

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

SOIL SURVEY OF YORK COUNTY,
SOUTH CAROLINA.

BY

J. A. DRAKE AND H. L. BELDEN.

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., May 14, 1906.

SIR: Among the areas to which the work of the Soil Survey in the cotton-growing region was extended in 1905 is York County, S. C. A desire for the work was expressed in a number of requests from prominent planters of the county and the need for it emphasized in a letter of indorsement from the Hon. D. E. Finley, who points out that the exclusive culture of cotton which has prevailed for so many years in this area is giving way to dairy farming, stock raising, and more intensive systems of cultivation in which it is very important that the farmers should thoroughly understand their soils, the management of their soils, and the crops adapted to them.

The accompanying manuscript embodies the results of the survey. I recommend its publication as advance sheets of the Field Operations of the Bureau of Soils for 1905, as provided by law.

Respectfully,

MILTON WHITNEY,
Chief of Bureau.

HON. JAMES WILSON,
Secretary of Agriculture.

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MAP.

Soil map, York County sheet, South Carolina.

SOIL SURVEY OF YORK COUNTY, SOUTH CAROLINA.

By J. A. DRAKE and H. L. BELDEN.

LOCATION AND BOUNDARIES OF THE AREA.

York County is one of the northern tier counties and is situated about the middle of the northern boundary of the State. It is irregular in outline, though roughly rectangular. The Catawba River forms about half of its eastern boundary line and Sugar Creek the most of the remainder, while Broad River marks about half of the western border. The dimensions of the county vary from $15\frac{1}{2}$ to $23\frac{3}{4}$ miles north and south and from $19\frac{1}{2}$ to $36\frac{1}{2}$ miles east and west, and it comprises

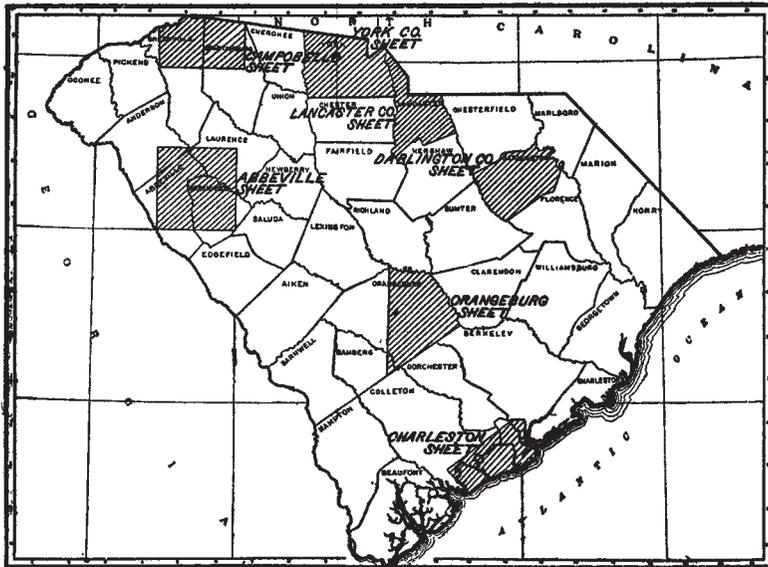


FIG. 1.—Sketch map showing location of the York County area, South Carolina.

428,416 acres or approximately 669 square miles of territory. Rock-hill is the largest and most flourishing town in the county. In 1900 the population of this town was 5,485. Yorkville, the county seat, is situated slightly west of the center of the county. The distances from this point to some of the more important southern inland and seacoast cities are as follows: Atlanta, 247 miles; Birmingham, 414 miles; Richmond, 321 miles; Norfolk, 387 miles; Charleston, 227 miles, and Savannah, 251 miles.

HISTORY OF SETTLEMENT AND AGRICULTURAL DEVELOPMENT.

The first settlement in York County occurred as early as 1757, the immigrants, who were of Scotch-Irish ancestry, coming principally from Pennsylvania. Upon the organization of the county they called it York after their native county in that State. It is well known that these people were of a most independent and liberty-loving character. When the British began to invade their soil, they banded together hurriedly and helped to deal the crushing defeats on the well-known battle grounds of this and adjoining counties, which are well considered a turning point in the Revolutionary war. This same sturdiness of purpose manifested in civil affairs was from the beginning a great factor in the building up of a prosperous agricultural community and later in making the county what it is at present. In 1790 the population of the county had reached 6,600, 14 per cent of which were negroes.

The earliest product the county had to give to commerce was the fur of wild animals. At that time this part of the State abounded in rich pasture lands, and the "cowpen keepers" soon followed the hunters and trappers. As a result live stock raising soon assumed some importance and large numbers of cattle were annually driven to Charleston and even to Philadelphia and New York. The abundant natural pastures made it necessary to cultivate merely enough land to supply the necessaries of life; but the settlers who tilled the soil increased until their corn and wheat formed a considerable proportion of the county's exports. This grain was floated down the waterways to the seacoast towns. The cultivation of cotton began early in the history of the county, but did not assume much importance until 1840, when 1,733 bales were grown. The cotton was hauled in wagons to Charleston and later to Columbia. About 1850 the Charlotte and Columbia Railroad, now a branch of the Southern Railway system, was constructed, passing through Rockhill. The production of cotton increased at once to 9,000 bales. The extensive production of cotton was confined to the eastern half of the county, which was within easy reach of the railroad. Cattle, sheep, corn, wheat, and oats continued to be of great importance, especially in the western half of the county, although as other railroads were built cotton growing became general in all parts of the county.

A general depression followed the war of 1861. The value of farm land per acre and the value of live stock was only one-half as great in 1870 as ten years before, while there was only two-thirds as much cotton, corn, and wheat produced as then. About this time a stock law was enacted by the different townships, which shows the trend of the agricultural development of the county. Rail timber was becoming scarce and the amount of land under cultivation had increased until it became cheaper to fence in the live stock than the crops, and the law

was passed accordingly. This tended, further, to disturb the equilibrium between the number of farm animals kept and the acreage under cultivation, so that in 1880 the output of cotton had increased nearly fourfold. In the next ten years it gradually increased to 32,000 bales. On the other hand, the number of dairy cows had decreased to one-half and that of other cattle and hogs to about one-third of the number in 1850. Since this date cotton has been the chief source of income, for while the combined acreage in corn, oats, wheat, cowpeas, and miscellaneous crops was as great in 1890 as at any earlier time, it was not quite as large as that devoted to cotton. Again, while the population of the county had doubled, there had been no increase in the production of corn, wheat, and oats. Since 1890 more dairy cows have been kept and all classes of stock are of a higher grade.

The manufacture of cotton goods has increased rapidly in the county during the past ten years, until now there are about twelve mills of good capacity in operation. One result of this developing industry has been to increase the size of towns and to better somewhat the local market for farm produce. This has had the effect of improving land values near the towns. The mills, however, have drawn a great many white people from the farms of the surrounding country and agriculture has suffered a retarding influence as well as receiving local stimulus.

