

SOIL SURVEY OF FRANKLIN COUNTY, GEORGIA.

By W. E. McLENDON.

DESCRIPTION OF THE AREA.

Franklin County lies in the northeastern part of Georgia, within the Piedmont section of the State. It contains 172,800 acres, or about 270 square miles. It is included within parallels $34^{\circ} 5'$ and $34^{\circ} 25'$ of north latitude and meridians 83° and $83^{\circ} 25'$ of west longitude. It is bounded on the north by Stephens County and the State of South Carolina, on the east by Hart County, on the south by Madison County, and on the west by Banks County. The line between the county and South Carolina is formed by the Tugaloo River, and between it and Madison County for a part of the distance by the Hudson River. The characteristic rolling topography of the Piedmont Plateau is well developed throughout the county, the altitude ranging from 600 to 1,000 feet above sea level. The high altitude has caused the development of an intricate system of rapid-flowing streams, which have carved out deep, narrow valleys with little or no overflow lands. Where the valleys are very deep, as in the northwestern and southeastern parts of the county, the topography ranges from quite rolling

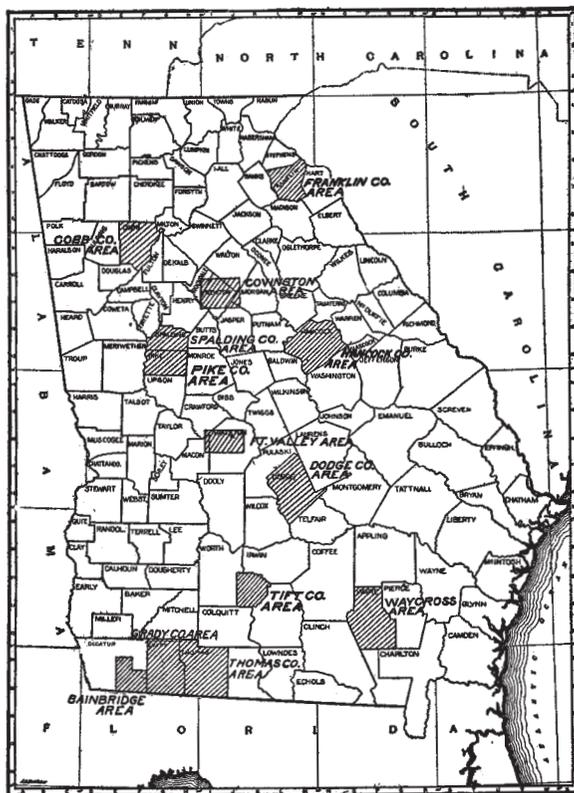


FIG. 18.—Sketch map showing location of the Franklin County area, Georgia.

to hilly and broken. In many other places the streams are bordered by steep slopes, only a few of which, however, are too rough to be farmed successfully. The local differences in elevation range from 25 to 200 feet, the levellest areas being found as a rule along the crests of the larger drainage divides. In the eastern part of the county is a prominent ridge, forming the drainage divide between the Tugaloo and Savannah rivers on the east and the Hudson River on the west. The elevation here is from 850 to 920 feet above sea level, while along the North Fork of the Hudson River, only 3 to 5 miles distant, it is only 600 to 700 feet. The highest elevation, about 1,000 feet, is attained in the ridges near the northwestern corner of the county.

The drainage of a very large proportion of the county is affected by the Hudson River and its tributaries. North Fork flows almost due south through the east-central section of the county, being joined within about 4 miles of the southern boundary by the Middle Fork from the northwest. Nails Creek, a tributary of the main river, flows along the southern boundary. The principal tributaries of Middle Fork are Indian, Leatherwood, Payne, Hunters, and Stephens creeks, and of North Fork, Double, Bear, and Unawatti creeks. The northeastern corner of the county is drained by the Tugaloo River and a few of its tributaries, including Eastanolle and Gum Log creeks. A narrow strip in the southeastern corner drains through Beaverdam Creek, which empties directly into the Savannah River. A few grist and flour mills are found along the creeks, where sufficient power is easily developed. The different forks of the Hudson River offer excellent opportunities for developing considerable hydro-electric power for the nearby towns.

Settlements began in the territory embraced by Franklin County before the middle of the eighteenth century, but, until the Indians were completely driven from the section during the course of the Revolutionary War, progress of settlement was slow and very much hampered. Soon afterwards all of the better lands were fairly well occupied. The settlers came principally from the lower part of South Carolina, North Carolina, and Virginia. Their descendants constitute the bulk of the present population. There were comparatively few slaveholders in the county and the negro population is very small.

The county has an extensive system of public roads, but most of them are not kept in good repair, and have grades too steep to allow heavy hauling without difficulty. The people are rapidly awakening to the necessity for better roads, and as a result work has been begun looking toward the improvement of all of the roads. Wide low-grade roads are now (fall, 1909) being constructed between Carnesville and Lavonia and Canon and Royston. The rural free-delivery service reaches all sections of the county.

