SOIL SURVEY

Cherokee County North Carolina

Series 1941, No. 2

Issued September 1951

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Administration
Bureau of Plant Industry, Soils, and Agricultural Engineering
In cooperation with the
NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION
and the
TENNESSEE VALLEY AUTHORITY

How to Use THE SOIL SURVEY REPORT

FARMERS who have lived in one locality for a long time come to know about the soil differences on their own farms and on those of their immediate neighbors. What they do not know, unless a soil survey has been made, is how nearly their soils are like those at experiment stations or in other localities from which higher yields are reported. They do not know whether these higher yields are from soils like their own or so different that they could not hope to get yields equally high, even if they adopted the practices followed in these other places. The similarities and differences among soils are known only after a map of the soils has been made. Knowing what kind of soil one has and comparing it with soils on which new developments have proved successful will remove some of the risk in trying new methods and varieties.

SOILS OF A PARTICULAR FARM

To find what soils are on any farm or other tract of land, locate the tract on the soil map, which is in the envelope inside the back cover. This is easily done by locating its boundaries by such landmarks as roads, streams, villages, and other features.

Each kind of soil is marked with a symbol on the map; for example, all soils marked Co are of the same kind. To find the name of the soil so marked, look at the legend printed near the margin of the map and find Co. The color where Co appears in the legend will be the same as where it appears on the map. The Co means Congaree silt loam. A section of this report (see table of contents) tells what Congaree silt loam is like, for what it is mainly used, and some of the uses to which it is suited.

How suitable is Congaree silt loam for the production of important crops? Turn to table 11 where estimated crop yields are listed for each soil under two levels of management—that used by the majority of farmers in the county, and that considered the best they could achieve within practical limits. Compare the yields for Congaree silt loam with those for other soils.

What is good use and management for Congaree silt loam? In the section Soil Use, Management, and Productivity, the soils are discussed by groups according to similarities in the management they require. Refer to table 9 for suggested crop rotations and the particular suitabilities of the soils to important crops and to table 10 for fertilizer requirements of the soils for specific crops, crop rotations, and planting dates.

SOILS OF THE AREA AS A WHOLE

If a general idea of the soils of the county is wanted, read the introductory part of the section on Soils. This tells where the principal kinds are found, what they are like, and how they are related to one another. Then study the soil map and notice how the different kinds of soils tend to be arranged in different localities. These patterns are likely to be associated with well-recognized differences in type of farming and land use.

A newcomer who considers purchasing a farm in the county will want to know about the climate as well as the soils; the types and sizes of farms; the principal farm products and how they are marketed; the kinds of farm tenure; equipment and machinery; availability of schools, churches, highways, railroads, telephone and electric services, and water supplies; industries; and towns and population characteristics. This information will be found in the sections on General Nature of the Area and on Agriculture.

Students and others interested in how the soils of the county were formed and how they are related to the great soil groups of the world should read the section on Morphology and Genesis of Soils.

This publication on the soil survey of Cherokee County, N. C., is a cooperative contribution from the—

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Series 1941, No. 2 Issued September 1951

SOIL SURVEY OF CHEROKEE COUNTY, NORTH CAROLINA

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United States Department of Agriculture in cooperation with the North Carolina Agricultural Experiment Station and the Tennessee Valley Authority

CONTENTS

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AGRICULTURE is the principal industry of Cherokee County. The important crops—corn, rye, hay, sorgo, potatoes, sweetpotatoes, and some fruits—are grown mainly in the narrow valleys. Small acreages of snap beans, cabbage, and tobacco are raised as cash crops, and a few cattle are sold to outside markets. The rough mountain areas that comprise more than eight-tenths of the county are in forest. Harvesting and processing of tanbark, pulpwood, chestnut and hemlock acid wood, timber, and other forest products is next to crop production in importance. Most farms are of the subsistence type, the cash income being derived from outside sources rather than sale of farm products. In 1940 there were 21 sawmills producing 10,000 to 19,000 board feet per day, 2 veneer, 3 dimension, and 2 mineral manufacturing plants, a leather and an extract plant, and a textile mill. Marble, talc, and quartzite are mined in limited quantities. To provide a basis for the best agricultural use and management of the soils a cooperative soil survey was begun in 1941 by the United States Department of Agriculture, the North Carolina Agricultural Experiment Station, and the Tennessee Valley Authority.

