SOIL SURVEY OF CHEROKEE COUNTY, SOUTH CAROLINA.

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

LOCATION AND BOUNDARIES OF THE AREA.

Cherokee County lies in the northwestern part of the State of South Carolina and adjacent to the North Carolina line. It is bounded on the east by York County, on the south by Union County, and on the west by Spartanburg County. Broad River, after flowing across the county, forms a part of its eastern boundary, and Pacolet River its southern boundary.

Fig. 12.—Sketch map showing location of the Cherokee County area, South Carolina.

Gaffney, the county seat, is a thriving, progressive town, which has gained rapidly in population and commercial importance within the last ten years. Its present population is not less than 4,000. Blacksburg is another town of considerable importance in the county.

HISTORY OF SETTLEMENT AND AGRICULTURAL DEVELOPMENT.

In 1897 Cherokee County was formed from portions of the three adjoining counties—Spartanburg, Union, and York. The early set-

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a As Mr. Drake was ill during a considerable part of this survey, the report was prepared largely by Mr. Belden.
tlers came from Pennsylvania, Virginia, and North Carolina, and were mostly of Scotch-Irish and English ancestry. They began locating permanently within the present boundaries of this county between 1760 and 1770, and, being a considerable distance from the towns that sprang up in each of the counties above named, this section remained comparatively thinly populated until a hundred years later. However, a number of large plantations were operated during the first half of the nineteenth century, principally in the southeastern part of the county. Each plantation supplied most of its own needs. Corn, wheat, oats, pork, and some beef were the staple products. Many other minor crops, which later included cotton, were also grown for home use. Ironworks, established at Cherokee Ford on Broad River, continued in operation until the close of the civil war.

Corn, wheat, and pork were the products first sold to the nearest towns, and by 1850 a little cotton was produced on the plantations near Broad and Pacolet rivers. A railroad from Spartanburg to Columbia was built through Union County in 1858, which soon gave a new impetus to cotton growing, then a young industry in this section. Horsepower gins were built before the war, but the cotton used at home, as most of it was at that time, was still often separated from the seed by hand.

In 1873 the main line of the Southern Railway was completed through what is now Cherokee County, and the town of Gaffney founded near Limestone College. Up to this time little cotton had been sold from the central and northern parts of the county, but with the new means of transportation and the increasing demand for cotton the valuable farming land of this region was soon put in cultivation to this staple. White farmers settled upon new land that could be rented or purchased at a low figure, and much of the land now under cultivation has not been cleared more than twenty-five or thirty years. Its value near Gaffney was from $1.50 to $3 an acre in 1873, whereas it now brings $25 an acre. Farther from town the land, bought for $8 in 1890, is now worth $20 to $25 an acre.

The farming population increased very rapidly, as much as one-third in some parts of the county, between 1880 and 1890. In 1886 and 1888 the Marion and Kingsville branch of the Southern Railway was constructed through Blacksburg and helped to develop the country along its route. Shortly after 1880 the first cotton mill in the county was built at Cherokee Falls, and in 1896 a large cotton mill was erected in Gaffney, since which time three other cotton mills have been built in Gaffney and one in Blacksburg.
CLIMATE.

The following table, showing the normal monthly temperature and rainfall, is compiled from records of the Weather Bureau stations at Gaffney and Yorkville. The latter town is situated in the adjoining county of York, but is near enough to make the figures applicable to the area surveyed. Unfortunately, normals of temperature were not available for Gaffney.

Normal monthly and annual temperature and precipitation.

<table>
<thead>
<tr>
<th>Month</th>
<th>Yorkville</th>
<th>Gaffney</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Temperature</td>
<td>Precipitation</td>
</tr>
<tr>
<td></td>
<td>°F.</td>
<td>In.</td>
</tr>
<tr>
<td>January</td>
<td>43.1</td>
<td>3.86</td>
</tr>
<tr>
<td>February</td>
<td>46.4</td>
<td>4.77</td>
</tr>
<tr>
<td>March</td>
<td>53.1</td>
<td>4.90</td>
</tr>
<tr>
<td>April</td>
<td>61.6</td>
<td>3.78</td>
</tr>
<tr>
<td>May</td>
<td>71.3</td>
<td>3.58</td>
</tr>
<tr>
<td>June</td>
<td>77.1</td>
<td>6.75</td>
</tr>
<tr>
<td>July</td>
<td>79.2</td>
<td>5.43</td>
</tr>
<tr>
<td>August</td>
<td>77.9</td>
<td>4.96</td>
</tr>
<tr>
<td>September</td>
<td>73.6</td>
<td>4.38</td>
</tr>
<tr>
<td>October</td>
<td>62.0</td>
<td>3.78</td>
</tr>
<tr>
<td>November</td>
<td>53.1</td>
<td>2.98</td>
</tr>
<tr>
<td>December</td>
<td>46.1</td>
<td>2.98</td>
</tr>
<tr>
<td>Year</td>
<td>62.0</td>
<td>32.15</td>
</tr>
</tbody>
</table>

The average annual rainfall of 50 inches is very well distributed throughout the year. The rainfall is heaviest during the three summer months when the temperature is highest and the growing crops need the most moisture and is lightest during the cotton picking in October, November, and December. The average date of the last killing frost in spring, as recorded at Gaffney, is April 5, and the first in fall is November 6. This gives a growing season of seven months, which is ample for maturing the cotton crop.