The railroad facilities are not adequate for the best development of a large part of the county, especially the western half, which is from 10 to 20 miles from the nearest railroad station. The Elberton branch of the Southern Railway crosses the eastern edge in a general north and south direction, connecting with the main line at Toccoa, in Stephens County, and with the Seaboard Air Line at Elberton. This affords quick service to all points north and west. A branch line from Lavonia or Canon to Carnesville, the county seat, would greatly improve the facilities for the western part of the county and no doubt would prove a profitable investment.

Lavonia and Royston, each with a population of about 1,500, are the principal towns and trading centers. Bowersville is a place of about 1,000 inhabitants just outside the county at the junction of the Southern and Hartwell railways. Canon is a small town, on the edge of the county, between Bowersville and Royston. Carnesville has a population of 300. Franklin Springs, a summer resort of considerable note, is $2\frac{1}{2}$ miles west of Royston. Practically all of the products marketed go to outside points, except the cotton seed, a large proportion of which is handled by oil mills at Lavonia and Royston.

CLIMATE.

The high altitude and nearness to the mountains give Franklin County a mild, healthful climate, adapted to a diversity of farming interests. The conditions of temperature and precipitation are fairly well represented in the table below, which was compiled from the records of the Weather Bureau station at Elberton, 20 miles south of the county. No statistics for any point nearer the county were available at the time of the survey. The summers are long and warm, but they are not attended by hot, oppressive periods, except sometimes during the months of July and August, when the temperature reaches 100° F., and even then the nights usually are pleasant. The winters are short and mild, but the temperature is quite changeable. Stock may be allowed to graze nearly every day throughout the winter and no expensive housing is required.

The snowfall is light and occurs almost entirely during the months of December, January, and February. The average annual precipitation is 50 inches. This is very well distributed throughout the year, but occasional droughts during the spring and summer months cause some injury to the growing crops. As a whole, however, the temperature and moisture conditions are very favorable to plant growth. Not much can be done to prevent the harmful effects of excessive rainfall, except to terrace against erosion and prevent overflows as much as possible by keeping the drainage ways open, but the effects of drought can be largely overcome by proper methods of tillage and the exercise of care in selecting crops adapted to the different soils.

Areas that are naturally droughty from steep surface features or a large amount of stone in the soil should not be used for the late maturing summer crops. The fall months are the driest of the year, the weather being very favorable for gathering the cotton and corn crops, and for preparing the fields for winter grains.

At Elberton the average date of the last killing frost in the spring is March 29 and of the first in the fall November 8, while the date of latest frost in the spring is April 7 and of the earliest in the fall October 25. The growing season is nearly seven and a half months long, being two weeks or more shorter than in the Coastal Plain region of the State. The shorter season makes it more difficult to grow heavy yields of cotton, as very often the late bolls are frost bitten before they reach maturity. This is especially true on the clay soils, which are inclined to give a slower and later growth. The peach crop is made somewhat uncertain on account of early blooming and subsequent injury by erratic frosts. Other fruits are also affected to some extent. Yet it is not unlikely that peach growing could be made very profitable if confined to the higher lying sandy areas, where late frosts are least apt to occur.

The following table gives statistics of the weather conditions of the region:

Normal monthly, seasonal, and annual temperature and precipitation at Elberton, Elbert County.

| Month. | Temperature. | | | Precipitation. | | | |
|-----------------|--------------|-------------------|-------------------|----------------|-----------------------------------|------------------------------------|----------------------|
| | Mean. | Absolute maximum. | Absolute minimum. | Mean. | Total amount for the driest year. | Total amount for the wettest year. | Snow, average depth. |
| | °F. | °F. | °F. | Inches. | Inches. | Inches. | Inches. |
| December | 45 | 78 | 5 | 3.8 | 2.8 | 7.2 | 1.0 |
| January | 43 | 78 | 5 | 4.8 | 5.4 | 4.2 | 0.3 |
| February | 44 | 76 | -2 | 5.8 | 4.9 | 3.8 | 3.1 |
| Winter | 44 | ..... | ..... | 14.4 | 13.1 | 15.2 | 4.4 |
| March | 54 | 88 | 14 | 5.5 | 3.4 | 5.0 | 0.2 |
| April | 62 | 94 | 30 | 3.4 | 2.2 | 5.8 | Trace. |
| May | 72 | 98 | 39 | 2.7 | 2.1 | 6.0 | 0.0 |
| Spring | 63 | ..... | ..... | 11.6 | 7.7 | 16.8 | 0.2 |
| June | 78 | 102 | 47 | 4.6 | 2.8 | 4.2 | 0.0 |
| July | 80 | 104 | 58 | 5.2 | 7.5 | 6.1 | 0.0 |
| August | 79 | 100 | 61 | 5.4 | 1.4 | 15.4 | 0.0 |
| Summer | 79 | ..... | ..... | 15.2 | 11.7 | 26.7 | 0.0 |
| September | 74 | 102 | 45 | 3.2 | 2.1 | 7.5 | 0.0 |
| October | 64 | 89 | 30 | 2.9 | 2.3 | 0.8 | 0.0 |
| November | 53 | 83 | 20 | 2.7 | 5.6 | 0.7 | 0.3 |
| Fall | 64 | ..... | ..... | 8.8 | 10.0 | 9.0 | 0.3 |
| Year | 62 | 104 | -2 | 50.0 | 42.5 | 67.7 | 4.9 |

AGRICULTURE.