CLIMATE.

The climate of York County is mild and equable. The range in temperature, though slightly greater than on the immediate southern coast, is less than for places farther inland. A comparison with the corn belt as represented by Illinois and Indiana shows that while the monthly temperature there for the winter months is 15° to 20° and for the fall months is 7° to 15° colder than for this county, the average for each of the summer months is but 3° to 4.5° cooler. There are occasional freezes, and snow often falls during the winter, but the winter precipitation is mostly in the form of rain. Farm work is often carried on throughout the year.

From the following table, compiled from records of the Weather Bureau stations at Winthrop College and Yorkville, it will be noticed that April and May have less rainfall than the summer months, and also that October, November, and December are the driest months of the year, which greatly facilitates cotton picking and the early winter work of the farm. The rainfall of the area is ample during the growing season for all farm crops.

Normal monthly and annual temperature and precipitation.

Month.	Yorkville.		Winthrop College.		Month.	Yorkville.		Winthrop College.	
	Temperature.	Precipitation.	Temperature.	Precipitation.		Temperature.	Precipitation.	Temperature.	Precipitation.
	° F.	Inches.	° F.	Inches.		° F.	Inches.	° F.	Inches.
January.....	43.1	3.86	43.2	3.51	August.....	77.9	4.96	78.0	4.38
February.....	46.4	4.77	45.8	4.60	September..	73.6	4.38	73.2	4.12
March.....	53.1	4.90	52.6	4.26	October.....	62.0	3.78	62.1	3.18
April.....	61.6	3.78	61.4	3.36	November..	53.1	2.98	53.3	2.99
May.....	71.3	3.58	71.4	3.44	December...	46.1	2.98	46.4	2.84
June.....	77.1	6.75	76.8	4.57	Year..	62.0	52.15	62.0	46.56
July.....	79.2	5.43	79.0	5.22					

The following table gives data regarding the occurrence of frost. The average length of the growing season, as deduced from these records, is about seven months:

Dates of first and last killing frosts.

Year	Yorkville.		Winthrop College.	
	Last in spring.	First in fall.	Last in spring.	First in fall.
1897.....	Mar. 28	Nov. 24	.....	.....
1898.....	Apr. 8	Oct. 23	.....	.....
1899.....	Apr. 5	Nov. 4	.....	.....
1900.....	Apr. 5	Nov. 9	Apr. 5	Nov. 8
1901.....	Mar. 22	Nov. 6	Mar. 22	Nov. 6
1902.....	Apr. 9	Nov. 28	Apr. 9	Nov. 28
1903.....	Mar. 3	Nov. 7	Mar. 2	Oct. 27
1904.....	Apr. 7	Nov. 17	Mar. 16	Oct. 23
Average.....	Mar. 30	Nov. 11	Mar. 23	Nov. 6

PHYSIOGRAPHY AND GEOLOGY.

York County is situated in the Piedmont Plateau and has the topographic features common to that province. The surface is a gently rolling plain, becoming more rolling as it approaches the rivers and creeks, and finally hilly and broken on their immediate banks or above the narrow strips of bottom lands through which the numerous water courses flow. That part of the county lying west of the Carolina Northwestern Railroad is cut by more streams and is rougher and more broken than the eastern half, and on this account has a greater area poorly suited to agriculture.

The eastern part of the county is drained by the Catawba River and its principal tributaries, Fishing, Allisons, Crowders, and Sugar creeks. Along most of the course of the river for a mile or more back the land is hilly and broken; but the most of it is in farms, only occasional areas being considered too rough for cultivation. The country adjacent to Allisons, Crowders, and Sugar creeks is rough and broken,

which is the character of the surface, though in a less degree, near the smaller branches which flow into them; but this condition does not extend back for such a distance as along the river. The topography is smoother along Fishing Creek, though along the lower 5 miles of its course the slopes are somewhat broken and slightly rough. West and south of this creek there occurs a level tract of country about 22 square miles in extent, which is occupied by the Iredell clay loam, being popularly known as the "black-jack" country. With the exception of this area and the one near Rockhill, in which the same type of soil is found, both of these areas occurring in the form of broad depressions having generally a level surface, the remainder of the eastern part of the county is undulating to rolling and well suited to agriculture in general.

The western part of the county is drained by Broad River and the streams which flow into it. The largest of these are Kings Creek, which enters on the line between York County and Cherokee County, Bullocks Creek, which enters farther south, and Turkey Creek, which does not reach the river within the county. Many creeks and branches unite farther up to form these principal tributaries. The country along Broad River is rougher and the broken zone extends farther back than is generally the case along the Catawba River, and the same character of country is found more uniformly along the creeks just mentioned and their tributaries. Both rivers afford excellent water power, some of which is already utilized. The smaller streams furnish power for running many saw mills and grist mills, for which purpose they have been used since the days of the earliest settlement.

The rocks which, through their decay, have furnished the material for the soils of York County are of igneous and metamorphic origin. They range from coarse-grained and fine-grained granite to rocks of a more basic character, as porphyries and trap, and, among the metamorphics, gneiss and talcose schists. The coarse-grained granites and gneisses have given rise to the Cecil sand and contributed slightly in some cases to the Cecil sandy loam. The predominating rock of the latter type, however, has been a granite or gneiss of finer texture, yet having an abundance of quartz which when liberated remained on the surface to form the sandy loam of the first few inches of the soil. The Cecil clay has been formed from rocks very similar in character, but having in general less quartz and more feldspar. In some cases the finer grained metamorphic rocks have entered largely into the formation of the last-named soil. The more basic rocks, or those having a larger percentage of iron, have formed, by their weathering, the Iredell clay loam. In some instances near this type these rocks have also contributed material to the Cecil clay. The Cecil fine sandy loam and the Cecil silt loam have been derived from fine-grained metamorphic rocks, those entering into the former type differing from

those giving rise to the latter mainly in the percentage of fine grains of quartz which they contained, being sufficient in the case of the fine sandy loam to give the coarse texture to the surface soil.

SOILS.

Nine distinct types of soil are shown in the accompanying map. The extent of area occupied by each type appears in the following table:

Areas of different soils.

Soil.	Acres.	Percent.	Soil.	Acres.	Percent.
Cecil clay	185,152	43.3	Meadow	14,720	3.4
Cecil sandy loam	88,768	20.7	Cecil stony clay	1,280	.3
Iredell clay loam	40,640	9.5	Rock outcrop	128	.0
Cecil silt loam	37,376	8.7			
Cecil fine sandy loam	35,136	8.2	Total	428,416	.....
Cecil sand	25,216	5.9			

CECIL CLAY.