PHYSIOGRAPHY AND GEOLOGY.

The surface of Cherokee County is partly very rolling to hilly and partly gently rolling. The very hilly section, comprising about one-third of the area of the county, consists of an extension of Kings Mountain, which enters the county in the northeastern corner and extends southwesterly for a distance of 18 miles, terminating at a point on Thickety Creek 7 miles south of Gaffney. The average width of this region is about 8 miles. The rougher, more broken areas occur along Kings Creek and Broad River, especially along the upper part of the creek and near Cherokee Falls.

Partially encircling the Kings Mountain region and covering the remaining two-thirds of the county is a more level country, typical of the Piedmont Plateau. This is smoothest in the region northwest of Gaffney, where the streams are small and erosion less active. Here the only very rough areas are found in the vicinity of Thickety Mountain and in certain places along Thickety Creek. In other parts of the
county, along the larger streams, the surface is generally much more hilly than in the interstream plateaus, but the southern part of the county also lies well for farming purposes.

As in nearly all parts of the Piedmont Plateau the regional drainage is very complete. The chief stream is Broad River, which flows through the county in a generally north and south direction. Into this stream empty the Pacolet River, forming the southern boundary of the county, and Thickety Creek, which, with their many tributaries, drain the most of the western and southern parts of the county. These streams have a generally southeasterly course. The drainage of the northern parts of the county also finds its way into Broad River through a number of smaller streams. Many of the streams afford water power, which has been partly developed.

The geological formations consist mainly of igneous rocks, although the Kings Mountain belt is made up of metamorphic rocks, and there are two occurrences of limestone. Granite is the prevailing rock, with gneisses and schists in the mountain area. The latter rocks give rise to the Cecil silt loam and Cecil fine sandy loam, and where the bedrock comes near the surface, as on the crests of the highest ridges, to small areas of Cecil stony loam. The three types derived in whole or for the most part from granites are the Cecil sandy loam, Cecil sand, and Cecil clay.

The geological formations are of some importance economically. Tin and monozite are being mined at present, while bodies of iron and some other minerals are known to exist. The limestone formation near Gaffney on Limestone Creek is quarried and burned.

SOILS.

With the exception of Meadow, the soils mapped in the present survey are residual. Eight distinct types are recognized, all of which have been found in earlier surveys within the Piedmont Plateau. The following table gives the name and extent of each type:

<table>
<thead>
<tr>
<th>Soil</th>
<th>Acres</th>
<th>Percent</th>
<th>Soil</th>
<th>Acres</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cecil sandy loam</td>
<td>105,024</td>
<td>45.5</td>
<td>Meadow</td>
<td>6,208</td>
<td>2.6</td>
</tr>
<tr>
<td>Cecil silt loam</td>
<td>48,384</td>
<td>21.0</td>
<td>Iredell clay loam</td>
<td>1,344</td>
<td>.6</td>
</tr>
<tr>
<td>Cecil fine sandy loam</td>
<td>33,792</td>
<td>14.6</td>
<td>Cecil stony loam</td>
<td>832</td>
<td>.4</td>
</tr>
<tr>
<td>Cecil clay</td>
<td>22,592</td>
<td>9.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cecil sand</td>
<td>12,736</td>
<td>5.5</td>
<td>Total</td>
<td>230,912</td>
<td></td>
</tr>
</tbody>
</table>

CECIL SANDY LOAM.

The soil of the Cecil sandy loam, to a depth of from 5 to 12 inches, is a brown medium sandy loam. The subsoil, to a depth of 36 inches, is a compact friable clay of a light or dark red color, sometimes contain-
ing a little coarse sand and usually slightly lighter in texture than the subsoil of the Cecil clay. In the surface soil there is also often found considerable coarse sand and some small quartz fragments, the latter usually being more numerous on the ridges. Over a few square miles in the vicinity of Cowdeysville, small quartz and other rock fragments form from 5 to 15 per cent of the surface soil and give the type there the local name of "gravelly sandy land." From that locality extending westward to the county boundary both the soil and subsoil contain considerable coarse sand, owing to the coarser texture of the parent rock. The sandy loam soil is usually deeper and lighter textured where the surface is most level, which may be at the top of a ridge or at the bottom of a slope. A slightly heavier sandy loam is found where some washing has taken place or the underlying rock is finer grained.

Beginning north of Blacksburg, the type covers nearly all the northwestern third of the county. It also extends along the western side and again occupies most of the strip 5 or 6 miles wide across its southern end.

Much of the more level portion of the type lies to the northwest of Gaffney and needs but little terracing to prevent washing, the eroded portion being confined to a few cuts near the creeks.

Along Broad River and Buffalo Creek and in the extreme southern part of the county along Pacolet River the type presents a rougher surface, because of its proximity to these larger streams, which flow in deep channels. A strip of country a mile or more in width along each of these streams and large inflowing creeks is formed of a succession of rounded hills. These hills are not often too steep or badly eroded to prevent cultivation, and the roads usually follow the wide ridges where very little erosion has yet occurred.