Most of the early settlers located near the larger streams and confined their efforts largely to the fertile bottom lands, as at that time the rolling uplands were not considered of much value for farming. This idea was due partly to the fact that many of the settlers came from leveler sections and partly to the heavy yields secured on the bottom lands without much care and with little deterioration of the soil after years of careless tillage. Gradually, however, settlement extended all through the uplands, many of the farms including no bottom lands. The leveler sandy lands, on account of the greater ease with which they could be tilled, were first occupied, then the rougher clay and stony loam areas. Even at the present time the best and most extensive improvements are found on the gently rolling sandy areas. The individual holdings, as a rule, were rather large, but the land brought under cultivation depended upon the supply of labor at hand, some of the slave plantations being very large.

Being far from markets and without any transportation facilities, the settlers turned their attention to producing corn, wheat, oats, and such other crops as could be consumed at home or exchanged locally. Nearly every farmer raised hogs for pork and lard, and a great many gave considerable attention to the production of cattle and sheep. Hemp, indigo, and tobacco were grown in a limited way for a while, but subsequently were wholly or entirely abandoned. Cotton, although grown to a limited extent, did not play an important part in the agriculture of the county until after the civil war. Land being cheap and plentiful, the farmers gave very little attention to keeping the soil in a productive state by means of good tillage or the proper rotation of crops. If a field became very much run down after some years of cultivation, it would be abandoned and new land cleared to take its place. The farmers were for the most part out of debt, but there was, in general, no great degree of prosperity.

As the necessity for a ready-money crop was strongly felt after the civil war more and more attention was given to cotton, and this finally became the most important crop of the county. Wheat continued to be grown, but with the increase in the acreage of cotton less and less attention was given to other lines of farming. As a result, although the section is adapted to stock raising, dairying, and the growing of a great variety of forage crops, practically nothing is being done in these lines. The average farmer does not produce an adequate supply of corn and meat. Cowpeas, which thrive on any of the soils and afford excellent feed and the cheapest means of improving the soil, are not grown nearly as extensively as they should be, nor do they play an important part in the rotation of crops. The

whole system is that of devoting the best energies to producing cotton and subordinating all the other crops. Instead of depending upon cotton almost exclusively as the money crop and buying the necessities that could be produced more cheaply at home, a more diversified farming will lead to a more substantial prosperity and at the same time keep the farms in a higher state of productiveness.

There has been a decided improvement in the condition of the farming class within the last few years on account of the higher prices of cotton. The home surroundings are undergoing improvement and better methods of farming are gradually coming into favor, although there is still room for further advancement. In many instances the scarcity of labor could be offset by adopting the better types of farm implements and machinery.

No statistics are available that will show the present relative importance of the different crops, but some idea can be had from the figures given in the Twelfth Census, reporting conditions for the year 1899.

To make these figures applicable it will be necessary to reduce them about one-fourth on account of the territory cut off and included in the new county of Stephens. Of the 184,936 acres in farms, 90,380 acres, or nearly half, was reported as improved. There were 36,474 acres in cotton, producing 13,070 bales; 28,525 acres in corn, producing 302,090 bushels; 8,105 in wheat, producing 39,910 bushels; 1,921 acres in oats, producing 9,840 bushels, and 1,198 acres in grasses and pea vines for hay, producing 1,293 tons. Among the minor crops may be mentioned sorghum, cowpeas, sweet potatoes, and miscellaneous vegetables for home use.

About all of the timber suitable for lumber has been removed, but there is enough pine and oak, hickory, and other hardwoods still standing to provide fuel for a long time to come if economically handled. In 1900 the forest products were valued at \$21,789.

No fruit is grown for the market, and as a rule the home orchards receive very little attention. Apples, pears, peaches, and several other fruits would do well, if given the proper care, and in places peaches could be grown very successfully for the market.

Cotton and corn lands are left bare during the winter and very little plowing is done until just before planting time. Where cotton follows cotton a common practice is not to plow broadcast, but to run center furrows between the old rows, apply the fertilizer, and bed with four furrows. If cotton follows corn or some other crop, the land may be broken before the rows are laid off. Most of the after cultivation is done with sweeps and scrapes, which require three trips to the row to complete a cultivation. The crop is laid by in the latter part of July and early August, while the plants are still growing and fruiting rapidly. Cultivation is done more with the idea of

keeping grasses and weeds down than to conserve the soil moisture for the use of plants. Shallow cultivations, in the middles at least, would prove very beneficial as long as the plants are setting fruit. Sometimes as much as one-third of the crop is lost by not keeping the soil stirred so as to prevent the disastrous results of droughts.