The surface soil of the Cecil clay, to a depth of 7 inches, consists of a reddish-brown to red loam or clay loam, which passes abruptly at the depth mentioned into a compact and slightly micaceous red clay, varying little, if any, throughout the remainder of the soil profile to 36 inches. The prevailing character of the surface soil is a reddish-brown or red loam, but over much of the type this more loamy covering has been removed sufficiently to convert the type into a soil of slightly heavier texture or into a clay loam. In small spots on the steeper slopes, where washing has been more severe, the red clay subsoil is exposed, and in such places cultivation is difficult. There is a small area of the type between the series of foothills to Kings mountain and Kings Creek in the extreme northwestern corner of the county, where the soil is deeper and more loamy than is generally the case.

The Cecil clay is a prominent and easily recognized soil of the Piedmont Plateau, and in York County it covers a greater area than any other type. It is not confined to any one part of the area, but is found in large continuous bodies and smaller isolated areas in almost all parts. Its upland position and general undulating and rolling topography affords rapid surface drainage, and unless terracing is practiced there is much damage from washing. Near the rivers and smaller streams the topography becomes rougher and the fields are more broken, in some instances the slopes being too steep for cultivation. In this case, if the best of precautions be not taken, it is often necessary to abandon the fields because of erosion, proving the folly of clearing the timber growth from such slopes. Terracing and contour cultivation is at present practiced throughout the type.

The formation of the Cecil clay has been brought about by the weathering and disintegration of the underlying rocks, which processes have usually taken place to great depths, cuts of 15 feet often revealing only well-formed red clay. Thus little opportunity is offered to study these rocks, but in most cases they are fine-grained granites, gneisses, or schists. West of McConnellsville and in other places where the type adjoins the Iredell clay loam, the more basic rocks of the latter soil have been prominent in its formation.

The agricultural value of the Cecil clay depends more largely on the cultivation and general management it receives than is the case with any of the other soils found in the area. Though naturally a strong and productive soil and one which responds readily to proper treatment and remains productive for a long period of time, shallow plowing, or plowing when wet, insufficient preparation, and neglect in cultivation reduce it below the average and make it one from which only meager results are obtained. It is probable that only in a very few instances are its fullest possibilities realized. "Broadcasting," or breaking up thoroughly with a turning plow, each year to a slightly greater depth, the use of the disk harrow, and the crusher, if necessary, in reducing the surface to a good tilth, followed by frequent but shallow cultivation to prevent the formation of any crust, together with a moderate application of barnyard manure and an occasional crop of cowpeas, may well be considered indispensable for the best results with this soil.

The Cecil clay is best adapted to wheat, oats, and grasses, while the average production of cotton and corn is about equal to that of any of the other types. Cotton makes slow growth in the spring, but after the soil warms up sufficiently and the plants are well started, they will withstand much more wet weather than on the other types. The crop also passes through periods of drought seemingly as well as on types of more favorable texture. Where special attention is given in the way of cultivation and fertilization, a bale and even more of cotton is produced, but the average will run about one-half bale per acre. Twelve bushels of wheat, 20 to 25 bushels of oats, and about 14 bushels of corn are considered fair average yields, while in all cases more can easily be grown. One and one-half to two tons of pea-vine hay have been grown after wheat and oats are harvested, but the general average will probably fall below 1 ton per acre. Though the after effects of growing this crop are not so immediate they are more lasting than on the more sandy types. Aside from the money value of the hay, which is said to be about \$10 a ton, the beneficial effects on the soil would warrant an increased acreage in this crop in a regular rotation.

The following table shows the average results of mechanical analyses of the Cecil clay:

Mechanical analyses of Cecil clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Pr. ct.	Pr. ct.	Pr. ct.	Pr. ct.	<i>Pr. ct.</i>	<i>Pr. ct.</i>	<i>Pr. ct.</i>
13458, 13460.....	Soil.....	2.0	7.8	6.4	18.2	13.2	23.5	28.5
13459, 13461.....	Subsoil.....	1.0	4.3	3.5	9.1	5.2	16.2	60.5

CECIL SANDY LOAM.

The soil of the Cecil sandy loam, to a depth of 9 inches, is a very light brown to gray sandy loam, the sand content of which is of the medium to fine grades. The subsoil, from 9 to 36 inches, consists of a compact red clay, essentially the same as the clay material of the Cecil clay, the two types being very closely related.

The topographic features of this soil are not unlike those of the Cecil clay, being of a general rolling character. Occasionally the Cecil sandy loam is found on the upper parts of ridges and the Cecil clay on the slopes below, in more or less broken and disconnected areas, due to the washing away of the sandy loam covering, but in the larger and more important areas, the former type occupies not only the ridges, but extends in its typical form down the entire slopes as well, the only exception being where the slopes are quite steep and deeply eroded. This condition arises near streams and occasionally extends some distance back from their courses. In such areas the subsoil frequently becomes less typical, changing to a more yellow color and to a looser and more open texture. Throughout the areas of this soil it is necessary to employ terraces or sidehill ditches to prevent erosion.

The important areas of this soil occur southeast and west of Fort Mill, north and northeast of Lesslie, about 5 miles south of Rockhill, south and east and northeast of Yorkville, while smaller and less important areas are found here and there in nearly all parts of the county. Other areas too small to be shown on the accompanying soil map, which is drawn on the scale of 1 inch to the mile, occur in slight depressions within the different areas of the Cecil clay wherever the sand has accumulated to a sufficient depth. The same is true of small areas of Cecil clay within the areas of Cecil sandy loam, where the surface sandy loam has been removed by washing, exposing the red clay below. In a few instances this mixture of the types occurred in so nearly equal proportions that it was a question for somewhat arbitrary decision which to indicate on the map. These bare spots require the same careful treatment as the Cecil clay, while the more sandy areas possess the peculiarities of the Cecil sandy loam, and hence are no little trouble in the cultivation of some fields.

A small area in the extreme southwestern part of the county along the Chester County line and extending to Broad River differs to some extent in both soil and subsoil from the main bodies of the type. Here the soil from 8 to 10 inches is a heavy dark-brown to reddish-brown sandy loam, containing a considerable proportion of coarse to medium sand, and the subsoil to a depth of 36 inches ranges from a sticky sandy loam to a heavy loam or sandy clay of a red color. Large yields of corn are secured on this phase, which is also well adapted to cotton, wheat, vegetables, and fruits.

The Cecil sandy loam is residual in origin, being derived from the underlying igneous and metamorphic rocks, principally granites and gneisses, in which a larger percentage of quartz is present than in those which form the larger and more typical areas of the Cecil clay. The finer clay particles have been removed by the drainage waters, and a larger proportion of the quartz particles has been left on the surface, forming the sandy loam covering. A small quantity of sand is likewise present in the subsoil, and quartz fragments of varying sizes are found in both soil and subsoil and on the surface, though only in a few instances in sufficient quantities to be a hindrance to cultivation.

