prevent the leaching out of fertilizers which are added to the soil, will aid in maintaining proper moisture conditions, and make the soil more coherent. Growing cowpeas and velvet beans also adds nitrogen supply.

This type is valued at $15 to $25 an acre, depending upon location and improvements.

ORANGEBURG COARSE SANDY LOAM.

The surface soil of the Orangeburg coarse sandy loam consists of a grayish-brown to reddish-brown, coarse sandy loam, from 8 to 12 inches deep. The subsoil is a heavy, tenacious, red sandy clay extending to a depth of 36 inches. Small red and brown ferruginous concretions are found in the surface soil. As a rule the soil is easily

cultivated, although where not more than 8 inches deep it bakes slightly upon drying.

The type is found in three or four small areas in the county. One of these lies east and northeast of Milbury, and another 3 miles northwest of Robbins.

The topography is undulating to gently rolling. Drainage is good throughout the type and although erosion has been slight it has in places removed a portion of the surface soil. In such places the shallow surface material has a reddish cast.

Cotton and corn are the principal crops. Yields ranging from one-half to 1 bale of cotton and 20 to 35 bushels of corn per acre are obtained. At Blackville some truck is grown. The type is well adapted to such truck crops as cucumbers, cantaloupes, beans, cabbage, potatoes, and onions. It is similar to the Orangeburg sandy loam in all characteristics except texture.

ORANGEBURG SANDY LOAM.

The Orangeburg sandy loam in its typical development consists of a loamy medium sand to sandy loam, ranging from gray to brown in the surface 4 inches and grading below into a red or yellowish-red loamy sand, which continues to a depth of 15 inches. The subsoil is a heavy, tenacious clay extending to a depth of 3 feet or more and resting upon a yellow and red mottled clay. Areas which have been subject to wash or erosion have a light surface mantle of decidedly reddish, heavy sandy loam, and on the numerous small, eroded spots throughout the type the soil is shallow and loamy. Small red and brown ferruginous concretions and fragments of sandstone are found throughout the soil mass. The soil is easily cultivated, except in the areas where erosion has brought the subsoil near the surface. Upon drying the soil in shallow areas becomes slightly baked.

This type, though not extensive, is found in a number of small areas scattered throughout the county. The largest are found in the northwestern part, about 2 miles north of Robbins. The type usually forms isolated areas surrounded by the Norfolk and Tifton sandy loams. Many such areas are not shown in the map on account of their small size.

The topography is undulating to gently rolling. The larger areas have much the same position as the Norfolk sandy loam, while the smaller areas are nearly always found as slight ridges or knobs, lying a little above the surrounding soils. Occasional small areas of this type are found along the slopes of the larger stream valleys. Usually, however, these spots are too small to map. Drainage throughout the type is good. The Orangeburg sandy loam has been derived from more highly oxidized portions of the Coastal Plain deposits.

The greater part of the type is in cultivation, it being considered a productive soil of wide crop adaptation. Where uncultivated it supports a growth of longleaf pine, red oak, post oak, and other varieties of hardwood. It is utilized principally for the production of cotton and corn, although some oats, rye, sorghum, and cowpeas are grown. With fertilization cotton yields from one-half to 1 bale and corn from 20 to 40 bushels per acre. In seasons of ample rainfall oats when fertilized yield from 20 to 40 bushels per acre. The type is well adapted to a large number of vegetables. Asparagus does best on areas of deeper surface soil. The soil is naturally strong, but is deficient in organic matter, which should be supplied by turning under pea vines or other vegetation. Applications of barnyard manure and compost would also prove beneficial, but the supply is entirely inadequate. Larger tracts of the type are valued at $25 to $40 an acre, depending on location and improvements.

RUSTON COARSE SAND.

The surface soil of the Ruston coarse sand consists of 4 to 10 inches of a brownish-gray to grayish-brown coarse sand composed largely of coarse, subangular quartz fragments with some medium sand. The subsoil consists of an orange or reddish-yellow loamy coarse sand, several feet deep.

Only a few small areas of this type are found. They lie in the northeastern part of the county, the town of Blackville being located mainly on one of them. There are a few small areas bordering the South Fork of the Edisto River Swamp, lying several feet above the overflow land. This represents the outer edge of the upland. The type occupies the same position as the Orangeburg coarse sand and joins bodies of the Norfolk coarse sand, the difference in color of the surface soil making it stand out distinctly from the latter type.

Areas of this type have a nearly level to gently undulating surface and good drainage. A large part of the land is under cultivation, the principal crops being cotton and corn. With fertilization cotton yields from one-fourth to one-half bale and corn from 15 to 25 bushels to the acre. Truck crops are grown to some extent. Cucumbers, cantaloupes, asparagus, and watermelons give good yields with fertilization. The type is light and porous and warms up early. It is adapted to many other truck crops, such as beans, peas, and sweet potatoes. The soil is deficient in humus, but responds quickly to applications of barnyard manure, compost, and green manuring. Cowpeas and velvet beans also improve the structure.

This type is intermediate between the Norfolk coarse sand and Orangeburg coarse sand in point of productiveness. It occupies only a very small area in this county.

TIFTON COARSE SANDY LOAM.