Lands intended for cotton should be given a deep breaking during the winter or early spring, and the beds should be made very low if raised at all. The crop would withstand drought better and less hand hoeing would be necessary. In late fall rye or vetch should be sown broadcast over the cotton fields to act as a cover crop and to afford pasturage during the winter months. Attention should be given to selecting the varieties of cotton best adapted to the different soils. Cottons suited to the clay lands as a rule are not the ones best adapted to the sandy soils, where the moisture conditions and habits of growth are different. The crop has a tendency to grow longer and mature later on the clay than on the sandy soils, and as the fall frosts are comparatively early an early maturing variety would prove best for the clay lands. A large plant growth is an unnecessary drain upon the land unless the stalks have time to fill out well with bolls.

The methods of planting and cultivating corn are quite variable and do not apply to any particular type of soil, but in all of them there is a general lack of thoroughness, which in most cases means a poor crop. The soils used for corn culture ought to yield 30 to 50 bushels per acre, but the general average is less than 15 bushels, although the majority of the farmers use some fertilizer. The rows are placed from 4 to 5 feet apart and the hills from 2 to 3 feet. Usually only one plant is allowed in the hill. The planting is done on level ground, on low ridges, or in water furrows, the last being the method most generally practiced. The furrow method gives the plants a deeper root development, which is very desirable during dry seasons and makes it easier to keep down grasses and weeds without the use of the hoe. Cultivation is done with scooters, light turning plows, sweeps, etc., which require several trips to the row to complete a single cultivation. Much time and labor would be saved by using cultivators with several teeth. By breaking the soil deep and preparing the seed bed thoroughly it would be possible to plant corn much closer in the drill than it is now planted, and it would not suffer near as much from drought as under the present system. All of the after cultivation should be very shallow in order not to cut off too many of the feeding roots, which are always found in abundance near the surface. Too often the mistake is made of doing only enough plowing to get the crop in and then trying to prepare the soil and cultivate at the same time.

Large quantities of commercial fertilizers are being used, and with the increase in the acreage of cotton the total quantity is increasing every year, despite the fact that the price is rising. Fertilizers are also coming into more general use for corn and other crops. For cotton the applications range from 150 to 600 pounds to the acre. The results are often very unsatisfactory, especially where the seed bed is shallow and poorly prepared. To get the most satisfactory results with fertilizers it is necessary to have the soil deep enough for a good root development and well enough supplied with humus to hold an adequate supply of moisture. There is a general lack of knowledge as to the manurial requirements of the soils, except that they respond in a greater or less degree to any fertilizer. As a matter of economy it pays to buy only the best grades, preferably the different ingredients separately to be mixed at home. Some use complete fertilizers, some a mixture of acid phosphate and cotton-seed meal, others a mixture of acid phosphate, cotton-seed meal, and kainit in varying proportions. The clay soils give less response to potash than to either phosphorus or nitrogen. In addition to the usual applications of fertilizer at planting time, a few have begun using nitrate of soda as a top dressing, and if applied at the proper time the yields are often greatly increased. About 25 pounds of nitrate of soda could be used profitably by applying at planting time. It is immediately soluble and would start the crop off before the cotton-seed meal begins to act. It is not good economy to use the cotton seed as a fertilizer. It should be exchanged for cotton-seed meal, as in this way a good price is obtained for the oil, which has no value as a fertilizer ingredient. The meal being fine it acts more readily than the seed, which requires some time to decay.

The practice of rotating crops is the exception rather than the rule. In a great many instances cotton follows cotton for a number of years. Again cotton and corn alternate in an irregular way. With the two-crop system a good plan would be to grow cotton two years and corn one year. At laying-by time cowpeas should be broadcast or sown in rows through the corn, and, if the cotton is not large, in every other middle. The pea vines would add considerable humus to the soil and put it in better shape for the next crop. A better plan would be to plant cotton one or two years, corn one year, and oats or wheat and pea vines the next. By the proper rotation of crops it would be possible to grow good corn, wheat, and oat crops without the use of commercial fertilizers, and the amount used for cotton could be greatly reduced. Every effort should be made to work up a deep loamy soil and keep it well supplied with humus.

Only a few general soil adaptations are recognized, the tendency being for every farmer to grow the general line of crops, regardless

of the soils he has. The clay lands are better adapted to cotton than to corn and the sandy lands are too light for wheat. The sandy areas are especially adapted to peaches.

On an average the farms contain between 75 and 300 acres, and there are a few with 500 or more acres. The larger plantations are generally subdivided, and parts of them are rented out in tracts of 30 to 60 acres. According to the Twelfth Census the average size of farms was about 65 acres, but the census enumerated each tenant holding as a separate farm. There is an increasing disposition among the landowners to cultivate personally a smaller area and to lease a greater proportion of their farm lands, or to move to town and depend entirely on tenants. In 1900 only about 30 per cent of the farms were operated by the owners, while about 46 per cent were thus operated in 1890.

Several ways of renting land are in vogue. If the owner furnishes everything but the labor and half of the fertilizer, he generally gets a half of the crop; if only the land, he gets a fourth. A great many rent for a stipulated amount of lint cotton, ranging as high as 3 to 4 bales for a one-horse crop. Cash rentals range from \$2 to \$5 an acre, depending upon the character of the land and distance from the railroad. A large part of the labor is absorbed in the tenant system, but where hired by the day farm hands get from 50 to 75 cents a day, and by the month from \$10 to \$15, with board or house and rations in addition. The tenants generally depend upon their families for the necessary help. Cotton is picked for so much a hundredweight, the rate ranging from 50 to 60 cents.