While in productiveness the Cecil sandy loam is about equal to the Cecil clay, it possesses some salient differences. It is easier to cultivate, no special care need be taken as to the time or condition of the field when plowed or cultivated to prevent the formation of a crust or clods, and a cultivation is not so essential after rains to prevent the escape of moisture. While it warms earlier in the spring and is a more typical cotton soil in this one respect, in the event of too frequent and prolonged rains cotton is greatly injured. The practice of producing one crop continuously for many years has greatly exhausted the supply of organic matter, and its productiveness would quite generally be improved by increasing this very essential constituent. On the whole, however, it is a very desirable soil, well suited to the agricultural practices of the area.

Cotton, corn, pea-vine hay, and sorghum forage are grown with about equal success, but the soil is probably best adapted to cotton. By returning the seed from the crop each year and applying small quantities of commercial fertilizers, no difficulty is experienced in producing good yields year after year continuously, but such a system of cropping is not to be recommended. Under the present conditions one-half bale of cotton is an average yield. Experience has demonstrated that with the use of stable or cowpen manures and the growth of an occasional crop of cowpeas this yield can be almost doubled, with less expense for mineral fertilizers than under the present system. Such a system is equally as important with all the other crops grown. About 12 bushels of corn, 18 to 20 bushels of oats, 10 bushels of wheat, and three-fourths to 1 ton of pea-vine hay are fair average yields per

acre under the present average conditions of the type, all of which yields could be easily made much greater in the simple way suggested for cotton. Wheat and oats are not grown now as much as formerly on the type, but followed by cowpeas, both of these grains, although not so well adapted to this soil as to the Cecil clay, can be made profitable crops. The growing of cowpeas is increasing, and the beneficial effects upon the soil are very noticeable. This practice, together with slightly deeper plowing, so as to mix a part of the subsoil with the sandy top soil, can be relied upon to bring about a very great improvement in the productiveness of this type, even though it may in general be considered in a comparatively fair condition now.

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

Mechanical analyses of Cecil sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Pr. ct.	Pr. ct.	Pr. ct.	Pr. ct.	<i>Pr. ct.</i>	<i>Pr. ct.</i>	<i>Pr. ct.</i>
13470, 13474.....	Soil.....	6.3	18.1	9.3	25.8	13.0	14.9	12.2
13471, 13475.....	Subsoil....	3.5	7.2	3.8	7.3	3.8	23.8	51.2

In order to ascertain the manurial requirements of this soil, an examination was made by the wire-basket method. For this purpose a sample was selected from a field 2 miles northeast of Rockhill. This field has been planted to cotton continuously for thirty years, receiving applications of cotton-seed meal, acid phosphate, and manure in the last few years.

The results obtained indicate that a decided increase in productiveness may be obtained by the use of a complete fertilizer with lime, by the use of manure, or of cowpeas and lime. Fair results were obtained with nitrate of soda and sulphate of potash, with acid phosphate alone, with lime alone, or nitrate of soda alone. It was also found that lime when added to the soil several weeks before the soil was planted gave much better results than when added immediately before.

In these tests wheat plants were used as an indicator, and while the results are not held to be strictly applicable to other and unrelated crops, they will no doubt be found to be applicable to a large part of this soil in the area.

CECIL SAND.

The surface soil of the Cecil sand consists of a very light gray to white sand or sandy loam, medium to coarse in texture, and varying from 8 to 18 inches in depth, with an average depth of about 14 inches. Where the fields are newly cleared the soil has a decidedly darker color and the first 4 inches is a loamy sand, which condition is due to the

presence of a comparatively large proportion of organic matter. This, however, disappears after several years of continuous cropping, and the soil assumes the light color so characteristic of the type in general. While this supply of humus lasts the soil is much less affected by extremes of temperature and moisture content and possesses a greater crop value. Almost all of the type has been under cultivation for a great many years, in many instances cotton being the only crop for from twenty to thirty years in succession, and in the present condition of the soil moisture soon evaporates from the surface and crops are apt to suffer during slightly prolonged droughts, while frequent and prolonged rains are equally as injurious. Light showers at frequent intervals furnish the most ideal conditions for plant growth on this type.

The subsoil grades at varying depths from the overlying sand into a yellow sandy clay, open and somewhat porous in the upper part, but becoming more compact and having a higher clay content at the depth of 36 inches. Some coarse sand and fine gravel are generally present throughout the profile.

The Cecil sand is found in widely separate parts of the county, mainly in three continuous areas of from 8 to 12 square miles each. The largest and most level of these tracts extends 3 miles east from Clover and north to the county line. Another occurs northwest of Yorkville and west of Filbert. The third is in the southeastern part of the county and constitutes the region locally known as "Sand Tuck." Two smaller areas occur just east of this one near Catawba Junction, and others of similar size are found in different parts of the county.

The Cecil sand generally has a rolling topography. It occupies broad, well-defined divides which are cut here and there by small streams and erosions. Near these are the most rolling parts of the type, but only in a few instances is the surface rough. Farther from the streams the surface gradually becomes less rolling and in many instances is merely undulating. The general surface configuration, together with the relatively high position, affords excellent drainage and allows the fields to dry off quickly.

The Cecil sand is formed by the weathering and decomposition of a coarse-grained granite. During this process the finer particles of the surface soil have been removed by the drainage waters, while the coarser material, which is abundant in this rock, has been left on or near the surface.

The general characteristics of the Cecil sand adapts it naturally to the production of early truck. Each of the principal areas are found near railroads, but as yet no attempt has been made to grow truck crops for the market, possibly on account of the relatively high freight rates. Melons are now grown to some extent for the local markets and the result, so far as the product is concerned, is very gratifying. Cowpeas do well and show marked beneficial effects in the next suc-

ceeding crop. Farmers should sow this crop as often as possible and try to make it a part of a regular three-year rotation, suggested elsewhere in this report. The decay of the roots, besides furnishing nitrogen, also supplies organic matter and in a measure corrects the one great deficiency in this type of soil. Where this is done, much better results with all crops may well be expected, especially if manure is also applied.

Cotton is the chief crop grown, and corn, wheat, and oats to a much less extent. Sweet potatoes of an excellent quality are produced, but for domestic use only. Eight bushels of wheat, 18 bushels of oats, 10 bushels of corn, and one-half bale of cotton are fair average yields. The fact that this type is easily worked adds much to its favor in the estimation of the farmer, and this together with the fact that by fertilizing thoroughly it produces a yield of cotton equal to most of the other soils of the area, causes it to be valued at about the same price, which usually ranges from \$6 to \$10 an acre.

The following table shows the average results of mechanical analyses of the Cecil sand:

Mechanical analyses of Cecil sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Pr. ct.	Pr. ct.	Pr. ct.	Pr. ct.	<i>Pr. ct.</i>	<i>Pr. ct.</i>	<i>Pr. ct.</i>
13466, 13468.....	Soil.....	8.5	14.8	12.6	31.2	13.4	14.0	6.0
13467, 13469.....	Subsoil....	4.9	7.2	5.0	11.8	5.6	13.9	51.0

In order to study the manurial requirements of this soil, a sample was collected and examination made by the wire-basket method. The field from which the sample was taken is located about 2 miles southwest of Lesslie. It has produced crops of cotton, corn, oats, and cowpeas, but has received very little fertilizer, and is below the average in productiveness.