The surface soil of the Tifton coarse sandy loam consists of a coarse loamy sand or sandy loam from 10 to 15 inches deep. The surface 4 or 5 inches is a dark-gray to grayish-brown or brownish-gray, grading into a yellowish color which continues until the subsoil is reached. This is a bright or ocherous yellow, rather heavy clay, slightly sandy and friable, extending to a depth of 4 to 6 feet where a heavy, mottled-gray, yellow, and red clay is encountered. The surface soil contains all grades of sand from coarse to very fine, but the bulk of the sand content is coarse or medium. The sand grains are mostly quartz and are sharp and subangular to angular in shape. Small red and brown iron concretions and occasional small amounts of fine quartz gravel are found in the soil. Occasional areas are found where the concretions are numerous, but this characteristic of the Tifton soils is not so prominently developed in this county, except in spots as in other areas. The surface soil is quite loamy and often it shows a yellowish tinge on slopes or where slightly eroded. The soil is easy to cultivate, though in dry seasons it often becomes somewhat baked or compact, especially where it is not more than 12 inches deep. The type is sometimes spoken of as "clay land," or where the iron concretions are numerous, as "pebbly land." Where under cultivation it is usually deficient in organic matter.

Large areas of the Tifton coarse sandy loam are found in the northern part of the county in the vicinity of Williston, Blackville, and Elko, and also north of Dunbarton and Robbins.

The type is very similar to the Norfolk coarse sandy loam there being fewer of the iron concretions than is characteristic of the general run of Tifton soils. The subsoil of the Tifton coarse sandy loam is, however, heavier and of a brighter yellow color than that of the corresponding Norfolk type. The surface soil of the Norfolk coarse sandy loam is also usually somewhat deeper and is lighter in color at the immediate surface. The Tifton coarse sandy loam occurs closely associated with soils of the Norfolk series and as they grade one into the other, the boundaries between the types often were necessarily shown arbitrarily.

The surface is undulating to gently rolling, this feature being more pronounced than on the Norfolk soils. It is sometimes slightly eroded and terracing is often practiced to prevent the surface from washing where the slopes are somewhat steep. Drainage is usually good throughout the type. The water-holding capacity of the soil is marked considering the coarse texture.

This type represents Coastal Plain material in which oxidation, perhaps on account of better drainage, has been more complete than with the Norfolk soils.

The uncultivated areas of the type are covered with a growth of longleaf pine, white, red, post, and other oaks, with some hickory and other hardwoods. Much of the type is in cultivation, as it is a strong productive soil, well adapted to many crops. It is considered one of the best types in the county, and it is largely utilized for cotton and corn. Some truck crops are also grown in the vicinity of Williston, Blackville, and Elko. Cotton and corn are the main crops, with sorghum, sugar cane, oats, rye, peanuts, cowpeas, and garden vegetables of secondary importance. When fertilized heavily, cotton yields from one-half to 1 bale per acre and corn from 20 to 40 bushels. Fertilizers of various grades are used in amounts ranging from 200 to 500 pounds per acre, the formula usually approximating 8–2–2 or 8–4–4. Compost, barnyard manure, and cotton seed or cottonseed meal are also used with excellent results in conjunction with the commercial fertilizers. The land is greatly improved by growing cowpeas and velvet beans, especially when the vines are turned under. Much of the land has been cultivated for many years, the farmers using commercial fertilizers to maintain the yields, and seldom building up the soil by rotating crops or by supplying organic matter in other ways. As a consequence the land is in many places less productive than formerly. In dry years crops suffer on account of the tendency of the soil to bake and become compact. This is true to a greater extent in those places where the supply of organic matter has been impoverished. An increase in the organic-matter content would greatly lessen the tendency to droughtiness, as the subsoil retains water well if the surface soil is kept in a friable and mellow condition.

When the fields are fertilized, oats produce good yields in seasons of ample rainfall, 20 to 40 bushels per acre being made. Rye, sowed in the fall, affords good winter and early spring pasturage. Peanuts, sweet potatoes, and sugar cane are grown in a small way and produce well.

The type is adapted to most of the truck crops, and some cucumbers, cantaloupes, watermelons, cabbage, and Irish potatoes are produced for market. Asparagus does well where the surface soil is rather deep. Cucumbers yield an average of 150 baskets, cantaloupes 75 or 100 crates, and watermelons one-third to one-half carload per acre. The yield of asparagus ranges from 20 to 35 crates to the acre.

Truck crops are heavily fertilized, and maturity is hastened by top dressings of nitrate of soda.

Land of this type of soil is at present valued at $20 to $50 an acre, the price depending upon location and improvements, tracts near the larger towns often commanding a higher figure.

TIFTON SANDY LOAM.

The surface soil of the Tifton sandy loam consists of a gray or brownish loamy sand to sandy loam from about 12 to 18 inches deep. The surface 4 or 5 inches are a gray or brownish-gray, while the subsurface is yellowish. The subsoil is a bright yellow or ocherous yellow, friable clay, slightly sandy but quite sticky and heavy. At a depth of several feet a substratum of mottled gray, red, and yellow clay is encountered. This mottled clay sometimes approaches within 3 feet of the surface on slopes, but such places have slight areal extent. A few small red and brown iron concretions are found throughout the surface soil and on the surface. These are characteristic of the Tifton soils in some other areas that have been mapped, but in this county there are but a few small spots where these pebbles are present in as great abundance as in case of the average of the Tifton elsewhere.

The soil of the Tifton sandy loam contains little organic matter, especially where it has been in cultivation for a long time. This results in a slightly compacted or crusted condition of the soil where the shallow surface soil is found. The type is friable and as a rule easily cultivated. Locally it is known as "clay land" or "pebbly land."

This type is found in small tracts to areas of several hundred acres in various parts of the county, the most extensive tracts lying in the northern part. It is closely associated with the Norfolk sandy loam, which it resembles in several ways. The heavier subsoil and slightly darker colored surface are important differences, and the iron concretions are more common in the Tifton.

The topography is undulating to gently rolling and drainage is generally good throughout the type. Some slopes are so steep as to produce slight erosion, but little excessive washing is found except during very heavy rains. Cultivating these slopes with the contour or terracing is sometimes practiced with good results.