GENERAL NATURE OF THE AREA

LOCATION AND EXTENT

Cherokee County covers an area of 457 square miles, or 292,480 acres, in the extreme southwestern corner of North Carolina, bordering Georgia and Tennessee (fig. 1). Graham County adjoins it on the north, and Macon and Clay Counties on the east. Murphy, the county seat, located at the junction of the Valley and Hiwassee Rivers, is 90 miles southwest of Asheville, and 180 miles west of Charlotte. The county is irregular in outline, as its boundaries are mainly the crests of winding mountain ridges except on the Georgia border.

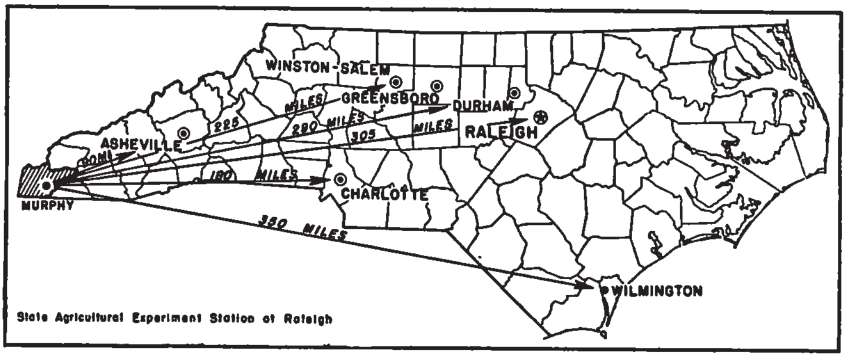

FIGURE 1.—Location of Cherokee County in North Carolina.

PHYSIOGRAPHY, RELIEF, AND DRAINAGE

Situated in the southern part of the Appalachian Mountains, Cherokee County is a part of the Blue Ridge province of the eastern United States (*1*),[2] which embraces a belt of mountainous country west of

[2] Italic numbers in parentheses refer to Literature Cited, p. 102.

the Piedmont province. The mountains in this belt are remnants of a former highland.

The landscape is one of rugged mountain ranges and narrow intervening valleys. The most conspicuous valley, ½ to 1 mile in width, extends along the Valley River from Andrews to Murphy. Important ranges are the Valley River Mountains in the eastern part, the Snowbird and Unicoi Mountains in the northern part, and Payne Mountain in the west. These higher ranges are steep, narrow-ridged, and broken with sharp peaks.

Elevations above sea level vary widely. The highest points are Grassy Top and Weatherman Bald, both 5,000 feet; and the lowest, 1,300 feet, at Old Apalachia on the Hiwassee River near the Tennessee line. Other elevations are: Andrews and Culberson, each 1,800 feet; Grandview, 1,768; and Murphy, 1,614 feet.[3]

The interior of the county is an area of low mountains, foothills, and tableland. The more prominent elevations are Franklin, Vance, and Fort Butler Mountains and Sheep Knob, all of which have steep slopes and sharp crests. The relief of the foothills and tableland is gently rolling to strongly rolling and steep. The smoother areas are in the vicinity of Valleytown, Andrews, Peachtree, Marble, Unaka, Grandview, Letitia, Suit, Ranger, and Culberson. Along many of the streams are strips of first bottoms, a few feet to about 1 mile wide; colluvial areas; and a few small almost level terraces.

The Valley, Hiwassee, and Nottely Rivers and their tributaries drain all the county except a small area in the extreme northern part that is drained by headwaters of the Tellico River. All drainage eventually empties into the Tennessee River. Every farm is reached by one or more of the creeks, branches, and streamlets that extend to all sections. The county is well drained, except in some flat areas of the first bottoms. Runoff is excessive on the hilly uplands and mountain slopes.

GEOLOGY

The upland soils of the county have developed in place from the weathering of local geologic formations, mostly highly metamorphosed sedimentary rocks of the Cambrian age. Most of these sedimentary formations are in the so-called Ocoee group. In the northern and western parts, the principal rocks are conglomerate, graywacke, gneiss, slate, and some mica schist; in the southern part, mainly very fine-grained mica schist, talc schist, and some slate. Other rocks of minor importance are quartzite, sandstone, shale, limestone, and marble. The limestone and marble formations lie too deep to allow the derivation of any soil from them, but they may have influenced some of the nearby darker colored soils to a minor degree. Among the most important formations within the area are Great Smoky conglomerate, Brasstown schist, Nantahala slate, and the Valleytown formation. Smaller areas of Murphy marble, Andrews schist, Tusquitee quartzite, and Nottely quartzite also occur. The characteristics of these formations are briefly described in the following.