The results obtained show that a marked increase in productiveness may be obtained by heavy applications of stable manure, the use of a complete fertilizer, with or without lime, or by the use of cowpeas and lime. Sulphate of potash with acid phosphate, and nitrate of soda alone or with sulphate of potash produced a small increase. Lime when used alone gave only a very small increase, but when used in connection with other fertilizers seemed to be very beneficial.

In these tests wheat plants were used as an indicator and the results are not held to be applicable to other and unrelated crops or to fields which have received treatments essentially different from that from which the sample was taken.

IREDELL CLAY LOAM.

The Iredell clay loam is locally known as the "Black-jack" lands, so named from the predominating tree growth. The surface soil, averaging about 8 inches in depth, is a dark-brown loam which contains a large amount of organic matter as compared with the other soils of the county. There is usually a large percentage of small, gravelly iron concretions present in the soil and on the surface. Toward the outer edge of most of the different areas of the type the soil becomes sandy, on account of the influence of the surrounding types. The subsoil differs widely from the soil both in texture and color. From 8 to 30 inches it is a stiff, tenacious, waxy clay of a light-yellow color, and practically impermeable, locally known as "pipe clay." The subsoil is very retentive of moisture, and when only moderately wet plowing deeper than the shallow top soil is impracticable. Deeper plowing can be practiced, however, when the material is in a slightly drier condition by the use of the disk plow. The impervious clay stratum prevents disintegration and decay taking place at any great depth, as is the case in the Cecil clay and other types, and, as a result, below 30 inches there is usually found only partially decomposed rock material, which is looser and more open in texture than the superimposed material.

The largest area of the Iredell clay loam, and the one best suited to agriculture, is situated in the southern part of the county, extending east and west from Smiths Turnout and thence northward beyond Fishing Creek. This area occupies a broad basin-like depression, surrounded on all sides, except the south, by higher elevations. The soil is quite dark in color, the surface is level to gently undulating, and in many instances the natural drainage is very poor, but in almost every instance this can be overcome by surface ditching. As yet land values have not justified the expenditure of money in testing tile drainage, but when values increase the experiment should be made.

The area of next importance in size occurs south and southeast of Rockhill, beginning at the edge of the town and extending about 4 miles in an unbroken tract. Much of the surface soil of this area is somewhat lighter in color than in the area just described, the difference being due to the lower content of organic matter. This area also occupies a broad depression, but has a topography slightly more rolling and in general is better drained. Near Rockhill the type is somewhat stony and uncleared, being ill-adapted to cultivation. Stony areas occur in other parts of this body, but are of less extent. In many instances the stones have been picked from the surface and fields have thus been rendered well suited to cultivation even where they were practically worthless before.

An area about 4 square miles in extent occurs northeast of Rockhill, the most of which lies at a somewhat higher elevation, is more rolling, and has better drainage than the two areas already referred to. A slightly stony condition is quite prevalent, but in most cases the quantities are not sufficient to prevent cultivation. Smaller areas are found north of Fort Mill near the State line. About 8 square miles of the type is located in the southwestern part of the county, much of which is also stony. The topography is rolling, and while much of the area is under cultivation, a large proportion of it is better suited to grazing.

The Iredell clay loam is residual in origin, being derived from the weathering and decomposition of basic, igneous rock, which occurs in the form of intrusive dikes. The process of formation is practically the same as that of the other principal types of the county, but the difference in the character of the parent rock has formed a soil of striking peculiarities. The presence of an excessive amount of iron in this rock is doubtless largely responsible for the sticky, waxy nature of the subsoil.

It is said that the best of the Iredell clay loam was formerly considered almost worthless for anything but growing corn or grazing and that as late as fifteen years ago it could be bought for 50 cents an acre. Corn and grass could be grown to a good advantage, but other crops, especially cotton, rusted or "frenched" and gave very poor yields. This has been overcome, it is stated, by the use of potash fertilizers, principally kainit, and at present the type is considered a cotton soil about equal in productiveness to any other type in the county, although it must be admitted that all crops are greatly injured during wet years. About one-half bale would probably be the average production of cotton, though a bale per acre is often produced. This crop is now by far the most important of any on the type, and the acreage is believed to be increasing. As compared with the other soils of the county it is also well adapted to small grains and grasses. Yields of 12 bushels of wheat and 25 to 30 bushels of oats are often secured. Bermuda grass thrives, yielding an abundance of pasturage and hay. Cowpeas and sorghum do well, producing about a ton of forage per acre and occasionally more. Ten to 12 bushels of corn is considered a good yield. A small field was sowed to alfalfa last year, the success of which remains to be seen. So far it seems to be doing well, and it is probable that with proper preparation of the soil this crop may be grown with a reasonable degree of success on the better drained portions of the type. If reasonably successful, it would prove a great benefit to the impervious subsoil. It is more reasonable to suppose, however, while it may do well enough to be profitably grown, that this waxy, close-textured subsoil will in general be prohibitive, as this crop does best on a deep soil with a loose open

subsoil, well-drained bottom lands, which are seldom or never overflowed, being probably the ideal situation for the crop in the east.

There are a number of relatively small areas along or near Turkey and Bullocks creeks and their branches which have been classified as the Iredell clay loam, although differing in some respects from the general description of the type. Here the soil to an average depth of about 6 inches is a light-gray sandy loam, the sand ranging from medium to fine in texture, but the subsoil is very similar to that in the main areas of the type. This phase is not so well suited to agriculture, the topography being characterized by deep erosions, steep slopes, and narrow ridges. Some cotton and corn are grown, but the yields are small.

The following table shows the average results of mechanical analyses of the Iredell clay loam:

Mechanical analyses of Iredell clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Pr. ct.	Pr. ct.	Pr. ct.	Pr. ct.	<i>Pr. ct.</i>	<i>Pr. ct.</i>	<i>Pr. ct.</i>
12824, 13488.....	Soil.....	10.4	14.9	5.6	12.6	10.6	27.6	18.2
12825, 13489.....	Subsoil....	1.4	3.8	1.7	8.9	8.0	34.6	46.8

The manurial requirements of this soil were determined in tests made by the wire-basket method. For this purpose a sample was collected near Ogden. The field from which the sample was taken has been in cultivation eighteen years, and for the past ten years has been in cotton, with a gradual increase in yield, due probably to thorough cultivation and the use of considerable quantities of manure, ashes, and kainit.

The results obtained by this examination indicate that a large increase in productiveness can be secured by the use of manure. Nitrate of soda, cowpeas and lime, or a complete fertilizer gave a small increase, while sulphate of potash alone, lime alone, or acid phosphate alone gave little, if any, benefit.