On even the most level tracts there is sufficient drainage to allow the surface water to run off. A large amount of the rainfall percolates through the soil into the heavy clay subsoil to be retained there for the future use of the crop. When the surface becomes dry it does not bake into a crust, but in its loose condition acts as a mulch to prevent the rapid evaporation of the soil water. This feature of the Cecil sandy loam causes the cotton crop to suffer more during a prolonged wet period than it does on the Cecil clay, from which the water runs off rapidly. But all crops stand a drought better on this type of soil than on the Cecil clay.

The soil owes its origin to the disintegration of the underlying granite, which is usually encountered at a great depth below the surface. Near the Cecil fine sandy loam and the Cecil silt loam, notably in the southeastern part of the county, the Cecil sandy loam is derived in part from gneiss and schist.

A larger percentage of the Cecil sandy loam is in cultivation than of any other soil type in the county. It is well adapted to cotton and the

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secondary crops of this region, and sells for $8 to $25 an acre. When a crop of cowpeas is grown about every third year, by thorough cultivation and the use of barnyard manure the yield of cotton will average from three-fourths of a bale to 1 bale per acre on this soil. On the other hand, where cotton has been continuously cultivated under the tenant system, with the exclusive use of commercial fertilizers, a low yield is secured, ranging from one-fifth to one-third bale per acre. The average yields, taking the type as a whole, are about one-half bale of cotton, from 12 to 15 bushels of corn, from 5 to 8 bushels of wheat, and from 2 to 3 tons of cowpea hay per acre.

The following table shows the results of mechanical analyses of samples of the fine earth of the Cecil sandy loam:

**Mechanical analyses of Cecil sandy loam.**

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Fine gravel</th>
<th>Coarse sand</th>
<th>Medium sand</th>
<th>Fine sand</th>
<th>Very fine sand</th>
<th>Silt</th>
<th>Clay</th>
</tr>
</thead>
<tbody>
<tr>
<td>13867</td>
<td>Soil</td>
<td>4.8</td>
<td>16.9</td>
<td>10.7</td>
<td>30.7</td>
<td>14.1</td>
<td>12.1</td>
<td>10.1</td>
</tr>
<tr>
<td>13868</td>
<td>Subsoil</td>
<td>2.9</td>
<td>7.3</td>
<td>3.5</td>
<td>11.5</td>
<td>4.1</td>
<td>18.4</td>
<td>51.9</td>
</tr>
</tbody>
</table>

A study of the manurial requirements of this soil was made in the Bureau laboratories by the paraffined wire-basket method. The soil used was a brown medium sandy loam with a heavy, friable red clay subsoil. The field from which the sample was taken was cleared from an oak forest twenty years ago and was later abandoned, but for the last three years has been planted to cotton, receiving 200 pounds of complete mineral fertilizer each year.

The results obtained indicate that an excellent increase in productivity may be secured by the use of manure or by nitrate of soda with sulphate of potash; that nitrate of soda alone or sulphate of potash alone will give a medium increase, while lime alone or acid phosphate alone will give little if any increase. Cowpeas and lime gave only a small increase, but in field practice would probably prove more beneficial.

Those farmers interested in making field tests along the lines indicated should bear in mind that wheat plants were used as an indicator in the above experiments and that the results are not held to be strictly applicable to other and unrelated crops or to fields which have received treatments essentially different from that from which the sample was taken.

**CECIL CLAY.**

The Cecil clay consists of a heavy reddish-brown loam or clay loam, 5 inches in depth, underlain to a depth of 36 inches by a heavy red clay, which is rather friable and slightly micaceous. On the surface over about half of the area of the type are found fragments of quartz, granite, and gneiss, ranging in size from 2 to 6 inches in diameter.
The more stony areas lie in the southern and southeastern parts of the county.

The largest body of the type lies southwest of Gaffney along Thickety Creek, the remainder being scattered throughout the county in smaller tracts. East of Blacksburg the type occurs on steep hill slopes, surrounded by the Cecil silt loam. Here the soil is rather silty and the surface rougher than is usual for the Cecil clay, although nearly all of the type in the county is hilly—a larger proportion of it being subject to destructive washing than in any other of the types. Even where most level the surface is always rolling enough to allow water to escape rapidly. Both soil and subsoil, owing to their rather impervious nature, absorb water slowly, and crops can withstand a wet season better on this type than on any of the other soils in the county. During a dry season, however, a hard crust is apt to form on the surface and crops suffer for the lack of moisture. This condition is avoided where good cultivation is practiced and the soil is kept supplied with humus by growing cowpeas or by applying barnyard manure.

The Cecil clay, like the Cecil sandy loam, is derived mainly from granite, but also in small part from gneiss and schist. Some areas were once covered with a sandy loam, and but for erosion would be classed with the lighter textured soils. The washed areas are found more often where the type occupies the long, rough slopes next to the large streams.

The Cecil clay on the steeper banks and ravines is in forest and probably best suited to this use. It is in general well adapted to pasture grasses, and as much of it washes badly when plowed Bermuda grass might be planted and stock raising carried on with profit as an adjunct to cotton growing. Besides the direct profit to be realized from stock raising a much larger supply of manure would be thus furnished each year to keep the cotton land in a productive state.