Great Smoky conglomerate contains a variety of strata—not only conglomerate, but also sandstone, quartzite, graywacke, mica schist, garnet schist, and slate. These rocks are very resistant to erosion

[3] Data obtained from the Coast and Geodetic Survey, U. S. Department of Commerce.

and account to a large extent for the rugged mountain relief. All except the slate have a decided gray color. They become whitish on exposure through the weathering of the feldspar they contain. Most of the schists in this formation are micaceous and strongly resemble those of Carolina gneiss. Frequently they are filled with small crystals of garnet and ottrelite. Areas of Great Smoky conglomerate occur on Snowbird Mountains, in the vicinity of Hanging Dog Creek, and near Rich Knob.

Brasstown schist consists of banded ottrelite schist and slate. All the schist and slate of the formation is dark-colored, the range being dark blue or bluish black to dark gray. The formation is nearly always marked by a fine banding of light-gray and dark colors. The light-gray layers are highly siliceous and occasionally grade from fine sandy slate into seams of light-gray sandstone. The resistance of the rocks within the formation varies considerably under the influence of weathering. The less altered slates break readily into slabs and flakes and form low hilly ground, but the ottrelite schist yields much more slowly, and decay is never deep. Areas of Brasstown schist occur north of Andrews, along the Graham County line, and just west of Peachtree.

Nantahala slate, occurring in the vicinity of Rattlesnake Knob, on the south side of Snowbird Mountains and north of Marble, is composed mainly of black-and-gray banded slates and of schists distinguished by mica, garnet, staurolite, or ottrelite. The decay of this formation is very slow because it has so few soluble constituents. In places, many sandstone and conglomerate beds are interstratified with Nantahala slate, especially near the base, and the slate forms a transition to the Great Smoky conglomerate. The slate and schist in this formation are somewhat darker than the material of the associated beds, the color being imparted by minute grains of iron oxide.

The Valleytown formation—most extensive in the vicinity of Taylor Creek, south of Andrews, and north of Peachtree—consists mainly of mica schist and finely banded gneiss. Practically all the formations in the basin of the Valley River are of these rocks. They are very resistant to weathering and often stand as knobs and ridges somewhat above the adjoining Brasstown schist or rise abruptly from areas of Murphy marble. Soils developed from the Valleytown formation are in all places thin and full of fragments of rock and crystals and are usually low in fertility, because of the siliceous and micaceous nature of the parent material.

Murphy marble, both white and blue, occurs primarily along the Valley River between Marble and Andrews and near Peachtree. Andrews schist occurs in close association with Murphy marble and includes calcareous ottrelite schist with beds of iron ore. Tusquitee quartzite and Nottely quartzite are generally found in narrow bands between Nantahala slate and Brasstown schist or between similar formations (*7*).

Minerals of commercial value are marble, limestone, brown iron ore, and talc. The most extensive marble (pl. 1, *A*) and limestone deposits in the State are along the Nottely and the Valley Rivers. In mineral composition these range from high in calcium to high in magnesium content; the color varies from white to blue. Brown iron ore occurs in several localities between Murphy and Andrews; talc as lenses in a few places between Marble and Kinsey; and very pure magnesium ore averaging approximately 58 percent magnesium, about 2½ miles above the mouth of Low Creek. The limited mining operations carried on within the county are concerned primarily with the marble deposits (*4*).

CLIMATE

The climate of the county is temperate. The summer days are not excessively hot, and the nights are reasonably cool and pleasant. The winter months are not severely cold, and in most years outdoor work can be carried on practically throughout the winter season.

Locally the mean annual temperature and precipitation vary widely because of the great differences in elevation. On the higher mountains the precipitation is much heavier and the temperature considerably lower than in the valleys. The records of the Weather Bureau station at Andrews, in the northeastern part of the county, show the mean annual rainfall is 61.31 inches. Of the total, 16.21 inches comes in spring and 16.20 inches in summer. This is ample for crops adapted to the soils of the area. The total rainfall for the driest year is 45.65 inches, and for the wettest, 77.57 inches.

The mean annual temperature is 57.3° F. The mean for summer is 72.6° and for winter is 41.8°. The highest recorded temperature is 99° in June and July; and the lowest is −6° in January. The date of the latest killing frost in spring is May 17; the earliest in fall is October 2. The average date of the last killing frost in spring is April 25 and the average earliest in fall, October 19. The average frost-free period is 176 days.