In these tests wheat plants were used as an indicator, and the results are not held to be applicable to other and unrelated crops or to fields which have received treatments differing from that of the field from which the sample was taken.

CECIL SILT LOAM.

The Cecil silt loam is a light-gray to white silt loam, with an average depth of about 8 inches. The type has the local names, "white land" and "gray land." The light color, which is doubtless due to low organic matter content, is prevalent throughout the type, except in occasional slight depressions or on slopes where the subsoil comes near

the surface. This latter condition often gives rise to a rather heavy silt loam surface soil. The subsoil, extending from 8 to 36 inches, is a light-red to reddish-yellow heavy silt loam or sometimes a red clay. In general, the type is comparatively free from large stones, but areas are of frequent occurrence where from 5 to 25 per cent of the true soil and a smaller proportion of the subsoil is composed of angular quartz fragments.

The type was first encountered in the extreme eastern part of the county, where an area of considerable extent occurs north of Catawba Junction, along the Catawba River. No other body of this soil was found until the survey had reached the western and northwestern parts of the county where it becomes the principal type. It extends along the North Carolina line for a distance of about 6 miles and extends southwest to the Cherokee County line and to the vicinity of Smyrna and Hickory and westward to Broad River. The northern part of this extensive tract is quite generally rough, uncleared, and very little under cultivation; but this condition decreases to the south. The type as a whole is rolling to rough, the streams and draws having reached considerable depths below the adjacent slopes and ridges. The roughest parts are found near the rivers and small streams and where the type approaches the foothills of Kings Mountain. The general surface is such as to afford excellent surface drainage, but on the steeper slopes it is so rapid and the soil washes so readily that where cultivated great care must be observed to prevent serious damage by erosion.

The Cecil silt loam is formed by the weathering of highly metamorphosed schistose rocks. It is generally considered a rather poor soil for agricultural purposes. The possibilities of improving the fields which are best suited to cultivation, however, are very great. The lack of organic matter is doubtless the main deficiency of the type, and the chief aim of the farmer should be to remedy this defect. Possibly no means of accomplishing this is more easily within the reach of all than the growing of field peas at frequent intervals, preferably in a regular rotation. The beneficial effect of stable and cowpen manure on this soil would, it is believed, be found to be very great. All the roughage, grass, and stubble which accumulates on the farm should be plowed under to a good depth.

Cotton is the prevailing crop on this soil, as on the other types of the county. The yield is probably lower on an average, doubtless dropping below one-half bale per acre. Corn is grown to a less extent and the yield is correspondingly low, 6 to 10 bushels per acre being considered a fair yield under ordinary conditions. There is very little wheat and oats grown. Most of the farms have an ill-kept appearance. The price of land varies from \$5 an acre for the poorer to \$12 an acre for the better areas.

The following table shows the results of the mechanical analysis of a typical sample of the soil and subsoil of the Cecil silt loam:

Mechanical analyses of Cecil silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Pr. ct.	Pr. ct.	Pr. ct.	Pr. ct.	<i>Pr. ct.</i>	<i>Pr. ct.</i>	<i>Pr. ct.</i>
12822.....	Soil.....	1.5	3.7	1.3	4.2	12.9	61.4	14.7
12823.....	Subsoil....	0.9	1.7	.7	2.5	6.9	43.3	43.6

CECIL FINE SANDY LOAM.

The surface soil of the Cecil fine sandy loam is a gray to light-gray fine sandy loam, averaging about 8 inches in depth. Below this is found a light-red to yellow silty clay. This soil as a whole is very closely associated with the Cecil silt loam and may be considered an intermediate type between it and the Cecil sandy loam. In some instances it grades so gradually into the silt loam that it is difficult to determine the exact boundaries. Like the silt loam, also, small quartz fragments are frequently scattered over the surface.

About 35,136 acres of this soil was mapped, occurring in two principal and a few smaller areas. The largest one of these areas, situated in the northwestern part of the county, extends from the State line in a southwest direction to within a few miles northeast of Hickory. One of less importance begins about a half mile west of Hickory and continues westward almost to Broad River. A still smaller area is found southwest of Smyrna, which, together with a few others of less extent, constitutes the remainder of the type in the western part of the area. A continuous area, containing 14 square miles, is situated in the southeastern part of the county, in the vicinity of Lesslie and Catawba Junction. It will be noticed that the areas of this type occur quite generally between the Cecil silt loam and the other soil types.

A generally rolling topography, accompanied by good surface drainage, is found in this type. Terracing to prevent erosion is necessary and is practiced over most of its extent.

The Cecil fine sandy loam is derived from the underlying rock formations, which range from a fine-grained granite to the finer-textured crystalline rocks found beneath the Cecil silt loam, enough of the finer quartz particles being present to form a sandy loam.

The crops grown on this soil do not differ materially from those on the others. It is probably a slightly better type than the Cecil silt loam, but is generally rather inferior to the Cecil sandy loam, as indicated by the crop yields. A greater proportion of the type is under cultivation in the southeastern part of the county than in the northwestern and the farms are better kept, showing a more prosperous condition and a more advanced agriculture.

The following table gives the average results of mechanical analyses of the Cecil fine sandy loam:

Mechanical analyses of Cecil fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Pr. ct.	Pr. ct.	Pr. ct.	Pr. ct.	<i>Pr. ct.</i>	<i>Pr. ct.</i>	<i>Pr. ct.</i>
13478, 13480.....	Soil.....	0.8	2.7	3.0	28.8	36.9	17.1	11.6
13479, 13481.....	Subsoil....	.4	2.1	2.0	12.3	18.9	13.9	49.7

MEADOW.

The Meadow is usually a loose loamy sand to sandy loam. It lies along the streams and is commonly known as bottom lands. In this area the Meadow forms some of the best corn lands. Some of the type is low and wet, a condition probably more prevalent along the smaller streams, although not constant along the entire length of any of them. The Meadow along the rivers would normally be overflowed only in the case of floods, were it not for artificial dams. Above the dam of the Catawba Power Company on the Catawba River all of the Meadow is under water most of the time, while below this dam some excellent farming land exists, the greater part of which is under cultivation every year, and little damage from overflow is sustained.

Corn is the principal crop, yielding from 40 to 50 bushels during favorable years and averaging probably 20 bushels one season with another. Abundant growths of hay and grass are produced, and occasionally good yields of cotton. About the same condition exists along the Broad River, but the bottoms are usually narrow. Alfalfa could probably be successfully grown on the higher and better drained areas, where not subject to overflow.

CECIL STONY CLAY.

The Cecil stony clay is a heavy red loam, 6 to 8 inches deep, underlain by a heavy red clay to the depth of 36 inches. On the surface and within the soil is usually from 30 to 60 per cent of rock fragments, from 6 inches or less in diameter to small boulders, and the subsoil generally contains a smaller percentage of a rock of very similar character.