The type is devoted largely to cotton, the average yields being from one-third to two-thirds bale per acre. Corn averages from 10 to 15 bushels and wheat from 5 to 10 bushels per acre.

Farms on this type now sell for $7 to $20 an acre, the price varying with the topography and the improvements.

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

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Fine gravel</th>
<th>Coarse sand</th>
<th>Medium sand</th>
<th>Fine sand</th>
<th>Very fine sand</th>
<th>Silt</th>
<th>Clay</th>
</tr>
</thead>
<tbody>
<tr>
<td>13332, 13824</td>
<td>Soil</td>
<td>2.6</td>
<td>7.6</td>
<td>5.9</td>
<td>10.9</td>
<td>15.7</td>
<td>21.5</td>
<td>29.7</td>
</tr>
<tr>
<td>13233, 13633</td>
<td>Subsoil</td>
<td>.9</td>
<td>4.9</td>
<td>3.9</td>
<td>11.2</td>
<td>11.2</td>
<td>19.0</td>
<td>48.5</td>
</tr>
</tbody>
</table>

*Mechanical analyses of Cecil clay.*
A study of the manurial requirements of this type was made, using a large sample of this soil collected one-half mile north of Wilsons Chapel. The soil at this point is a heavy dark-red loam or clay loam to a depth of about 5 inches, contains about 3 per cent of quartz fragments, and has a red clay subsoil. The field from which the sample was taken is a terraced hillside, which was cleared twenty or twenty-five years ago, and has been planted to cotton with an occasional crop of wheat ever since. For the last few years it has received an annual application of mineral fertilizer.

The results obtained by the paraffined pot method indicate that a good increase in productiveness may be obtained by the use of manure or of nitrate of soda with sulphate of potash. When lime and acid phosphate were added to the latter treatment the conditions showed a further slight improvement. Nitrate of soda alone or cowpeas and lime gave a fair increase, while lime, sulphate of potash, or acid phosphate alone showed little if any benefit.

In these tests wheat plants were used as an indicator, and the results are held to be applicable only to related crops and to fields which have received treatment similar to that from which the sample was taken.

**CECIL SAND.**

To a depth of from 12 to 20 inches the Cecil sand is a light-gray coarse or medium sand. The medium-textured soil is especially pronounced in areas adjacent to the Cecil fine sandy loam. The sand particles are always rough and angular. The first 5 or 6 inches of soil is loamy and contains more vegetable matter than at a lower depth. The subsoil to a depth of 36 inches is a yellow or light-red clay that contains considerable sand. On some of the ridges and hills there is from 10 to 20 per cent of quartz fragments in the surface soil.

The Cecil sand occurs in six small areas near the North Carolina State line and in other areas lying in the southern part of the county. The largest area, extending northeast from Asbury and Dawkins Mill, covers about 10 square miles. Areas too small to map occur in the Cecil sandy loam.

The areas of the type in the northern part of the county have a slightly greater elevation than the surrounding soil types, but the surface is only gently rolling and not subject to washing. In the southern part of the county the topography is a series of low, rounded hills. Here the deepest and best soil is on the hilltops and in flat areas near the streams. The steeper slopes are subject to erosion, and on them partly disintegrated rock is often reached within less than 3 feet of the surface. The type is always rolling enough to give good drainage. At the same time the heavy clay subsoil retains moisture well, and all crops, especially cotton, give good yields even in dry seasons.
The Cecil sand has been formed from a coarse-grained, light-colored granite. This rock in its partly disintegrated state is seen in all the washouts at from 3 to 10 feet below the surface.

Nearly all of the type is under cultivation. It is a good soil for cotton, and, in fact, all the farm crops do fairly well. The good effects of manures and commercial fertilizers are quickly seen on this soil, but the benefit is not so lasting as on the heavier soil types. It is an excellent soil for cowpeas, and as it is very important to keep a supply of vegetable matter in the surface soil to retain the moisture and maintain the best tilth this crop should be grown on every field as often as once in every three or four years. Sweet potatoes and watermelons, which do well, are grown for home use. The average yield of cotton is one-third to one-half bale, corn from 5 to 15 bushels, and cowpeas from 2 1/2 to 3 tons of hay per acre. Land of the Cecil sand type sells for $7 to $15 an acre.