Data compiled from the records of the Weather Bureau station at Andrews in table 1 may be considered fairly representative of the

TABLE 1.—*Normal monthly, seasonal, and annual temperature and precipitation at Andrews, Cherokee County, N. C.*

[Elevation, 1,800 feet]

Month	Temperature			Precipitation			
	Mean	Absolute maximum	Absolute minimum	Mean	Total for the driest year [1]	Total for the wettest year [2]	Average snowfall
	°*F.*	°*F.*	°*F.*	*Inches*	*Inches*	*Inches*	*Inches*
December	42.0	73	−1	6.80	3.57	16.83	2.1
January	41.2	78	−6	5.40	3.39	6.88	2.5
February	42.3	80	−4	5.50	8.62	9.83	2.6
Winter	41.8	80	−6	17.70	15.58	33.54	7.2
March	48.7	86	6	6.60	4.42	5.44	2.6
April	56.9	88	15	4.61	4.84	4.52	(3)
May	64.0	95	27	5.00	6.38	3.01	0
Spring	56.5	95	6	16.21	15.64	12.97	2.6
June	71.0	99	38	5.10	2.09	5.36	0
July	73.8	99	44	6.10	4.08	6.16	0
August	73.0	98	44	5.00	4.49	4.16	0
Summer	72.6	99	38	16.20	10.66	15.68	0
September	69.5	95	33	3.80	.48	3.71	0
October	57.9	90	18	3.40	2.00	6.63	(3)
November	47.4	83	8	4.00	1.29	5.04	.4
Fall	58.3	95	8	11.20	3.77	15.38	.4
Year	57.3	99	−6	61.31	45.65	77.57	10.2

[1] In 1933. [2] In 1932. [3] Trace.

more important climatic features at lower elevations in the greater part of the county.

WATER SUPPLY

An abundant supply of water for livestock is furnished by the many streams, and excellent spring water for domestic use is available on most farms. Well water, where needed, is obtainable at various depths, usually within 50 feet of the surface. Artificial lakes supply water power as well as recreation. The Hiwassee River has a fall of 314 feet from Murphy to the North Carolina-Tennessee boundary and of 260 feet from Hayesville, in Clay County, to Murphy. The Tennessee Valley Authority has a hydroelectric power plant and dam (Hiwassee) on the Hiwassee River, 22 miles northwest of Murphy (pl. 2). A second dam (Apalachia) is approximately on the North Carolina-Tennessee line, but its power plant is about 8 miles downstream. The Hiwassee dam impounds a lake with a shore line of 162½ miles and an area of 6,240 acres at normal level. The impounded lake at Apalachia is smaller.

On many of the creeks in the county small sawmills are operated by water power. A small dam constructed on Persimmon Creek forms a lake for recreational purposes. Hiwassee Reservoir is also used for sports. Additional hydroelectric power could be developed on some of the smaller streams, as Hanging Dog, Crane, Shoal, and Persimmon Creeks.

VEGETATION

The natural forest cover (*5*) of Cherokee County is predominantly in two of the seven main natural divisions of the Eastern Forest Region; namely, birch-beech-maple-hemlock and chestnut-chestnut oak-yellow-poplar. Apparently very small areas of the spruce-fir division are on the very highest parts of the county.

The original vegetation consisted of many kinds of oak, with which were interspersed white and scalybark hickory, yellow-poplar (tuliptree), white ash, wild cherry, black and white walnut, black gum and sweetgum, maple, persimmon, dogwood, chestnut, and birch. The undergrowth includes shrubs and small plants, as rhododendron, mountain-laurel, and huckleberry. Galax and trailing-arbutus were and still are common plants on many of the mountains.

A large part of the original forest has been cut for timber, and the present stand consists of second- and third-growth trees, most of which are too small to be used as sawlogs. In the northern part the tree growth on north slopes is mainly Appalachian hardwoods; on the south slopes it is of the pine-hardwood type, except in the Tellico River watershed in the extreme northern part, where the forest is mainly hardwood on all slopes. In the central and southern parts the pine-hardwood type predominates. In some places pure stands of pine occur.

The principal Appalachian hardwood species are Northern red oak, chestnut oak, basswood, and poplar; associated species are white pine, hemlock, black birch, black cherry, sugar maple, buckeye, beech, scarlet oak, white oak, red maple, cucumber magnolia, sourwood, black gum (black tupelo), ash, and dogwood. In the pine-hardwood type, shortleaf pine, pitch pine, scarlet oak, and black oak predominate, mixed with a few trees of Southern red oak, Virginia pine, post oak, and white oak. The pure stands of pine are predominantly shortleaf. There are practically no living chestnut trees, the once dense growth having been killed by blight prior to 1930. Most of the dead chestnut trees have been removed and used for tannic acid.

Cultivated lands no longer used are soon grown over with weeds, broomsedge, and briers. Within 3 or 4 years, white or shortleaf pine and black locust appear on the drier sites and yellow-poplar on the moister areas. Except on severely eroded lands, the growth is rapid, and trees make a good stand in a few years.