Land values are increasing rapidly throughout the county and will go much higher if cotton continues to bring good prices. The Cecil sandy loam sells for \$25 to \$50 an acre, and near Royston, Canon, and Lavonia some tracts can not be bought for less than \$75 an acre. The clay lands are worth from \$15 to \$40 and the stony land from \$10 to \$30 an acre.

With the growing scarcity of labor, the necessity for better methods is being more strongly felt. More attention should be given to crops for forage and pasturage, which do not require a great deal of hand labor. The section is admirably adapted to the raising of hogs, cattle, sheep, mules, and horses, and to dairy farming. This line of farming would not only lead to a substantial prosperity among the farmers, but it would afford the cheapest and most efficient means of keeping the soils in a productive state. All of the hillside fields should be carefully terraced to prevent destructive erosion.

SOILS.

There is not a great variety of soils in the county and the differences occurring are due in a large measure to erosion, either in its

broader relation to topography or in its more recent and more local activities upon the cleared and cultivated fields. The soils fall naturally into two general groups, the residual upland types and the alluvial bottom-land types, the latter being very limited in extent.

The residual soils are derived from the weathering of ancient igneous and metamorphic rocks of a highly crystalline nature. A small area at Crawfords Store, and another extending from Hunters Creek, about half way to Carnesville, consist of a dark-gray hornblende granite. The remainder of the county is occupied by a gray medium-grained gneiss, ranging from a massive structure almost like that of granite to highly micaceous and schistose rock. In places it is interstratified with a darker hornblende gneiss and in others by what appears to be a quartzose schist. The minor variations do not have any appreciable influence upon the soil, except possibly in determining the proportion of stone it contains.

The hornblende granite gives rise to a heavy phase of the Cecil clay and to the Iredell clay loam. The gneiss gives the Cecil sandy loam in the levellest areas, and the Cecil clay and Cecil stony sandy loam in those more rolling.

The alluvial areas are derived from wash material from the slopes brought down by the streams and deposited in their flood plains. On account of their very limited extent and wet nature they are all grouped as Meadow.

Including Meadow, five types of soil were recognized. The name and extent of each are given in the following table:

Areas of different soils.

| Soil. | Acres. | Per cent. |
|-----------------------------|---------|-----------|
| Cecil clay..... | 82,240 | 47.6 |
| Cecil sandy loam..... | 53,120 | 30.7 |
| Cecil stony sandy loam..... | 31,360 | 18.2 |
| Meadow..... | 5,376 | 3.1 |
| Iredell clay loam..... | 704 | .4 |
| Total..... | 172,800 | ..... |

CECIL SANDY LOAM.

The Cecil sandy loam, to a depth of 4 to 8 inches, is a brown or brownish-gray sandy loam, rather low in organic matter in all of the cultivated areas. Varying quantities of angular quartz fragments are strewn over the surface and mingled with the soil, but except in small areas generally on the steeper slopes the quantity present is not sufficient to change the properties of the soil or to interfere seriously with proper methods of tillage. In the leveler areas the quantity of coarse material is negligible. The subsoil is a strong red friable clay extending to a depth of 3 or more feet without much change in color

or texture. At various depths below 3 feet the clay becomes less plastic and soon grades into soft weathered material which, in an undisturbed condition, has much of the coloring and original gneissoid structure of the parent rock. Solid bed rock is rarely encountered within 10 feet of the surface, and in most places the weathering has gone on to even greater depths. Thin quartz veins occur with varying frequency throughout the subsoil.

In the early settlement of the county the Cecil sandy loam was an extensive type, but as a result of erosion its area has been greatly reduced, with a corresponding increase in the extent of the Cecil clay. Now it occurs mostly as remnants along the main drainage divides where the topography is of a gently rolling character. The change from sandy lands to clay lands by the removal of the surface material is still going on to some extent and in nearly every field of any size are a number of clay or "gall spots." The largest areas form an irregular strip along the eastern edge of the county, extending from Royston north to the Tugaloo River. Other of the more important areas occur near Carnesville and at Sandy Cross and McDuffies store. The areas along Gum Log Creek and the Tugaloo River in places are quite rolling, for which reason they are considered less desirable than the average of the type. The areas around Royston, Canon, and Lavonia are typical.

The rock from which the Cecil sandy loam is derived is a gray medium-grained gneiss, consisting of orthoclase and plagioclase feldspar, quartz, muscovite, and biotite mica, and smaller proportions of a few other minerals. Where the gneiss is inclined to be schisty, as a rule the resultant soil is somewhat heavier than in the typical areas and in addition to the usual amount of quartz there may occur on the surface scattering fragments of the partially weathered rocks.