The following table gives the results of mechanical analyses of fine-earth samples of the Cecil sand:

**Mechanical analyses of Cecil sand.**

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Fine gravel</th>
<th>Coarse sand</th>
<th>Medium sand</th>
<th>Fine sand</th>
<th>Very fine sand</th>
<th>Silt</th>
<th>Clay</th>
</tr>
</thead>
<tbody>
<tr>
<td>13834</td>
<td>Soil</td>
<td>4.8</td>
<td>16.3</td>
<td>7.7</td>
<td>30.9</td>
<td>15.9</td>
<td>16.7</td>
<td>7.2</td>
</tr>
<tr>
<td>13835</td>
<td>Subsoil</td>
<td>1.6</td>
<td>8.3</td>
<td>4.8</td>
<td>19.5</td>
<td>15.0</td>
<td>21.2</td>
<td>29.6</td>
</tr>
</tbody>
</table>

**CECIL SILT LOAM.**

The Cecil silt loam is a loose gray silt loam, with a depth of 10 inches, changing to a compact red silt loam and underlain at 14 inches by a red silty clay. On a few of the higher ridges, where the parent rock is near the surface, the subsoil is a heavy red silt loam instead of a clay, while on the more level parts of the type it is a heavy clay containing but little silt. The surface soil on many of the ridges and some of the hill slopes contains from 10 to 30 per cent of quartz fragments, due to the presence in the underlying rock of veins of quartz, which weathers very slowly. Where most numerous, the fragments interfere somewhat with cultivation, but the soil is no less productive on that account.

The Cecil silt loam occurs in one continuous body, averaging 6 miles in width, that reaches from the northeastern part of the county to a point 5 miles south of Gaffney. Within its borders there are small areas of the Cecil fine sandy loam, Cecil clay, Cecil stony loam, and Meadow.

The topography of the type is mostly rolling, but becomes hilly near the streams, as well as next to the areas of the Cecil stony loam and along some few steep ridges where the underlying rock comes
near the surface. Low, rounded hills with many gentle slopes well suited to cultivation compose most of the area.

The Cecil silt loam is derived from the metamorphic rocks common to the Kings Mountain ridge and other parts of the Piedmont Plateau. These rocks consist of gneiss and schist. Because of the broken surface features of portions of this type more of it is in forest than any of the other types, except the Cecil stony loam. The steepest hillsides should never be deforested, as destructive washing would follow. There are a number of fenced pastures where dairy cattle and other live stock are kept. Besides supplying the needs of the farmer, a portion of the milk and butter, as well as some beef, is sold in the local markets. If stock raising were generally introduced on this type, much of the land too rough for cultivation could be put to good use as pasture. Cotton has not been cultivated so long on this type as on the others in the county. The gradual lessening of the productiveness of the soil where plowed every year will soon become apparent, as is now the case with the older cotton fields. The use of manure and the rotation of cotton with other crops, including cowpeas, will be necessary to keep the soil in a profitable producing state. As on the other soils, cotton is at present practically the only money crop, but its economical production on this soil depends to a greater degree than on the other types upon the practice of a proper rotation and on the combination of stock raising or dairying with cotton growing.

Farms on the Cecil silt loam sell for from $6 to $15 an acre. Two-thirds of the type lies within less than 4 miles of a railroad station. The average yield of cotton is nearly a half bale per acre, corn from 6 to 15 bushels, and cowpeas from 2 to 3 tons of hay per acre.

The following table gives the average results of mechanical analyses of typical samples of the fine earth of the Cecil silt loam:

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Fine gravel</th>
<th>Coarse sand</th>
<th>Medium sand</th>
<th>Fine sand</th>
<th>Very fine sand</th>
<th>Silt</th>
<th>Clay</th>
</tr>
</thead>
<tbody>
<tr>
<td>13371, 13338...</td>
<td>Soil</td>
<td>0.5</td>
<td>1.2</td>
<td>0.9</td>
<td>5.3</td>
<td>15.8</td>
<td>57.1</td>
<td>18.6</td>
</tr>
<tr>
<td>13372, 13339...</td>
<td>Subsoil</td>
<td>.1</td>
<td>.6</td>
<td>.6</td>
<td>2.9</td>
<td>7.9</td>
<td>51.3</td>
<td>36.0</td>
</tr>
</tbody>
</table>

In order to study the manurial requirements of this soil, a large sample was taken one-half mile south of Sardis Church. The soil at this point is a loose light-gray silt loam, containing about 10 per cent of quartz fragments, underlain by a heavy red clay subsoil. The field from which the sample was taken occupies a terraced hillside, was cleared twenty-seven years ago, and has since been farmed continuously to cotton with an occasional crop of wheat, the yields being
low. For the last few years an annual application of 200 pounds per acre of a complete mineral fertilizer has been used.

The results obtained by the wire-basket method indicate that an excellent increase in productiveness may be obtained by the use of manure, cowpeas, and lime, or of a complete fertilizer with lime, much better results being obtained when the lime was added twenty days before the planting than when added immediately before. Nitrate of soda alone or lime alone gave a fair increase, while sulphate of potash or acid phosphate alone or in combination gave only a small increase.

In these tests wheat plants were used as an indicator, and the results are held to be applicable to this crop only and to the field from which the sample was taken. They are, however, probably applicable to this type of soil over a large part of the area.

**CECIL FINE SANDY LOAM.**

The Cecil fine sandy loam consists of a dark-gray fine sandy loam, 6 inches in depth, underlain to a depth of 36 inches by a light-red clay. The subsoil is similar to that of the Cecil clay and Cecil sandy loam, but is more friable and contains a slightly larger proportion of silt and finer grades of sand. The ridges and knolls are often strewn with quartz fragments, the quantity ranging from 10 to 30 per cent, but are seldom numerous enough to interfere greatly with cultivation.