ORGANIZATION AND POPULATION

Cherokee County[4] was formed in 1839 from Macon County and named for the Cherokee Indians. The first white settlers, mostly natives of North Carolina from Buncombe, Haywood, and adjoining counties, were of English, Dutch, Scotch, and Irish descent. A few brought Negro servants with them.

The present inhabitants are mainly descendants of the early settlers, though some have moved in from Tennessee and Georgia in recent years. Only a few Indians remain, as most of them have been moved to Swain County. The small Negro population is concentrated near Murphy and Andrews. Throughout the interior and smoother parts of the area, the population is rather evenly distributed, but in rough mountainous sections it is sparse, particularly along the outer borders. The central and southwestern parts are therefore the most thickly populated. The population, 18,813 in 1940, was classed as rural as there are no towns of more than 2,500 inhabitants.

Murphy, the county seat (population 1,873), is an important trading and shipping point for all the western parts of the county, especially for lumber, pulpwood, and wood for the production of tannic acid.

INDUSTRIES

Farming is the main industry, but considerable annual income is derived from the sale of tanbark, acid wood, pulpwood, cross ties, and other forest products sold at Andrews and Murphy or at other points along the railroads. Most of the county is included in the Nantahala National Forest. There is some virgin timber left, but most wooded areas contain small hardwood trees and much pine.[5] In 1939 approximately 257,000 acres, or 86 percent of the total land area, was in forest, of which nearly 26 percent, or 91,653 acres, was farm woodland.

Two veneer plants, 21 sawmills having a capacity of 10,000 to 19,000 board feet per day, an extract plant, a leather plant, a textile mill, and 2 mineral-manufacturing plants operate in the county. In 1939 nine manufacturing establishments employed 296 persons, and the value of the manufactured products was $650,495. Many small mines and mills are operated by one to three individuals. The minerals produced are marble, talc, and quartzite. Some iron ore was mined during World War I. The total income from mineral production is not high, as most operations are small.

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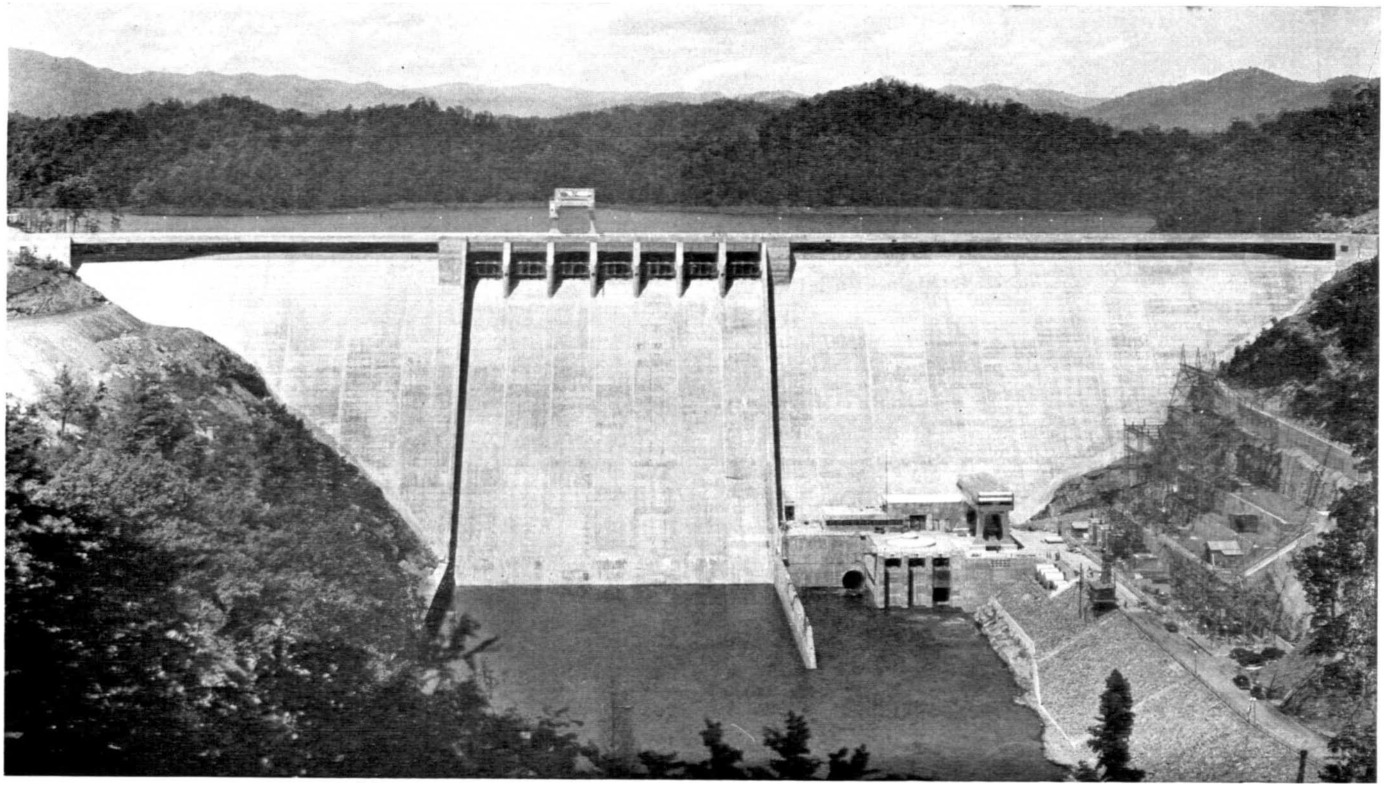
[4] In 1872, 6 square miles of Cherokee County were added to Graham County.