The Tifton sandy loam is one of the strongest soils in the county, and is adapted to a large number of crops. It is extensively cultivated in practically the same way as the Tifton coarse sandy loam, which it closely resembles. The crops grown consist of cotton, corn, and to a less extent sorghum, sugar cane, oats, rye, peanuts, and cowpeas. Near shipping points the type is utilized for the production of cantaloupes, cucumbers, asparagus, watermelons, cabbage, potatoes, and other vegetables. It is well adapted to the production of such crops. Lettuce, which is not grown for market at present, could probably be made a profitable crop. Commercial fertilizers are used on all crops. Some barnyard manure and compost, cotton seed, and cottonseed meal are also applied. The soil needs more

humus, which can best be supplied by plowing under green manuring crops, such as cowpeas and soy beans. Cotton yields one-half to 1 bale per acre and corn from 20 to 40 bushels. The soil is susceptible of great improvement; and if the natural means of fertilization are utilized and care taken in the management of the land, a high state of productiveness can be maintained with a greatly lessened expenditure for commercial fertilizers.

Land of this type at present is valued at $20 to $40 an acre, and well-located areas near the railroads command a higher price.

PORTSMOUTH COARSE SANDY LOAM.

The surface soil of the Portsmouth coarse sandy loam consists of about 6 inches of a dark-gray to black coarse sandy loam or loamy coarse sand grading into a gray coarse sand, sometimes slightly loamy, which extends to a depth of 18 or 24 inches. The subsoil to a depth of 36 inches is a gray or mottled gray and yellow coarse sandy clay. Where black the surface soil is rather heavy owing to accumulation of organic matter.

This type is found in but a few areas in the county, two of which occur just east of Blackville and contain several hundred acres each. A small area is also found north of Dunbarton.

The surface of the type is flat or depressed. Near Blackville and Dunbarton areas form low, basinlike depressions, or ponds, which hold water after rains. The drainage is poor but could be improved by ditching. Liming drained areas will improve them. The timber growth consists of loblolly or shortleaf pine, gum, water oak, and other species of plants requiring moist conditions.

Little of the type is in cultivation. If drained it will produce good crops of cotton, corn, and certain vegetables.

PORTSMOUTH SANDY LOAM.

The surface soil of the Portsmouth sandy loam consists of 4 to 8 inches of a black or dark-gray sandy loam, grading into a gray sand or loamy sand which continues to a depth of 12 to 24 inches. The subsoil to 36 inches consists of a gray clay, often mottled with yellow and sometimes carrying a considerable amount of sand. There is no great uniformity in the texture of this soil. Much of it may consist of a sandy soil, dark in the upper few inches, underlain at various depths by a sandy clay, gray in color, and often mottled with yellow. The surface soil contains considerable organic matter, the result of the decay of the rank vegetation flourishing in moist soils.

Small areas of this type are scattered over all parts of the county. The areas are isolated and usually surrounded by areas of Norfolk soils. They are nearly always composed of small lake beds or pond depressions which are dry, except during rainy seasons.

The topography is flat and depressed, the type usually lying 3 to 10 feet lower than the surrounding soils. The surface is covered with water during many months of the year, and much of it at all times, except during very dry seasons. Some of these ponds have been drained by ditching, and many of them have outlets which represent the heads of small streams. Numerous areas of this character exist that are too small to map, and many of these, having fair drainage, in dry seasons are cultivated with the surrounding Norfolk and Tifton soils.

The rank vegetation growing in these wet places has resulted in a considerable accumulation of organic matter in the surface soil. The gray or drab color of the subsoil is doubtless due to the poor aeration and lack of oxidation caused by the excessive moisture. The type is often covered with a heavy growth of short-leaf pine, water oak, gum, and a heavy undergrowth of water-loving plants. Some areas are treeless and covered only with a growth of sedges and grasses.

Little of the Portsmouth sandy loam is in cultivation, although the drained areas produce good yields of cotton and corn in favorable seasons. Cucumbers, cabbage, onions, and probably lettuce and celery, would do well on this soil when well drained. Liming would prove of great value. The type is not very extensive, and during rainy seasons much of it is covered by shallow lakes or ponds.

PORTSMOUTH FINE SANDY LOAM.

The surface soil of the Portsmouth fine sandy loam consists of 6 to 10 inches of a dark-gray or black fine sandy loam, containing a large amount of organic matter. The soil at this depth usually grades into a gray, more or less sticky, fine sand which at a depth ranging from 12 to 20 inches passes into the true subsoil of gray or sometimes mottled gray and yellow fine sandy clay.

This type forms the bottoms of small ponds or lakes usually less than 200 acres in extent. The type occurs in the rolling upland of the eastern part of the county, and the areas are widely scattered. The areas lie from 3 to 10 feet below the surface of the surrounding types, and are covered with water during the rainy seasons unless artificially drained. Some of them occur about the heads of small streams, but in such situations the land is nevertheless wet and poorly drained. A part of the type has been drained by ditching.

The origin of the type is the same as that of the Portsmouth sandy loam, except that finer materials have been washed into the depressions, resulting in the formation of a soil of finer texture.

Some of these ponds are open and covered with a growth of sedge grass, while others support a growth of shortleaf pine, gum, water oak, pin oak, and an undergrowth of water-loving plants.

Little of this type is under cultivation. The soil when drained is adapted to the production of cotton, corn, and a number of truck crops. Oats produce good yields, as seen in small spots where they have been partly cultivated. The type is similar in all respects, except texture to the Portsmouth sandy loam. If well drained, it would make fine farming land and doubtless would well repay the expense of reclamation. The use of lime to correct the acidity or other unfavorable soil conditions would prove helpful in getting the land into good crop-producing condition after drainage.