Practically all of the type is under cultivation, but it was originally timbered with shortleaf pine, red, white, post, and Spanish oaks, and an undergrowth of dogwood, etc. It is highly prized for all of the crops of the section and is equally as well adapted to a number of other crops not now grown. It is the same type used so successfully in Elbert County for the growing of peaches, and it is very probable that the higher lying areas here would prove equally as well adapted to this industry. Dairy farming and the raising of hogs, cattle, and mules are promising industries not now followed on a commercial scale. Cotton is the first crop in acreage and importance and corn is the second. Wheat and oats are grown to some extent, but they are not important crops with many of the farmers. Under the prevailing system of management the average yield of cotton is slightly less than one-half bale per acre. Corn yields from 10 to 30 bushels, wheat from 6 to 12 bushels, and oats from 20 to 45 bushels per acre. The best farmers find it easy to make a bale of cotton per acre and correspond-

ingly larger yields of the other crops grown. Commercial fertilizers are in general use. Very little distinction is given to the rotation of crops with the idea of keeping the soil in a productive state.

The soil is especially in need of deeper and more thorough tillage than is now generally practiced, and a system of rotation should be followed that would keep it well supplied with humus. All of the cultivated areas should be properly terraced in order to check the washing and gullying, which are now excessive. Areas that can not be protected from erosion by terracing should be used for pasturage, sowing Bermuda grass, which will form a very tough sod and at the same time provide good grazing. In selecting areas for peach growing it is very advisable to get those least subject to frosts. This can be told by watching the cotton crop in the late fall. It will be found that some areas are killed outright, while others are not affected to any extent. The latter offer the better sites for orchards.

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

Mechanical analyses of Cecil sandy loam.

| Number. | Description. | Fine gravel. | Coarse sand. | Medium sand. | Fine sand. | Very fine sand. | Silt. | Clay. |
|-------------|---------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | | <i>Per cent.</i> | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. |
| 23001 | Soil..... | 4.4 | 16.2 | 13.8 | 32.3 | 10.0 | 12.8 | 10.4 |
| 23002 | Subsoil | 3.2 | 9.3 | 8.5 | 13.9 | 5.8 | 24.5 | 35.3 |

CECIL CLAY.

The surface 3 or 4 inches of the Cecil clay consists of a reddish-brown loam or heavy sandy loam, or, in places, it may be little else than the raw red clay exposed by erosion. The subsoil is a deep red clay, rather stiff in its properties to a depth of 3 to 10 feet, from which depth it becomes less plastic and finally grades into soft weathered rock. Some of the more resistant layers of the parent rock occur near the surface, and loose fragments are found scattered over the soil in places. Throughout the type quartz fragments are strewn over the surface and mingled to a less extent with the soil. In some areas the quantity of stone is not sufficient to affect cultivation, while others are so stony and rough as to render them of little or no value for agriculture. With deep plowing the soil would become a brown loam or clay loam capable of retaining large amounts of humus and moisture, but as now handled crops suffer unnecessarily from drought, and as a result the yields are often cut very short. It is naturally a strong soil and can be brought to a high state of cultivation.

The Cecil clay occupies 47.6 per cent of the total area of the county and occurs over extensive tracts to the exclusion of any other type,

save strips of Meadow and small areas of the Cecil sandy loam. A phase somewhat heavier than typical extends in an irregular area from about 3 miles northwest of Carnesville to Crawfords Store. About the only noticeable difference is the finer texture of the soil and the presence of a larger proportion of partially weathered rock in both the soil and subsoil. The surface features range from gently rolling along the crests of the ridge to hilly and broken on the steeper slopes, with local differences in elevation of 25 to about 200 feet.

A large part of the type is the result of erosion upon areas that were originally the Cecil sandy loam. Others represent the original weathered product from some of the heavier dark phases of the gneiss. The heavy phase referred to above is derived from a dark hornblendic granite, which weathers only into heavy soils.

The principal tree growth consists of shortleaf pine and a variety of oaks, the former being more scrubby than on the sandy areas. About all of the merchantable timber has been removed.

A very large percentage of the type is under cultivation and used in the same system of farming as practiced on the Cecil sandy loam. When the seasons are just right the crop yields are about as good as on the Cecil sandy loam, but on account of its droughtier nature it is not considered as safe as the latter type for most of the crops grown. This, however, is due more to the cultural methods than to any characteristic of the soil itself. If plowed deeply so as to form a deep seed bed, even though it does not contain much organic matter, it will tide crops over long droughts without much injury.

It is recognized as a better soil for cotton than for corn, although good crops of corn can be produced where the soil is properly handled. The average yield of cotton is less than one-half bale and of corn about 18 bushels per acre. Wheat and oats, which are grown to a limited extent, give variable yields, depending upon the seasons and the condition the soil is in. Good crops of wheat can be grown on the best areas, especially if a proper rotation of crops be practiced. All of the cultivated areas should be terraced to prevent erosion, and the rougher stony areas not fit for cultivation should be seeded to grass and pastured. Many of the badly eroded slopes now considered next to worthless could be converted into good grazing lands by sowing to Bermuda grass. Peach trees would make a good growth, but the fruit as a rule would be too watery to stand shipping for any distance.