[5] CRUIKSHANK, J. W. FOREST RESOURCES OF THE MOUNTAIN REGION OF NORTH CAROLINA. U. S. Dept. Agr. Forest Serv., Appalachian Forest Expt. Sta., Forest Survey release No. 7, 55 pp., illus. 1941. [Processed.]

A, Marble pit, at Marble, N. C.
B, Corn, soybeans, and hay on Chewacla-Tate silt loams; a natural seeding of shortleaf pine in foreground on the steeper slope.



Hiwassee Dam, a Tennessee Valley Authority structure on the Hiwassee River, controls the flow of the river for power and against floods.

TRANSPORTATION AND MARKETS

Two railroads and five main highways provide adequate transportation. A branch line of the Louisville and Nashville Railroad from Atlanta enters the county near Culberson and follows the Nottely River to Murphy. The Asheville and Murphy branch of the Southern Railway enters the county at Topton and connects with the Louisville and Nashville at Murphy. The Tennessee and North Carolina Railway (freight) enters south of Peachtree and runs to Andrews. Paved highways leading to Asheville, Knoxville, Atlanta, and other nearby cities are open to travel throughout the winter, except during an occasional heavy snow or ice storm. Roads or trails extend into all parts of the county. Public roads are good in summer, but in winter they may be impassable in places to all methods of travel except light cars and horse-drawn vehicles.

Murphy, Andrews, Peachtree, and other towns serve as local distribution points for supplies. Most livestock is sold at local auctions and transported to Knoxville or Asheville. Dairy products and truck crops are sold to local retail dealers, and in Atlanta, Ga.; Copperhill, Tenn.; and Robbinsville, N. C. Little grain is sold except corn, which is usually ground into meal and marketed in the State or in Georgia. Most industrial products are shipped to the larger outside markets.

CULTURAL DEVELOPMENT AND IMPROVEMENT

Churches are generally conveniently located in the rural communities, and most of the schools are in towns or villages. School busses that serve all sections take pupils to and from consolidated grade and high schools. School buildings and churches are available for agricultural meetings and social gatherings.

Rural mail service extends to all communities. Telephone and rural electrification lines connect practically every thickly populated community. Telephones were on 38 farms in 1940; a total of 368 farms had electric distribution lines within one-fourth mile of the dwelling, and of these, 168 reported obtaining current from power lines and 12 from home plants.

SOIL SURVEY METHODS AND DEFINITIONS

In making a soil survey the soils are examined, classified, and mapped in the field and their characteristics recorded, particularly in regard to the growth of various crops, grasses, and trees.

The soils and underlying formations are examined systematically in many locations. Test pits are dug, borings made, and highway or railroad cuts and other exposures studied. Each reveals a series of distinct soil layers, or horizons, termed collectively the soil profile. Each horizon, as well as the underlying parent material, is studied in detail, and the color, structure, porosity, consistence, texture, and content of organic matter, roots, gravel, and stones are noted. The chemical reaction of the soil and its content of lime and salts are determined by simple tests.[6]

[6] The reaction of the soil is its degree of acidity or alkalinity, expressed mathematically as the pH value. A pH value of 7 indicates precise neutrality; higher values, alkalinity; and lower values, acidity (2). Indicator solutions or electric resistance units are used to determine the chemical reaction.

Other features taken into consideration are drainage, both internal and external; relief, or lay of the land; and the interrelations of soil and vegetation.