PORTSMOUTH SILTY CLAY LOAM.

The surface soil of the Portsmouth silty clay loam is a heavy silty loam, rather sticky and containing considerable clay, and from 4 to 10 inches deep. It is rich in humus and is quite black in color. The subsoil to 36 inches or more consists of a gray clay sometimes mottled with yellow. It is usually very heavy and silty but sometimes contains varying quantities of sand.

The outer edges of the type are often sandy on the surface, owing to wash from the adjacent sandy soils.

The type is found in a number of small, widely separated areas throughout the eastern part of the county. It occurs as low flats and shallow cypress ponds, which are dry except during rainy seasons. Often the areas are very swampy.

The occurrence of the type in depressions necessarily makes drainage poor, but by ditching it may be drained sufficiently to allow cultivation except in very wet seasons.

The soil has been formed in part at least by the washing in of fine material from the surrounding, low, gentle slopes. The loamy clay subsoil may represent an original heavy marine deposit.

The forest growth consists of cypress with some shortleaf pine and gum around the margins of the areas.

Little of this land has been drained and put under cultivation, though it is naturally a strong and productive soil well adapted to cotton and corn. Cotton sometimes makes too rank a growth, the plant going too much to stalk to make this crop profitable. The soil is well adapted to corn, and where well drained produces from 35 to 50 bushels per acre in good seasons. It can all be easily drained by ditching and if this were done many acres of valuable soil would be reclaimed. The use of lime on such areas is recommended.

SCRANTON SANDY LOAM.

The surface soil of the Scranton sandy loam, to a depth of about 6 to 8 inches, consists of a dark-gray, medium sandy loam with some indications of a fine sandy loam. As in the case of the fine sandy loam, this type grades into a pale yellowish gray medium sand, which

in turn passes into a yellow sandy clay extending to a depth of 36 inches. Below this an occasional red mottling is noticed making the substratum resemble the subsoil of the Coxville soils.

The type occurs in only three or four small, isolated areas in the southern and western part of the county. It is perhaps less used for agricultural purposes than any of the other types. The best developed areas are found in the southern part of the county.

In nearly every instance this soil is confined to the more nearly level or flat situations, which in most instances are noticeably lower than the surrounding soils.

Practically none of this type is being farmed, so that it was impossible to obtain any figures on crop production. The returns from the Norfolk sandy loam would perhaps be slightly higher in all instances than those from this soil when in its present wet condition. However, with proper drainage, such as can be established by ditching, it could easily be made to produce good yields of the staple crops—cotton, corn, and oats, and vegetables. The use of lime is recommended.

SCRANTON FINE SANDY LOAM.

The surface soil of the Scranton fine sandy loam consists of a dark gray loamy fine sand, underlain at a depth of about 6 inches by a lighter gray or yellowish fine sand. The subsoil, beginning at 18 to 24 inches, is a pale yellow sandy clay like that of the Norfolk fine sandy loam. Where this type lies adjacent to the Portsmouth soils a mottling of gray and red is usually found throughout the sandy clay subsoil stratum.

The Scranton fine sandy loam is found principally in the southern and southeastern parts of the county, the most typically developed areas occurring south and east of Fairfax.

The topography as a rule is level to slightly undulating. In the more nearly level areas surface water stands for considerable periods and in years of heavy rainfall renders such areas too wet for cultivation. The undulating areas are generally well drained and in most cases under cultivation.

In origin this soil is similar to the Norfolk soils, being differentiated from that series by the accumulation of organic matter in the surface few inches, the result probably of the somewhat poorer drainage.

At present the greater part of this land is in forest. There are a few areas of fairly good timber southwest of Ulmers, consisting principally of loblolly and longleaf pine and gum.

With small applications of fertilizer this soil has produced one-half to 1 bale of cotton to the acre, 20 to 25 bushels of corn, and 15 to 35 bushels of oats. In many places the prime need of the land is better drainage. Many areas are relatively high in organic matter, as compared with the Norfolk types, but continued additions of barn-

yard manure, and the turning under of cowpeas, especially in the more undulating areas would do much to maintain yields. With liberal applications of commercial fertilizers and the establishment of good drainage conditions this soil would undoubtedly be well suited to the production of truck crops.

Land values vary according to the proximity of the areas to railroads, but the average price is about $25 an acre.

COXVILLE COARSE SANDY LOAM.

The surface soil of the Coxville coarse sandy loam consists of a dark-gray coarse sandy loam, 6 to 12 inches deep, and rather heavy and compact in some of the slight depressions. Occasionally the bulk of the soil material is not coarser than medium sand, but even in such places there is sufficient coarse material present to impart a coarse feel to the soil, although the proportion of coarse sand may not be large enough to make the soil analyze a coarse sandy loam. The subsoil is a compact and impervious yellowish brown or yellow rather sandy clay that grades at about 24 inches into a mottled gray, yellow, and red plastic clay. This material reaches to depths of 36 inches or more. The mottling becomes more intense, and the red more conspicuous with increase in depth. In places the red mottling does not appear within the 3-foot section.

There are but a few small areas of this type. These lie in the vicinity of Blackville.

The surface is nearly level or slightly depressed in places and drainage is poor both on account of the absence of drainage outlets and the imperviousness of the subsoil. The type occurs in close association with the low, poorly drained areas of Portsmouth soils near the heads of small streams.

Cotton, corn, and some vegetables are grown on the type near Blackville. It is quite productive where drained, and produces, with fertilization, one-third to three-fourths bale of cotton and 15 to 30 bushels of corn per acre. Cucumbers yield well and make a quick growth where fertilized. Cantaloupes, beans, potatoes, and a number of other truck crops succeed where the land is fertilized and properly drained.