Beginning at the State line northeast of Blacksburg, the main body of this type extends in a southwesterly direction in a belt from 1 to 2 miles in width, and except for one break, between Gilkys and Abingdon creeks, reaches entirely around the Cecil silt loam. Another considerable area lies along Broad River, in the southeastern part of the county, and a number of smaller bodies occur in other parts of the county.

In both topography and texture the Cecil fine sandy loam is an intermediate type between the Cecil silt loam and the Cecil sandy loam. It occupies a series of low, rounded hills with gentle slopes and has good drainage.

The Cecil fine sandy loam is derived from the coarser crystalline metamorphic rocks of the Kings Mountain ridge. These are usually far below the surface, but are exposed on a few of the ridges. Between Limestone and Thickety creeks there is about 1 square mile of the type that varies somewhat from the typical description, being derived from a slightly different metamorphic rock. Here the subsoil is yellow instead of red.

The Cecil fine sandy loam is considered a good cotton soil, one-half bale per acre being about the average yield. Corn averages from 7 to 15 bushels, wheat from 5 to 10 bushels, and cowpea hay from 2 to 3 tons per acre. Farm land of this type sells at from $8 to $20 an acre.
The following table gives the average results of mechanical analyses of fine-earth samples of the Cecil fine sandy loam:

**Mechanical analyses of Cecil fine sandy loam.**

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Fine gravel</th>
<th>Coarse sand</th>
<th>Medium sand</th>
<th>Fine sand</th>
<th>Very fine sand</th>
<th>Silt</th>
<th>Clay</th>
</tr>
</thead>
<tbody>
<tr>
<td>13369, 13476</td>
<td>Soil</td>
<td>0.8</td>
<td>2.4</td>
<td>2.8</td>
<td>25.3</td>
<td>31.3</td>
<td>25.1</td>
<td>8.4</td>
</tr>
<tr>
<td>13370, 13477</td>
<td>Subsoil</td>
<td>.1</td>
<td>.9</td>
<td>1.1</td>
<td>12.3</td>
<td>16.1</td>
<td>20.0</td>
<td>49.3</td>
</tr>
</tbody>
</table>

A sample of this soil was collected 2 miles southwest of Gaffney, and a study of it made by the paraffined wire-pot method to secure information concerning its manural requirements. The soil at this place is a light-brown fine sandy loam, with a light-red clay subsoil. The field from which the sample was taken has been in cultivation for about twenty-five years, being planted a larger part of the time to cotton, with an occasional crop of corn or wheat. Two hundred pounds per acre of a complete mineral fertilizer have been used annually for the last few years.

The results obtained indicate that an excellent increase in productiveness may be obtained by the use of cowpeas and lime, a complete mineral fertilizer and lime, or of manure alone; that nitrate of soda alone produced a large increase, and that lime alone produced a fair increase. Lime when added at the time of planting was much less effective than when added several days before planting. Sulphate of potash alone gave a very small increase and acid phosphate a slight decrease.

In these tests wheat plants were used as an indicator, and the results are held to be applicable to this crop only and to the particular field from which the sample was taken, but are probably applicable in a general way to other crops and to this soil over a large part of its area.

**CEcil Stony Loam.**

The interstitial soil of the Cecil stony loam, to an average depth of 8 inches, is a loose silt or fine sandy loam. The subsoil, to a depth of 36 inches, is a red clay containing considerable silt. In both soil and subsoil there is from 20 to 60 per cent of quartz and metamorphic rock fragments, ranging from 2 to 6 inches in diameter. On the tops of the high hills there are spots strewn with rounded boulders and massive slabs of rocks.

The largest single area of the type occurs along the ridge of Whittersakers Mountain. Others occur on the tops of the highest hills of the main ridge that crosses Broad River at Cherokee Falls. Thickeky Mountain is also capped by a stony area. Two small areas near Pacolet River differ from the remainder of the type in having a clay loam soil and a heavier clay subsoil.
The Cecil stony loam was formed from the metamorphic rocks which gave rise to the silt and fine sandy loam types of the county. It is now stony because the high, rough topography permitted the fine material to be washed to lower levels as fast as the rock disintegrated. The type is in forest and is best adapted to this purpose, or where more level to permanent pasture.

IREDELL CLAY LOAM.

The Iredell clay loam is locally called "black-jack land," because of the character of the timber growth. The surface soil, to a depth of 6 inches, is a dark-brown loam, containing considerable silt or fine sand. The subsoil is a heavy, plastic, tenacious clay of light-yellow color, extending to a depth of 36 inches, and is locally known as "pipe clay." In its lower depth the subsoil contains from 10 to 15 per cent of particles of rotten rock. The top soil contains from 10 to 25 per cent of rock fragments, varying from particles the size of gravel to pieces 5 inches in diameter.

Four areas of the type are located near Wilkinsville. An area in the southwest corner of the county differs from the rest of the type in that the surface soil, 8 inches in depth, is a coarse light-gray sandy loam. Here the surface is gently rolling, which makes it desirable and for tillage. The rough, stony, and hilly portion of the type is not well suited for farming, although on the eastern side of the county some areas are under cultivation. The fragments on the surface are mostly of the dark-colored, fine-grained basic rock from which the soil is derived. A few, however, are of gneiss or schist that give origin to the adjacent soil types, and these have also assisted to a small extent in giving the surface soil its silty and fine sandy texture.