The soils are classified according to their characteristics, both internal and external, with special emphasis upon the features that influence the adaptation of the land to the production of crop plants, grasses, and trees. On the basis of these characteristics the soils are grouped in the following classification units: (1) Series, (2) types, (3) phases, (4) complexes, and (5) miscellaneous land types.

The series is a group of soils having the same genetic horizons, similar in their important characteristics and arrangements in the soil profile and having similar parent material. Thus, the series comprises soils having essentially the same color, structure, natural drainage, and other important internal characteristics, except those caused by accelerated erosion, and the same range in relief. The texture of the upper part of the soil, including that commonly plowed, may vary within a series. The series are given geographic names taken from localities near which they were first identified. Ramsey, Fannin, Talladega, and Congaree are names of important soil series in Cherokee County.

Soil types are divisions of series and are distinguished from each other by differences in the texture of the upper part of the soil, in uneroded soils of the surface layer, and in eroded soils of the plow layer. Soil type names consist of the soil series name followed by the soil class name that applies to the upper part of the soil, as sand, loamy sand, sandy loam, silt loam, clay loam, silty clay loam, or clay. Chewacla silt loam and Chewacla gravelly loam are names of soil types of the Chewacla series. In comparisons of the type and phases of that type, to avoid the repetition of their complete names, the type is sometimes referred to as the normal phase.

A soil phase specifically named is a variation within the type, differing from the normal phase of the type in some feature, generally external, that may be of special practical significance but not differing in the major characteristics of the soil profile. For example, within the total range of relief of a soil type some areas may have slopes that allow the use of machinery and the growth of cultivated crops and others may not. Differences in relief and degree of accelerated erosion may be shown as phases. Even though no important differences may be apparent in the soil profile or in its capability for the growth of native vegetation throughout the range in relief, there may be important differences in respect to the growth of cultivated crops. In such instances the more sloping parts of the soil type may be shown on the map as a sloping or a hilly phase. Hiwassee loam, hilly phase, is an example of a phase in the Hiwassee series.

The slope classification followed in defining, naming, and mapping slope phases in Cherokee County is as follows:

	Percent slope		*Percent slope*
Nearly level	0–2	Hilly	15–30
Undulating	2–7	Steep	30–60
Rolling	7–15	Very steep	60+

The erosion classification [7] followed in defining, naming, and mapping erosion phases in Cherokee County is as follows:

1. Classified and mapped as eroded are soils affected by erosion to the extent that the subsoil material is within plow depth over about half or more of the delineated area. Ordinary tillage of this land will bring parts of the upper subsoil to the surface and alter the character of the original surface layer through admixture of subsoil material. There may be a limited number of shallow short gullies. From 40 to 75 percent of the original surface layer has been lost from these eroded soils.

2. Classified as severely eroded are soils affected by erosion to the extent that practically all the original surface soil had been lost. In places some of the subsoil may have been lost. Tillage of severely eroded areas is almost entirely in subsoil material. Small short gullies, a few of which are too deep to be obliterated by tillage, are generally present.

In some places, two or more soil units are in such intimate or mixed pattern that they cannot be clearly separated on the map. Such areas are mapped as complexes, examples of which are Talladega-Habersham stony loams, steep phases, and Chewacla-Tate silt loams.

Some areas that have little or no true soil are termed miscellaneous land types. Examples in this county are Rough stony land (Ramsey soil material) and Stony colluvium (Ramsey soil material).

SOILS

GENERAL NATURE OF THE SOILS

For ease of classification and discussion the soils have been placed in six physiographic divisions: Group 1—soils of mountain uplands; group 2—soils of intermountain uplands; group 3—soils of high stream terraces; group 4—soils of low stream terraces; group 5—soils of colluvial slopes; and group 6—soils of first bottoms.

Mountain uplands are areas of long steep slopes, narrow intervening valleys, and a few less steep slopes, all occurring at high elevations, as on mountaintops and mountainsides. Intermountain uplands, less steep and at comparatively low elevations, consist of rolling to hilly land interspersed by valleys somewhat more open than those of the mountain uplands. Soils of the high stream terraces differ from those of the low. The oldest and best drained soils are on the high terraces; the youngest and most poorly drained are on the low. The soils of colluvial slopes have developed at the foot of mountain slopes from material transported by gravity, and, to some extent, by water; the soils of first bottoms have developed along rivers and other stream courses, usually under conditions of poor or restricted drainage.