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

Mechanical analyses of Coxville coarse sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
241830	Soil	7.9	19.4	14.0	19.4	10.7	18.3	10.4
241831	Subsoil	4.1	11.2	9.9	15.1	6.8	15.1	37.8

COXVILLE SANDY LOAM.

The surface soil of the Coxville sandy loam consists of a dark-gray medium to fine sandy loam from 8 to 12 inches deep. Below this is a somewhat plastic heavy gray or drab sticky sandy clay extending to an average depth of 18 inches and in turn underlain by a mottled gray, red and yellow sandy clay which continues to a depth of 36 inches. Frequently a rather heavy, sticky gray clay with red mottlings is found below the 3-foot profile. Where the soil occurs as slightly depressed level areas it is more compact and resembles in many respects the Portsmouth sandy loam. In such areas the water table is usually encountered at a depth of 24 inches.

The Coxville sandy loam may be said to occupy an intermediate position between the Norfolk and Portsmouth soils. As a rule the surface features are level, the type occupying a slightly higher position than the typical Portsmouth soils but grading into the flat or slightly depressed topography of the Portsmouth. The larger vegetation on this soil consists principally of shortleaf pine, a few scattering gum trees, and gallberry bushes.

Although considered of minor importance, the Coxville sandy loam is widely distributed, with large areas in the southern parts of the county.

With fair drainage conditions, as in the area near Ulmers, moderate to good yields of the staple crops are obtained. Cotton yields from one-fourth to 1 bale and corn from 25 to 40 bushels to the acre, while oats and rye give excellent returns. In practically all areas drainage is necessary to fit this type for cultivation. Thoroughly drained and sweetened by the use of lime (1,000 to 2,000 pounds per acre of burnt lime or twice this amount of ground limestone), this soil can be made one of the most productive in the county.

At present land values range from $15 to $40 an acre, the average price being about $25.

COXVILLE LOAM.

The soil of the Coxville loam is a dark-gray, heavy loam from 6 to 10 inches deep. It is underlain by a heavy, impervious yellow clay mottled with gray in the upper portion and grading at 24 to 36 inches into a heavy, compact mottled gray and yellow and red, plastic clay.

This type is found in two small areas a mile west of Blackville. It is flat and naturally poorly drained, although by ditching some of it has been given good surface drainage. Water stands in depressions for some time after rains, owing to the impervious subsoil. The type is found closely associated with small, poorly drained areas of the Coxville coarse sandy loam.

Where fertilized and drained this type produces fair yields of cotton and corn. In some areas there is a considerable amount of coarse

sand which gives the material a rather gritty feel, although the soil is on the whole rather compact. Cucumbers are grown on the type and produce early and good yields where the land is well drained, highly fertilized, and well cultivated. The type is considered an especially good cucumber soil. Strawberries should do well.

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

Mechanical analyses of Coxville loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
241832	Soil	2.9	12.4	12.2	22.9	10.8	26.3	12.9
241833	Subsoil	2.3	5.2	6.2	10.9	8.0	17.7	49.8

KALMIA GRAVELLY SANDY LOAM.

The type consists of a gray loamy sand, becoming yellow in color with depth, and at 12 to 20 inches grading into a yellow sandy clay. A relatively large quantity of smooth, rounded quartz gravel is a characteristic feature of the type.

One small area of this soil was mapped about 2½ miles northwest of Robbins near the Charleston & Western Carolina Railway. In crop value the type is similar to the coarse sandy loam member of the same series. Owing to its small extent the type is of little importance. It occurs on the Savannah River terrace.

KALMIA COARSE SAND.

The Kalmia coarse sand consists of a gray to a light grayish brown coarse sand, underlain at varying depths by a pale-yellow to medium yellow coarse sand. In some places the type grades into the Cahaba sand in such a way as to make the establishment of boundaries difficult. Occasionally a decidedly compact subsurface layer having the properties of hardpan is encountered at a depth of 4 or 5 inches, just below plow depth.

The topography is flat to very gently undulating, the type occupying areas on the Savannah River terrace. The most extensive bodies occur in the southwestern part of the county. Several small areas are also found in the Savannah River bottoms in the southwestern part of the county, lying 15 or 20 feet above the surrounding swamp, the higher portions being above normal overflow. This soil is considered a little stronger than the Norfolk coarse sand, which it resembles. It is suited to the same crops. Liberal applications of commercial fertilizers and green manuring crops, such as cowpeas or some other legume, are requisite for best crop production.

KALMIA SAND.

The Kalmia sand is a gray to light grayish brown incoherent sand, grading into a pale yellow or medium yellow sand. In the occasional slight depressions the material generally is moist throughout the year, a condition which has favored the accumulation of organic matter and given the surface a darker color. Lack of drainage has also resulted in a lighter color in the subsoil, owing to exclusion of air and retardation of oxidation. These dark-colored spots would have been mapped as Myatt sand had they been of sufficient size.

At a depth of 4 or 5 inches a compact layer having the properties of hardpan is frequently encountered. This should be broken up by deeper plowing or by subsoiling.

The Kalmia sand is very similar in character to the Norfolk sand, although differing slightly in some respects. It occurs as flat bench land on the stream terrace bordering the Savannah River bottoms. As with all the terrace soils, the water table is believed to stand much nearer the surface than in the rolling uplands, particularly where formed of the Norfolk sand. From an agricultural standpoint the drainage is very good, though inferior to that of the Cahaba sand. This probably accounts for the yellow color of the subsoil instead of the reddish color which prevails in the subsoil of the Cahaba where oxidation has been more complete.

This type is extensively developed throughout the Savannah River terrace, being the most important soil in point of area occurring in this topographic position.