Although nearly all of the Iredell clay loam in the county could be tilled, the roughest and stoniest areas, where not now in forest, could no doubt be more profitably used as pasture than as cultivated land. Where cultivated it is a fair soil for both cotton and corn. In addition to the usual commercial fertilizers, kainit is used by some farmers. It is said to prevent the rust of cotton. One-third of a bale of cotton and from 8 to 10 bushels of corn are the average yields secured.

The following table gives the results of mechanical analyses of the fine earth of Iredell clay loam:

**Mechanical analyses of Iredell clay loam.**

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Fine gravel</th>
<th>Coarse sand</th>
<th>Medium sand</th>
<th>Fine sand</th>
<th>Very fine sand</th>
<th>Silt</th>
<th>Clay</th>
</tr>
</thead>
<tbody>
<tr>
<td>13842</td>
<td>Soil</td>
<td>2.6</td>
<td>4.9</td>
<td>2.2</td>
<td>8.3</td>
<td>33.7</td>
<td>32.7</td>
<td>15.7</td>
</tr>
<tr>
<td>13843</td>
<td>Subsoil</td>
<td>.6</td>
<td>2.7</td>
<td>3.5</td>
<td>13.5</td>
<td>19.4</td>
<td>22.1</td>
<td>38.3</td>
</tr>
</tbody>
</table>
MEADOW.

The Meadow type of soil varies from a compact silt loam to a compact fine sandy loam and occasionally to a medium sandy loam. The texture is nearly always uniform to a depth of 36 inches. It has slightly more vegetable matter at or near the surface and is more compact below. The silt loam areas are found generally on the creeks and the sandy loam areas on the rivers. There are, however, small strips of Meadow on every stream where the three different textures of soil occur.

Even along the smallest creeks are found strips of Meadow suitable for cultivation. In the bends of the larger streams the Meadow land sometimes extends back a fourth of a mile.

Nearly all of the type lies at a sufficient elevation above the bed of the streams to give excellent drainage. One exception to this, however, is on the lower part of Thicket Creek, where overflows occasionally occur. Here the areas have been allowed to grow up in forest. The highest part of the bottoms sometimes lies next to the river channel, and in such cases that part next to the upland is made tillable by surface ditches leading into the streams.

The soil is formed from material washed from the uplands and deposited at the time of the periodical overflows, which usually occur before planting time. The finer sediments are laid down by the slow currents next to the upland, where the silt and heavier fine sandy loam are located. Along Pacolet River there are also occasional narrow strips of coarse sand next to the stream bed.

Excepting the coarse sand strips just mentioned, which are not cultivable, the crop value of the Meadow does not vary much with the texture of the soil. The fact that it is near the streams and at the foot of hills insures a good supply of moisture, an important factor in making it a uniformly productive soil, whatever the texture may be. It sells for more than the adjoining upland types. The Meadow is a good cotton soil where well drained. It is the best corn soil in the county, and is cultivated largely to that crop. Corn yields from 20 to 30 bushels per acre when grown continuously, if cowpeas are sown thickly in the field each year after the last cultivation and the vines then left on the ground.

AGRICULTURAL METHODS.

The extensive one-crop system usually practiced by cotton planters is not followed altogether by the more progressive farmers in Cherokee County. They are plowing deeper and pulverizing the seed bed more thoroughly, are adopting a rotation in which cowpeas are included frequently, and are saving and applying to the fields all the manure of the farm. Thus the old method of growing cotton year after year on the same field until the surface soil becomes so exhausted of vege-
table matter and the land so badly washed that it will no longer yield a paying crop has been more or less changed for the better by nearly every farmer in the county. About ten years ago terracing to prevent washing came into general use in this county.

It is now more often the custom than formerly to alternate cotton with some other crop, usually wheat. Many of the farmers object to following corn with cotton, even though cowpeas are sown in the corn at its last cultivation. A rotation recommended by many good farmers is cotton two years, corn with cowpeas the third year, and wheat and cowpeas the fourth year. The cowpeas sown in the corn are picked by hand, the vines being left on the field. After harvesting the wheat there is ample time to grow a crop of cowpea hay. When it is desired to grow cotton on the same land oftener than two years in every four wheat and cowpeas may follow the cotton, making a two-year rotation. Land can not be prepared so early in the fall for wheat after the cotton crop as when it follows corn, which is some objection to the latter arrangement. One great advantage in growing wheat after either crop is to protect the land from washing during the winter. The vegetable matter left in the soil by the two crops of cowpeas in the above four-year rotation puts the land in very good condition for the two years’ cultivation of cotton.

Besides the value of incorporating vegetable matter in the soil by the decay of the roots of the cowpeas, in order to increase its productiveness, experience has shown that much less terracing is needed in a field that is kept supplied with humus by a rotation of cotton with cowpeas and the use of farm manure. As the terraces occupy a good deal of the land and are more or less a hindrance to cultivation, any farm methods or crop rotation that will lessen their number and at the same time check or prevent washing should be received with favor.