Being so near the northern edge of the cotton belt, and being naturally a late soil, it is very essential that the farmers should plant early maturing varieties of cotton. The crops normally mature considerably later on this type than on the sandy lands, and frequently the top bolls are bitten by frost before they reach maturity.

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

Mechanical analyses of Cecil clay.

| Number. | Description. | Fine gravel. | Coarse sand. | Medium sand. | Fine sand. | Very fine sand. | Silt. | Clay. |
|--------------------|---------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|  |  | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | <i>Per cent.</i> |
| 23005, 23007 | Soil..... | 2.2 | 6.2 | 5.5 | 18.4 | 10.5 | 22.4 | 34.5 |
| 23006, 23008 | Subsoil | 3.1 | 3.3 | 3.2 | 16.9 | 8.1 | 16.5 | 48.7 |

CECIL STONY SANDY LOAM.

The soil of the Cecil stony sandy loam, which is from 5 to 7 inches deep, is a brown sandy loam or light loam, carrying from 20 to 50 per cent of angular quartz fragments and partially weathered fragments of gneiss, the latter usually of a highly micaceous character. The surface in places is literally covered with small fragments of stone, while in others the quantity present is much less, although greater than in the stoniest phases of the Cecil sandy loam. The subsoil to a depth of 3 feet varies from a red friable stony clay to a brown loam, consisting of clay and soft weathered rock mixed. At various depths below 3 feet the clay gives way to a soft weathered rock, and this in turn to solid bed rock a little lower down. The soil is fairly productive, but can not be handled very satisfactorily on account of the high stone content and the rough surface features.

This type is derived from a gray-colored gneiss of the same character as gives rise to the Cecil sandy loam. It owes its difference to the much more active erosion that has taken place during the process of formation. It is confined almost entirely to the southeastern part of the county, where the Hudson River and numerous smaller streams have produced a very rolling to rough, hilly topography, with local differences in elevation ranging up to 200 feet and general differences of over 300 feet. The roughest areas occur as a rule immediately along the streams, especially along the North and Middle Forks of the Hudson River. Some of the slopes here rise abruptly to a height of 100 feet or more above the stream beds, continuing thence more gradually toward the crests of the divides. The original timber consists of a good growth of red, Spanish, white, and post oaks, intermixed with shortleaf pine, hickory, and an undergrowth of dogwood, etc.

The roughest areas are not farmed to any extent, but those less broken are about all under cultivation, being used extensively for cotton and corn, and in a more limited way for all of the other crops of the section, including wheat, oats, sorghum, cowpeas, and sweet potatoes. The yields of cotton range from one-third to one-half

bale, of corn from 10 to 25 bushels, and of wheat from 6 to 10 bushels per acre. Where the soil is properly prepared it produces good crops of cowpeas and sorghum. Small areas under good management have been made to produce a bale of cotton per acre.

The general run of the type is too rough and stony for cultivation and could be used to better advantage for pasture lands, sowing to Bermuda grass, which would prevent any excessive erosion and at the same time provide the best of grazing. By using the best areas for cultivated crops and those of a rougher nature for pasture, the type offers excellent advantages for dairy farming and the raising of hogs, mules, and cattle. The areas best protected from frost would produce good peaches. Apples, pears, grapes, and a number of other fruits do well. The cultivated areas should be terraced.

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

Mechanical analyses of Cecil stony sandy loam.

| Number. | Description. | Fine gravel. | Coarse sand. | Medium sand. | Fine sand. | Very fine sand. | Silt. | Clay. |
|-------------|--------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|  |  | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | <i>Per cent.</i> |
| 23003 | Soil..... | 15.6 | 19.4 | 4.5 | 15.6 | 5.9 | 23.9 | 14.9 |
| 23004 | Subsoil..... | 11.4 | 18.7 | 9.3 | 16.6 | 9.0 | 14.9 | 20.0 |

IREDELL CLAY LOAM.

The soil of the Iredell clay loam, to a depth of 7 inches, is a brown loam. The surface is strewn with numerous small iron concretions and in places with scattering fragments of rock. The subsoil is a dingy yellow, very impervious, tough clay to a depth of 2 to 5 feet, grading below into partially decomposed rock.

The type is of residual origin from a dark hornblendic crystalline rock. It is of limited extent and of little agricultural importance. Two small areas occur about $2\frac{1}{2}$ miles northwest of Carnesville, one at Crawfords Store, and two others at the mouth of Hunters Creek, bordering the bottom lands at this point. A part of the area north of Stephens Creek is level, and the soil is inclined to be wet and acid on account of the very impervious nature of the clay subsoil. The remainder of the type is moderately rolling and fairly well drained from the surface.

The original forest growth consisted very largely of oak of different varieties and shortleaf pine, about the same in character as on the surrounding clay and sandy loam areas.

The small acreage under cultivation is devoted mainly to cotton and corn, and in a more limited way to wheat, oats, sorghum, cowpeas, etc. Cotton yields from one-fourth to one-half bale, corn from 10 to 20

bushels, and wheat from 6 to 12 bushels per acre. The poorly drained and the stoniest areas could be used to best advantage for pasture lands.