The soil is adapted to practically the same crops as the Norfolk sand, but the better drained part gives slightly better average yields with the same treatment, which is probably accounted for by the presence of a larger moisture supply in dry seasons. The yields with the same fertilization are not so good as those secured from the Cahaba sand. The greater part of the type is under cultivation to cotton, corn, and oats. The largest field of asparagus in the county is situated on this soil near Hattieville. This comprises some 300 acres. This crop has given very good returns here under the system of cultivation employed, which includes large applications of commercial fertilizers. A number of vegetables can be successfully grown on this type of soil. It is a valuable type, notwithstanding the fact that good yields depend on the use of fertilizers or manure.

KALMIA COARSE SANDY LOAM.

The Kalmia coarse sandy loam consists of a gray or light grayish brown to dark-gray, loose coarse sand to loamy coarse sand grading through pale-yellow loamy coarse sand into pale-yellow or yellow, friable, coarse sandy clay.

Some of the more poorly drained areas are dark at the surface and slight mottlings of gray are sometimes found in the subsoil of such areas. The type is of small extent, occurring in only a few tracts, one northwest of Milbury, one at Robbins, and two others 2 miles northwest of Robbins. The agricultural value is about the same as that of the Norfolk coarse sandy loam, the average yields being perhaps a little larger owing to the maintenance of a better supply of moisture during dry seasons. The type is adapted to cotton, corn, oats, melons, and vegetables, although these crops require good fertilization to make satisfactory yields.

KALMIA SANDY LOAM.

The surface soil of the Kalmia sandy loam consists of a gray or light grayish brown to dark-gray sand to loamy sand which quickly grades into a pale-yellow loamy sand. The subsoil, found at a depth of 12 to 20 inches, is a pale-yellow sandy clay sometimes mottled with gray in the more poorly drained situations.

The type occurs as flat to slightly depressed areas on the terrace bordering the Savannah River. The most important areas are located east and southeast of Johnsons Landing, northwest of Millett, with others to the northwest of Robbins.

This soil is adapted to about the same crops as the Kalmia fine sandy loam. While artificial drainage would improve some sections of the type, the need of drainage is less than in case of the Kalmia fine sandy loam. Cotton, corn, and oats are the principal crops, although a large variety of vegetables can also be grown.

Rather heavy application of commercial fertilizers are required for the production of good crops. Most of this land is in need of vegetable matter such as can be supplied by growing legumes in combination with farm crops and vegetables, and occasionally plowing under a green crop.

KALMIA FINE SANDY LOAM.

The Kalmia fine sandy loam is a light grayish brown to dark-gray fine sand to loamy fine sand, grading at a depth of 6 inches into a pale-yellow material of the same texture. The subsoil encountered at a depth of 12 to 24 inches is a pale-yellow or mottled yellowish and gray, friable, fine sandy clay. In some of the poorly drained sections the surface soil is of a decided gray color owing to accumulations of organic matter.

The type occurs as flat to slightly depressed areas over the terrace bordering the Savannah River swamp. The most important bodies are found south and southeast of Brier Patch Spring and north of Robbins.

With moderately liberal fertilization profitable crops of corn, cotton, and oats are grown. A portion of the type would be improved by ditching, especially in case of the darker colored areas where drainage is poorly established. Fertilizers relatively high in potash and nitrogen should be used except where the nitrogen can be supplied by growing cowpeas, velvet beans, or other legumes in a regular rotation with farm crops.

Vegetables would give about the same results as on the Norfolk sandy loam. Cotton, corn, and oats can be made successful crops.

LEAF FINE SANDY LOAM.

The Leaf fine sandy loam is a light grayish brown loamy fine sand, underlain at 12 to 16 inches by a rather plastic, fine sandy clay mottled with red, gray, and yellow.

The type occurs in a number of areas on the Savannah River terrace the largest being a long, narrow strip just west and southwest of Milbury. The other areas are relatively small. Owing to the flat surface and the somewhat impervious subsoil, drainage is not thoroughly established. Only a small proportion of the type is under cultivation, the principal crops grown being cotton and corn. By ditching or other means of drainage, this soil can be profitably utilized for the production of the general farm crops.

CAHABA SAND.

The surface soil of the Cahaba sand consists of a friable, incoherent, brownish-red sand about 14 inches deep, containing ordinarily a rather high percentage of the coarser grades of sand and fine gravel. The subsoil to a depth of 36 inches or more consists of a reddish brown to brownish-red slightly loamy sand becoming noticeably loamy between 24 and 36 inches. This loamy sand extends to a depth of several feet. The organic matter content of the type is low. Frequently a hard, compact layer is found at a depth of 4 or 5 inches, which in the cultivation of the type should be broken up by deeper plowing, as the compact material acts as a hardpan. The soil, however, is easily cultivated.

The Cahaba sand is found only in the western part of the county in irregular strips or bands on the level to gently undulating portions of the Savannah River terrace. These areas amount to only a few square miles in extent.

Owing to the loose, porous structure of this soil it has good underdrainage. The water table lies near the surface. Practically all of the type is in cultivation. It is locally known as "red sand." The virgin growth consists of longleaf pine and oak.

Cotton and corn are the principal crops. Cotton, with fertilization, yields one-fourth to three-fourths bale and corn from 15 to 25 bushels

to the acre. The type is well adapted to the production of truck though it is not used for that purpose. A wide variety of vegetables will succeed, as will peaches, plums, pears, strawberries, and bramble berries, although none of these are now grown commercially.

Fertilizers leach out rapidly, owing to the open nature of the soil. This can be remedied by incorporating vegetable matter, such as green cowpeas or rye.

CAHABA SANDY LOAM.