There are thirteen small areas scattered over the county, no one of which is much over one-half square mile in extent. The most typical development is found in the areas near Turkey Creek, in the southwestern part of the county, and on Nannys Mountain and two other hills near it in the northeastern portion. On Henrys Knob, west of Clover, and on a narrow ridge of Kings Mountain in the extreme northwestern corner the rocks are metamorphic instead of granitic, and the soil is more silty in character. The type here, as well as on Nannys Mountain, is too steep and rough to admit of cultivation—

in fact, it is not even suited to pasture, its principal value being for forestry purposes. Very little of the type is under cultivation, almost its entire area being devoted to pasture or allowed to remain in forest.

The following table gives the results of mechanical analyses of fine earth samples of the Cecil stony clay:

Mechanical analyses of Cecil stony clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Pr. ct.	Pr. ct.	Pr. ct.	Pr. ct.	<i>Pr. ct.</i>	<i>Pr. ct.</i>	<i>Pr. ct.</i>
13484.....	Soil.....	0.5	1.6	2.3	22.7	12.9	18.0	41.8
13485.....	Subsoil....	1.3	3.6	4.2	22.1	14.3	18.8	35.4

ROCK OUTCROP.

The two small areas of Rock outcrop in the county occur east of Clover. Here the coarse-grained granite that forms the Cecil sand of that part of the county is laid bare. On the Cecil sand northwest of Yorkville large and isolated boulders occur, but not to such an extent as to warrant classifying the areas as Rock outcrop.

AGRICULTURAL METHODS.

The benefit of better preparation and cultivation of the soil is being realized in this part of South Carolina, and modern farm machinery is coming into use with good results. There is, however, here as elsewhere, the same conservatism and tendency to stick to methods which have been in vogue so long as to become second nature, which is characteristic of the man who tills the soil. These methods combine what would seem to be the experience of farmers for a long period of time, but many of them have been formed without much thought or experimenting to test their real value. There is, therefore, much room for improvement in the general agricultural practices of the county.

The tendency to grow the crop which can be most easily turned into ready money at the close of each season has caused the attention of all to be turned principally to the production of cotton. In this way a one-crop system has become the dominant feature of the local agriculture. There is always a ready market for this product, and considering only the matter of immediate income the farmer can not see how he can afford a change of crop for even a year for the benefit of the soil, and consequently keeps on growing cotton year after year on the same fields sometimes for as long a period as twenty to thirty years. In this way the organic or humus content of the soil is exhausted, especially on the more sandy types, and the natural productiveness is reduced, and the crop must be kept up by the use of commercial fertilizer and cotton seed. By fairly liberal applications the yields are maintained reasonably well, and no very serious effects

are noticed, but it is believed this is done at too great a cost. In 1900 there was an expenditure of \$113,000 for fertilizers. A matter now almost totally neglected—the production and proper use of manures on the farm—would change this aspect of the case. It is the belief of some of the best farmers that with the use of stable or other manures more cotton can be grown per acre than under the present system. It is probable, however, that the best results can be obtained by a combination of organic and mineral fertilizers. There is, therefore, in any event an imperative demand for the keeping of more live stock on the cotton farms.

Another very important matter in growing cotton is a more careful selection and consequent improvement of the seed.^a This is receiving very little attention, the seed for planting being taken in bulk as it comes from the gin. Much can be done to increase the yield by selecting seed from the best and most thrifty plants, which possess ideal qualities in regard to stock or weed, number of bolls, and length and quality of staple. These seed should be planted on a separate plot, away from the remainder of the crop, and the plants given special attention. Some provision of this kind should be made each year for getting the best seed possible for the next season's planting.

The preparation of the soil for the crop should in general be more thorough, and the plowing, especially on the clay and "black jack" lands, should be deepened as much as possible. Fall plowing, it is thought, is a good practice. More level cultivation would also doubtless prove an advantage.

By establishing Bermuda grass pastures and growing more forage of different kinds, including the legumes wherever practicable, cattle and cotton raising should go well together. It is said, however, that this can not be done profitably; that the expense of feeding an animal through the winter is often equal to his value. The introduction of better meat-producing strains, or, where local conditions would permit, of dairy cattle, would perhaps show the question in a different light, and even if this is not done the farmer should consider that his feed has partly been converted into a form which is of most value to him on his farm and that he should look for the real profits in the increase in the next year's cotton crop and the general improvement of his land. It is time to cease working for immediate returns in money to the detriment of the soil.

There is also great need of a systematic rotation of crops, but because few crops will yield as much in ready money as cotton this feature of a rational agriculture is not considered. Here the increase in the number of farm animals will play an important part, making possible

^a For an interesting discussion of the selection of cotton seed see *Improvement of Cotton by Seed Selection*, by Herbert J. Webber, Yearbook Dept. of Agr., 1902.

rotations that would not be profitable otherwise, since the production of more forage becomes a necessity. An excellent yet simple rotation well suited to present conditions is, first year, cotton; second year, corn and cowpeas; third year, wheat or oats, followed by a crop of sorghum and cowpeas or cowpeas alone. If desired, the wheat or oats may be omitted and two crops of pea-vine hay grown, cotton following the next year. In regard to oats, it is quite generally believed that this is not a profitable crop to grow, but by sowing in September, either by the open-furrow system or with a drill, a yield of as much as 50 bushels has frequently been secured. Many prefer sowing in the open furrow, as it aids the crop in withstanding the effects of the freezing and thawing of the soil during winter. Spring oats should not be sown. In this rotation experience might show that it would be preferable to apply to the peas whatever manure was derived from the feeding of stock. Frequent mention has already been made in this report of the value of growing cowpeas, preferably in some such rotation as detailed above, but considering the success with which this crop can be grown and the beneficial effects that result it is thought that too much stress can not be placed on this subject, and it is gratifying to note that there is from year to year a gradual increase in the acreage devoted to this crop.

To overcome certain market conditions and to regulate the price of the raw material somewhat, there is a general movement in the cotton-growing States to reduce the acreage. This is probably a very wise precaution against low prices in general, but while the farmer is reducing his acreage there should be a determined effort to increase the production per acre by the use of improved seed, better cultivation, and by building up the worn-out fields. At the same time the land withdrawn from cotton culture should be devoted to some other product giving direct or indirect profit. This is another argument in favor of rotation.

AGRICULTURAL CONDITIONS.

That a general betterment in the condition of the land-owning class of the agricultural population has been taking place is very evident. While the degree of prosperity varies somewhat in different sections of the county, because of differences in local conditions, soils, etc., by far the greater part of the county is well suited to development of agricultural interests, and the general progress made not only equals but surpasses that of most cotton-growing districts. A large proportion of the farmhouses are commodious, well-built two-story buildings, painted and in good repair. Many are new structures and many others are in the course of construction.