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

Mechanical analyses of Iredell clay loam.

| Number. | Description. | Fine gravel. | Coarse sand. | Medium sand. | Fine sand. | Very fine sand. | Silt. | Clay. |
|-------------|---------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|  |  | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | <i>Per cent.</i> |
| 23009 | Soil | 7.4 | 12.7 | 7.6 | 19.6 | 13.7 | 22.3 | 16.5 |
| 23010 | Subsoil | 1.3 | 2.6 | 2.5 | 7.2 | 8.5 | 29.0 | 48.9 |

MEADOW.

All of the alluvial lands of the county are grouped under the term "Meadow," which implies a condition of poor drainage rather than a soil of definite texture. Narrow overflow strips occur along the North, Middle, and South forks of the Hudson River and most of their tributaries through the Cecil clay and Cecil sandy loam areas. The soil varies locally from a dark loam or sandy loam to a loose sand. In the early settlement of the section, when nearly all of the slopes were timbered, the bottom lands consisted for the most part of very productive dark soils, highly prized for agricultural purposes, but within recent years about all of the original soil has been covered to various depths with sand. Now the streams are badly obstructed and the bottoms are kept so wet in most places that they are no longer farmed to any extent. Areas otherwise fairly well drained overflow so frequently as to render crops very uncertain.

The areas along the Tugaloo River are the same as the Congaree fine sandy loam of Oconee County, S. C., but their very limited extent made it seem advisable to class them as Meadow instead of as a separate type. The soil here varies from a brownish gray sand immediately along the banks of the stream to a darker brown fine sandy loam next the slopes. These areas are naturally very productive and except for occasional overflows they are fairly well drained. When the seasons are not too wet they produce heavy yields of corn and forage crops.

There is very little that can be done to check the overflows of the rivers, but all of the areas along the smaller streams could be improved to the extent at least of making good pasture land by keeping the streams cleared of obstructions and ditching along the slopes to cut off seepage waters from higher lying areas.

SUMMARY.

Franklin County, area 270 square miles, is situated in the north-eastern part of Georgia, within the Piedmont Plateau. The surface is generally rolling. The general elevation ranges from 600 to 1,000 feet above sea level. Swift-flowing streams are numerous, drainage is good, and excellent water powers exist.

The county is fairly well settled throughout, the best and most extensive improvements being found on the gently rolling sandy areas.

The county has an extensive system of public roads and a good rural free-delivery service reaching all sections. The eastern half of the county has adequate railroad facilities, but the western half is from 10 to 20 miles from the nearest stations. A branch line from Lavonia or Canon to Carnesville should be built. Lavonia and Royston are the chief towns and local marketing centers.

The climate is mild, healthful, and adapted to a diversity of farming interests. The growing season is nearly seven and a half months long, or some two or three weeks shorter than in the Coastal Plain region of the State.

Cotton and corn are the only crops grown to any extent, although the soils and climatic conditions are favorable for the growing of a number of other crops. More attention should be given to the growing of forage and the raising of live stock. Dairy farming might be introduced. The sandy areas best protected from frosts are well suited to commercial peach growing.

The farms contain from 75 to 300 acres. About 30 per cent of the farms are operated by the owners, the remainder being operated mainly by white tenants.

Farm laborers receive from 50 to 75 cents a day, and from \$10 to \$15 a month, with board or rations and a house in addition.

Land values are rapidly advancing. The best lands can be bought for \$25 to \$50 an acre, except near the towns, where some of the choicest areas command \$75 or more an acre. The rough clay and stony areas sell for \$10 to \$30 an acre.

The soils are residual or alluvial. The residual soils are derived from ancient metamorphic and igneous rocks of a highly crystalline nature. Four types were recognized in the upland. Three of these are members of the Cecil series, and the other, an unimportant type, was mapped as the Iredell clay loam. The alluvial areas were all grouped as Meadow on account of their limited extent and wet condition.

The Cecil sandy loam is the best developed type in the county. It is adapted to all of the crops of the section, besides a number of others that are not now grown. The higher lying areas could be used to advantage in growing peaches. Dairy farming and the raising of stock offer promising results.

The Cecil clay is the most extensive type in the county, and the better areas are about as highly prized as the Cecil sandy loam. It is best adapted to cotton, clover, grasses, and pasturage. Good yields of wheat could be produced.

The Cecil stony sandy loam is rather difficult to handle on account of its rough topography and stony nature, but the least broken areas are farmed extensively to cotton and corn. The yields range from light to fairly good. Peaches, apples, pears, and several other fruits do well, but are grown at present only for home use. The roughest areas should be used for pasture lands.

The Iredell clay loam is very limited in extent and of no special agricultural importance. The small areas under cultivation produce light to medium yields of cotton, corn, and the few other crops grown. The type could be used to best advantage as pasture lands.

The term Meadow includes all of the alluvial lands. These are mostly of a wet nature and subject to frequent overflows, making crops very uncertain. If the smaller streams were kept cleared of obstructions their bottoms would at least afford good pasturage.

Erosion does much damage on the steeper slopes of all the types, and terracing should be practiced in all cultivated fields where the surface shows the damaging effects of wash.

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