The Cahaba sandy loam consists of a reddish-brown to brownish-red sandy loam, underlain at a depth of 8 to 12 inches by a red, friable sandy clay. In places the type grades off with a grayish surface color into the adjacent terrace soils which have lighter colored surface soils.

The type is developed along the Savannah River terrace in several areas, the largest body lying 2 miles southeast of Robbins, and the next most important one 1½ miles southwest of Four Mile Church. The total extent is small. The surface is flat to very gently undulating. Drainage is well established, the type lying above overflow.

The subsoil is texturally and structurally favorable to the retention of an adequate supply of moisture for the growth of crops. Owing to the flat position of this and the surrounding soils the water table seems to stand nearer the surface than on upland soils of similar character.

This is an excellent agricultural soil well suited to the production of cotton, corn, oats, vegetables, sugar cane, sorghum, and cowpeas. With moderate fertilization and proper cultivation a bale of cotton to the acre should be easily obtained.

The type is largely under cultivation to cotton, corn, and oats. The total area of this type is relatively small.

MYATT SAND.

The Myatt sand is a black sand having a loamy feel owing to the presence of a considerable amount of organic matter. At depths ranging from 10 to 16 inches a light-gray to nearly white sand is encountered. The type occupies flat, depressed areas on the Savannah River terrace. The largest of these is a long, narrow strip extending from Pen Creek to Four Mile Creek. Other small areas are found in the vicinity of Hattieville.

None of the type is under cultivation. Like the other Myatt soils, thorough drainage will be necessary before it can be used, and heavier applications of commercial fertilizers will be necessary than used on the sandy loam types.

The type supports a heavy growth of loblolly pine, water oak, gum, and other water-loving plants.

MYATT COARSE SANDY LOAM.

The surface soil of the Myatt coarse sandy loam is a dark-gray to black coarse sand grading into a gray, coarse sand. The subsoil, beginning at 15 to 24 inches, is a mottled gray and yellow coarse sandy loam to coarse sandy clay.

Several small areas of the type are found on the Savannah River terrace in the vicinity of Milbury. With artificial drainage, liming, and fertilization, corn, oats, cabbage, onions, and probably celery can be grown. At present it is too poorly drained for cultivation. It is covered with a growth of loblolly pine.

MYATT SANDY LOAM.

The Myatt sandy loam is a dark-gray to black loamy sand, underlain at a depth of 8 to 12 inches by a gray sand which grades with depth into a mottled gray and yellow sandy loam to sandy clay. The surface portion contains accumulations of dark-colored organic matter to which the dark color of the soil is due.

This type is developed in flat, depressed areas having poor drainage. The larger sections are confined to the Savannah River terrace in the vicinity of Robbins.

Very little of this type has been brought under cultivation, as thorough ditching will be necessary to establish the requisite drainage for profitable agriculture. This work could be done at comparatively small cost, and, once completed, corn, oats, and a number of vegetables could be successfully grown. Onions, cabbage, cauliflower, and probably lettuce would do well. Heavy applications of lime after drainage is established would improve the condition of the soil. One or two tons of burnt lime per acre, or twice this amount of ground limestone, could be safely used on this soil. Additions of complete fertilizers are also requisite for continued good yields.

MYATT FINE SANDY LOAM.

The surface soil of the Myatt fine sandy loam is a dark-gray to black loamy fine sand rich in organic matter, from 8 to 12 inches deep, grading into a light grayish fine sand. The subsoil, encountered at a depth ranging from 18 to 24 inches, is a gray to mottled gray and yellow fine sandy loam to fine sandy clay.

Like the sandy loam, this type occurs in flat and poorly drained areas on the Savannah River terrace, the largest body being found northwest of Millett along the Charleston & Western Carolina Railway. Another area about one-fourth square mile in extent is situated a mile south of Four Mile Church. None of the type is under cultivation, and artificial drainage by ditching or the use of tile is necessary before crops can be grown successfully.

The type is adapted to the same crops and requires the same treatment as the Myatt sandy loam.

CONGAREE FINE SANDY LOAM.

The surface soil of the Congaree fine sandy loam consists of a grayish or light-red loamy fine sand about 12 inches deep. The subsoil is a light-red fine sandy loam grading at a depth of 24 inches into red, heavy, fine sandy clay, which continues to 3 feet or more. A few mica flakes are found in the soil and subsoil, being most noticeable at the surface in fields which have been uncultivated for some time.

The Congaree fine sandy loam is found in the western part of the county, in a few small areas along the outer edge of the Savannah River bottoms, adjacent to the high terrace. It stands somewhat above the lowest bottoms, but is still low enough to be inundated during periods of high water.

The surface is gently undulating. The surface drainage is good, and the red color of the subsoil indicates fair underdrainage.

The type is alluvial in origin, having been formed by the deposition of soil material from waters which rise in the Piedmont region to the west. The resultant soil has been built up mainly from sediments washed from the Piedmont soils.

Much of the type is in forest, the principal growth being water oak, cow oak, loblolly pine, and gum. Cotton and corn are the principal crops grown. It is a good corn soil, and cotton yields from one-half to 1 bale to the acre in favorable seasons.

SWAMP.

The term Swamp has been used to include low, poorly drained stream bottom land, so wet and subject to overflow as to make cultivation impossible. The largest areas of Swamp occur in the Savannah, South Fork of the Edisto, and Big Salkehatchie bottoms. They vary from a hundred feet to about a mile in width, depending on the size of the stream. The widest strip, ranging from about one-half to 1 mile in width, occurs along the Savannah River; the next, about one-fourth mile to a mile wide, along the Big Salkehatchie and South Fork of Edisto Rivers. Along the smaller creeks and branches the bottom lands are usually from one-eighth to one-fourth mile in width. Along the smaller branches the areas of Swamp are often only a few feet wide, and too small to map on the scale used.