In those parts of the county in which these signs of prosperity are the most marked the land holdings are generally smaller than the average and under the direct management of the owner who lives on

the land himself. Where it is possible to secure sufficient and reliable labor by the day or month probably the most satisfactory results are obtained in this way, but this is becoming more difficult from year to year. The next most satisfactory way, if not equally satisfactory, is to rent the land in "one-horse farms," about 30 acres each, the owner of the land furnishing the mule to tend the crop, having general supervision as to the acreage to be planted to each crop, change of crops, cultivation, etc., and receiving a part of the crops as payment. Under this system, also, the landowner enjoys the right to see that the farm animals are well cared for and kept in good condition. One-half of the entire crop is the rent usually charged. A number of landowners live in town, often some distance from the farm, and lease it by the year for a cash rental, usually about \$1 to \$1.25 an acre, but as a rule, even where land is leased, payment is made in cotton, from 800 to 1,000 pounds of lint cotton for each one-horse farm of about 35 to 40 acres. In this case the tenant furnishes the work stock and generally all fertilizers. While the rent is nearly always paid, little interest is taken by the tenant to keep the farm productive. In nearly all cases and under whatever system it is necessary for the landowner to "advance" the tenant sufficient provisions for himself and family during the winter and until another crop is produced, which crop in turn is mortgaged and practically consumed before it is ready to gather. The fact that only 25 per cent of the total number of farms in the county are operated by the owners shows how prevalent these practices are.

In 1900 the average size farm in York County contained, according to the census, 84 acres. As a matter of fact the individual holdings are much larger than this, as the classification used by the Census Office in 1900 rated each tenancy as a farm.

Formerly there was adequate supply of farm labor, but changed conditions have gradually been bringing about a scarcity, the effects of which, although varying somewhat in different sections, are being felt more or less all over the country. The increase in the cotton manufacturing industry has taken practically all the white laborers to work in the mills. Since over 52 per cent of the population of the county are colored, it would seem that all needed farm labor could be drawn from this race, but many seek other employment, generally in the towns or on public works where the wages are higher, while the more skilled agriculturally prefer to farm for themselves under one or another form of tenancy. As a result a general scarcity of labor is being felt, which will in time have its effect upon the agriculture of the area. The farmer will have to meet this by doing his own work with the aid of more improved machinery. It is not an uncommon sight now to see the white farmer and his entire family at work in the fields together during the busiest season of the year.

The importance of cotton as a product of the county may be appreciated from the fact that it lacks but little of covering as large an

acreage as all the other crops combined. It is the one crop of the county, and the prosperity of almost the entire producing population depends directly or indirectly on the amount of money this crop brings into the county at the end of each season. Corn is the crop of next importance and in 1900 was occupying almost two-thirds as large an acreage as cotton. It is found that early planting yields the best returns. According to the same authority wheat was the crop of next importance, but there has been a general decline in the acreage since 1900. Other crops have comparatively small acreages, and, like corn, are grown only in sufficient quantities to meet or partially meet local requirements.

Formerly little or no attention was given to the growing of grasses, legumes, and other forage crops. The area of land devoted to these crops shows a decided increase in recent years. It is said that alfalfa can be easily grown in the county, though this legume has not been given a general test on the different soils to determine the yields and the length of time the fields will run without reseeding. Bermuda is considered the best grass for pasture and hay, and it stands drought better and gives more constant yields than any of the other sorts tried. Japan clover makes excellent pasturage. Several crops of good hay are often cut when the season is favorable. It is a very common complaint that red clover is not well suited to the conditions of the area and that it does not stand the heat of summer well. But this crop under favorable treatment in the way of a thorough preparation of the soil and a moderate application of manure was observed to give quite satisfactory results on several fields in the county, and it is believed that it can be very profitably grown if these precautions are taken. Crimson clover is probably better suited to this climate, but on the whole is probably not so desirable a crop as red clover. There is little market for clover hay, and since there are comparatively few cattle in the county there is little to encourage the growth of either of these crops as a source of direct profit. Johnson grass grows to a good advantage, especially in the bottom lands, where it is quite common, yielding a large quantity of hay and good pasturage. It is difficult to kill out and is a great hindrance to cultivation, which with its tendency to spread makes it very objectionable. Sorghum thrives, gives large yields of forage, and is meeting with general favor throughout the county. The production of dairy products is limited to supplying the local markets.

Because of the one-crop system of the area there is little opportunity to take advantage of soil adaptation, and no attention is paid to the matter. There are differences, nevertheless, which are plainly recognizable. The Cecil clay is well adapted to the growing of wheat, oats, clover, and cowpeas, and the grasses, while it is a very strong soil for cotton and corn, the average yields of the former probably equaling that on any other type in the county. The objection some-

times offered is that the lint is often stained by the red dust or the splashing of the soil by beating rains. This soil is easily built up, and it keeps cotton producing later in the fall than do the other soils. The Cecil sandy loam is more typically a cotton soil, but fair yields of corn, wheat, and oats are also obtained. Sweet potatoes and other crops which require a warm soil do well. The subsoil is not open or porous, and hence holds moisture well, and the soil is sandy and easily cultivated, and on the whole it is a type which comes nearest meeting the general requirements of all the crops of the area. The Cecil sand is best suited to cotton, melons, and early truck crops, and the Iredell clay loam to grass, cotton, and corn. The Meadow, or bottom lands, of the area is best adapted to corn and to grasses for hay and pasture. Where well drained and not subject to frequent overflow, alfalfa would perhaps do better on this than on any of the other types of the area.

The transportation facilities of York County are above the average for the Southern States. One branch of the Southern Railway crosses the eastern part through Fort Mill and Rockhill. Another branch crosses from the southeast corner and passes out near the northwest corner, running through Rockhill and Yorkville. The Carolina and Northwestern passes north and south through the center of the county, touching McConnellsville, Yorkville, and Clover. The Seaboard Air Line passes through the extreme southeastern part of the county. These roads afford a great number of shipping points, which are well distributed and within reach of nearly every part of the county.

Several first-class macadamized roads have been built during the last few years and more are under construction. Aside from these the roads of the county are poor during much of the winter and spring. There are a few modern road scrapers in the county, and by a more extended use of these the dirt roads in general could be greatly improved.

The present markets of York County are limited mainly to the handling of cotton. The production of all the other agricultural products now grown, or which might be grown, depends simply on the local demand or the demand of the near-by larger Southern cities. While there is probably sale for more fat cattle, sheep, and hogs than are now produced, the facilities for handling these locally are wanting and do not permit of any great increase along these lines. The establishing of a first-class packing house within the borders of South Carolina, insuring a certain and constant market for live stock, would do much to encourage the live-stock industry, so badly needed to work improvement in the present system of agriculture. This matter is believed to be worthy the attention of local capitalists.

[PUBLIC RESOLUTION—No. 9.]

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

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

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

Approved, March 14, 1904.

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

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