It is evident that cowpeas in common with other legumes have a very beneficial effect on the physical condition of the soil, besides their important functions of gathering nitrogen from the air, and that they also make the most nutritious and cheapest hay crop of the county.

In this county commercial fertilizer is applied at the rate of 50 to 70 pounds per acre for corn, and usually 200 pounds per acre for cotton. The brands in most common use contain 8 or 9 per cent of phosphoric acid and at least 2 per cent of both nitrogen and potash. It is used not alone to increase the yield but to hasten the growing and maturity of the cotton crop, for in some seasons the latest bolls are caught by the frost before ripening. A few farmers apply two or three times the above amount of fertilizer for cotton while others obtain good yields with the use of very little or no commercial fertilizer, depending mostly on thorough tillage, the use of barnyard manure, and a short crop rotation with cowpeas for successful results. Many have replaced the ordinary one-horse for the two-horse plow,
which turns a furrow 6 or 8 inches deep instead of the usual 3 inches. In preparing the land for the crop the soil is fined by harrowing either before or after bedding, and then frequent and careful tillage is practiced during the growing season.

AGRICULTURAL CONDITIONS.

According to the census of 1900 over three-fourths of the area of Cherokee County was then included in farms. The average size farm is given as 84 acres, 37 acres of which is improved land, and the total assessed value of farm land in the county was $1,635,430, or $8.30 an acre. The buildings on a tenant farm usually consist of a two or four room house, a small barn, a wagon shed, and a corn crib. On each plantation, which generally includes three or four tenant farms, there is a large two-story house and commodious outbuildings. Single farms of 100 to 150 acres worked by the owner are characterized by neat, substantial buildings, and these are increasing in number with the advance in the price of land.

According to the last census only 28 per cent of the farms in the county are operated by the owners. This shows that the tenant system largely prevails, as elsewhere in the cotton-producing States. Each tenant cultivates a one or two horse farm, consisting of 30 and 60 acres of plowed land, respectively, about half of which is planted to cotton. If the tenant furnishes the working stock, which is usually the case, the landowner receives as rent one-fourth of the cotton and one-third of the corn produced and pays in the same proportion his part of the cost of the fertilizer used and of ginning. On some of the less productive farms his share is only one-fourth of each crop. When the owner furnishes the working stock, etc., his share is generally one-half of both crops. Sometimes the tenant pays a stipulated rent of 1,000 to 1,500 pounds of lint cotton per one-horse farm and furnishes everything. Usually a tenant remains for a number of years on the same farm. Many of the negro tenants have been on the same plantations all their lives. In the southeastern part of the county, which is the oldest settled portion, about one-third of the tenants are colored at the present time, but the proportion of negroes is much smaller in other parts of the county. The negroes have gradually moved into the towns and white farmers have taken their places.

Hired labor is rather scarce. Fifty or 60 cents a day, including one meal, or $8 to $12 a month, with board, is the average wage. Hired labor is in greatest demand during cotton-picking season. Forty cents per hundred pounds, with 50 cents per hundred for the last picking, is the price paid.

The last census shows that more than one-half of the cultivated land in the county is devoted to cotton, one-third to corn, and the remainder
mostly to wheat, oats, cowpeas, sorghum, and sweet potatoes. Garden vegetables and orchard fruits are grown with success for home consumption.

It is evident that the acreage in cowpeas has increased during the five years since the census of 1900. The value of this crop, which is discussed in this report under "Agricultural methods," is becoming more generally recognized each year. It is safe to say that the most profitable farming in the future will not be in increasing the acreage devoted to the cotton crop, but rather in adopting the best methods to increase the crop yields per acre.

It is seen from this report that the different soils of the county, as elsewhere on the Piedmont Plateau, are all characterized by having a heavy clay subsoil, whether the top soil be a clay loam, a sandy loam, or a sand. This gives a greater uniformity in crop value than is usually the case where the surface soils are so much unlike in texture. The Cecil clay and Cecil sandy loam are recognized as the strongest soils in the county, being the best for cotton, and, except Meadow, the best for corn of any of the types. The Cecil sand, Cecil silt loam, and Cecil fine sandy loam are good cotton soils, and the latter at least is better adapted to corn than the Cecil sand. These three soil types respond quickly to the application of fertilizers or manures and are much easier to cultivate than the Cecil clay. Because of their lighter texture and steeper topography it is more necessary than on the heavier types to keep a supply of humus in the surface soil by crop rotation, including cowpeas, or in some cases by the production of manures through a combination of stock raising with cotton growing. A portion of the Cecil silt loam is too rough for cultivation, but well adapted to Bermuda grass pastures and cattle raising. The cotton-seed meal now shipped to distant States for cattle feeding might be used to good advantage at home if stock raising or dairying were made one of the important farm industries.

Direct transportation to all the large and local cotton markets is afforded by the railroads crossing the county. The main line of the Southern Railway, from Washington to Atlanta and New Orleans, passes through the central part from the northeastern corner to its western side. Points to the northwest and southeast are reached by the Marion and Kingville branch of the Southern Railway, which crosses the northeastern part of the county. The wagon roads are kept in excellent repair, making it possible to get the cotton crop to market cheaply from any portion of the county.
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