In the Savannah River bottoms the Swamp is somewhat different from that found along the other streams. Here the soil consists in places of silty loam to silty clay of a chocolate or brown color, underlain by gray mottled clay, mottled with yellowish, reddish, and brownish colors. In places it is covered with a layer of sandy material a few inches deep. The Swamp level lies but a few feet above the

normal water stage of the Savannah River. It is more or less cut up by small streams and lagoons. The surface is dominantly flat, with occasional slight depressions and hummocks. The bottoms are subject to frequent and long-continued floods, and even between overflows much of the Swamp is covered with standing water, while all of it remains in a permanently soggy wet condition.

These bottoms are covered with a heavy forest growth consisting largely of sweet gum, tupelo, blackgum, cypress, water oak, slash pine or swamp pine, and other water-loving trees and plants. Swamp palmetto is also abundant. The land is utilized to some extent for pasturage during the drier seasons. Such high dikes would be required to prevent inundation that the drainage of the Savannah River bottoms would be an expensive undertaking.

The Swamp along the South Fork of Edisto and Big Salkehatchie Rivers, as well as that along the smaller streams of the county, generally consists of a deep black soil ranging from a loam to a silty clay loam in texture. Much of it along the smaller streams is composed largely, in the surface section at least, of organic matter in various stages of decomposition. Sandy strips are of frequent occurrence, especially along the outer edge of the bottoms and the immediate stream banks.

The tree growth in these areas of Swamp consists principally of water oak, pin oak, sweet gum, tupelo, black gum, cypress, slash or swamp pine, and a dense undergrowth of vines and water-loving plants and shrubbery. These areas lie from about 2 to 5 feet above the normal water level of the streams and occupy narrow valleys 10 to 40 feet below the level of the adjoining uplands.

Some of the Swamp along the smaller streams could be reclaimed by deepening and straightening the stream channels and by building dikes or levees to prevent inundation. Such land would produce good crops of corn, oats, and grass. Cotton also could probably be grown successfully, as could sugar cane, sorghum, and a number of other crops.

SUMMARY.

Barnwell County is situated in the Coastal Plain region in the southwestern part of the State of South Carolina. It comprises an area of 874 square miles or 559,360 acres. The topography is undulating to rolling. The county lies between the Savannah, South Fork of the Edisto, and Big Salkehatchie Rivers, through which drainage flows into the Atlantic Ocean.

The population in 1910 was 34,208, of which more than 70 per cent is negro. The present white population is composed mainly of descendants of the early colonists.

The railroads in the county are important main lines and afford good transportation. The county roads are numerous. Their improvement is now receiving considerable attention. There are many churches and schools throughout the county and nearly all parts are reached by rural free delivery routes.

The climate is mild and the growing season about 8 months long. The mean annual precipitation is about 48 inches.

Nearly one-half of all the land in the county is in cultivation, the greater part of which is upland, as the bottom lands are poorly drained and must be reclaimed before they can be used for crops. Cotton farming is the principal type of agriculture in the county, 47,978 bales being produced in the year 1909. Corn, oats, sorghum, sweet potatoes, peanuts, cowpeas, and velvet beans are secondary crops.

Truck growing is being extended considerably in certain parts of the county, cucumbers, asparagus, cantaloupes, and watermelons being the main crops.

Commercial fertilizers are used very extensively, and are supplemented by cotton seed, cottonseed meal, and small amounts of barnyard manure and compost. In 1909 the expenditure for fertilizers amounted to $643,800.

The soils are typical of the Atlantic Coastal Plain. They have been formed by the weathering of unconsolidated sands and clays laid down as marine deposits, or of wash from such materials. Excluding Swamp, thirty-eight types of soil, grouped in 12 series, were mapped in the county.

The Norfolk and Tifton series are the most extensive, the former covering by far the greater part of the county. The sandy loams of the series are the most extensive and best agricultural soils. The sandy members of the series are good early truck soils, but are largely used for cotton.

The Tifton soils are especially adapted to cotton and truck crops and have a wide range of crop adaptation, being slightly more productive than the corresponding Norfolk soils.

The Orangeburg series is represented by four types. They are more productive than the Norfolk or Tifton soils but are of small extent.

The Scranton and Coxville series are represented by a few types of very small extent. With good drainage these types would make valuable soils.

The Portsmouth soils occupy small depressed, basinlike areas, poorly drained and uncleared. The r reclamation by ditching would be comparatively easy and inexpensive. Profitable crops could then be grown. They would prove especially good corn soils. Certain kinds of truck could also be grown on them.

The Kalmia soils are found on the Savannah River terrace. They are about the same or slightly better than the corresponding types of Norfolk series which they resemble.

The Myatt series occupies poorly drained situations along the Savannah River terrace. The soils closely resemble the Portsmouth soils.

The Cahaba series is represented by two types on the Savannah River terrace. They resemble the Orangeburg soils and are extensively cultivated. Only a small area of these types exists.

The Leaf series is represented by one type found along the Savannah River terrace. It is poorly drained and corresponds to the Coxville soils of the uplands in its main characteristics.

The Congaree series is represented by one type found in the Savannah River bottom and is the only cultivated type in the county subject to overflow. It has small extent.

Considerable areas of Swamp occur along all the streams. Though inherently a rich soil, it can in general be drained and reclaimed only at heavy expense. Such crops as corn and some of the heavier truck crops would doubtless do well on well-drained Swamp.

Agricultural conditions can be improved by a greater diversification of crops, the practice of definite crop rotations, and by using natural means for upbuilding the soils.

[PUBLIC RESOLUTION—No. 9.]

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

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

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

Approved, March 14, 1904.

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

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