The soils of groups 1 and 2 have a number of general characteristics in common. A large part of the intermountain and most of the mountain uplands is forested. Very little organic matter has accumulated under the forest cover, however, and most of the soils are low in nitrogen, especially after they have been cleared and cultivated for some time. In addition to the general lack of organic matter, they are

[7] Areas so eroded that the individual owner can afford reclamation only through reforestation or other extremely slow processes are classified and mapped as Rough gullied land (Talladega soil material). These areas are an intricate pattern of gullies; the soil profile over most of the land has been practically destroyed.

deficient in lime and other bases. Most of the bases in the parent rock have been dissolved and leached out by the heavy annual rainfall. Large areas of these soils are unsuited to general farming because of one or more of the following unfavorable features: Steep relief, shallowness to bedrock, degree of erosion, stoniness, relatively low fertility, and inaccessibility.

Represented in groups 1 and 2 are soils of six series, distributed as follows: In both mountain and intermountain uplands, the Habersham and Talladega; in mountain uplands, the Porters, Ramsey, and Ranger; and in intermountain uplands, the Fannin.

Ramsey soils, the most extensive of those in the mountain uplands, have formed over sandstone, shale, slate, and quartzite—mainly of the Great Smoky conglomerate and Valleytown schist geologic formations. They are closely associated with the Talladega, Ranger, and Porters soils and have slopes of 15 to 60 percent, mainly more than 35 percent. The surface soil is friable brownish-yellow to brownish-gray loam; the shallow subsoil is yellowish brown to brownish yellow. The solum, though permeable and friable, has a moderate water-holding capacity.

Porters soils, not typically developed in the county, are formed from weathered material of acid sedimentary rock and highly metamorphosed graywacke. They have a brown to grayish-brown mellow loam surface soil 10 to 15 inches deep, and a yellowish-brown to dark yellowish-brown friable and permeable loam to clay loam subsoil 15 to 25 inches thick. Although both surface soil and subsoil are open and easily penetrated by water, the water-holding capacity is good. External drainage is medium to rapid, as the soils have developed on slopes of 30 to 60 percent or more. They are moderate in fertility but are used principally for pasture, hay, or forest because of steep slopes and high altitudes.

Ranger soils have formed over slate and schist of the kinds usually associated with the ottrelite formation. The 8- to 12-inch surface layer of brownish-gray to bluish-gray loam usually contains broken slate fragments. The subsoil, a heavy silt loam or silty clay loam containing considerable quantity of small broken slate fragments, varies from gray to light brown, yellowish brown, or reddish brown, and is usually only slightly or weakly developed. Having formed on slopes of 30 to more than 60 percent, the soil has rapid to very rapid surface drainage; internal drainage is rapid.

Habersham soils, represented in both the mountain and intermountain uplands, have developed on slopes of 15 to 60 percent over graywacke, sandstone, and quartzite and other siliceous rocks, parts of which are highly metamorphosed. Surface drainage is medium to very rapid and internal drainage medium. The gray to yellowish-brown surface soil is 8 to 10 inches deep, and a light-red to brownish-red friable fine sandy clay loam or fine sandy clay subsoil extends to a depth of 30 to 45 inches. The soils are acid to strongly acid, contain very little organic matter, and are somewhat low in fertility. Their water-holding capacity is moderate to good.

Talladega soils, also common to both mountain and intermountain uplands, have developed from mica schist and talc schist on slopes of 8 to 60 percent or more, but predominantly on slopes of more than 30 percent. External drainage is medium to very rapid, and internal drainage is medium. Included in the series are types having a brown, light-brown, or light-red surface soil 5 to 8 inches thick, and a red, yellowish-red, light-red, or salmon-red friable slick clay or clay loam shallow subsoil. The surface soil and subsoil both contain enough finely divided mica flakes to impart a decidedly greasy or slick feel. The soils of this series have developed mainly in the steeper parts of the county in close association with the Fannin and Habersham soils.

Fannin soils have formed over mica schist and talc schist on intermountain uplands and are similar in many respects to Talladega soils. They are slightly more red, however, and the soil layers are considerably thicker. The depth of profile may vary from 40 to 50 inches. The surface soil is brown to light-brown loam to clay loam, 7 to 9 inches thick. The underlying layer is brownish-red, yellowish-red, or salmon-red silty clay containing considerable mica. Soils of this series are low in fertility and rather susceptible to accelerated erosion, but they have good water-holding capacity and respond moderately well to remedial treatment and careful management.

The soils of groups 3 and 4 are of the Hiwassee, Masada, State, Altavista, and Warne series. The Hiwassee and Masada have developed at higher elevations or on old high stream terraces, whereas the Altavista, State, and Warne have developed on younger and lower stream terraces. The drainage sequence becomes progressively poorer from the Hiwassee and Masada soils to the State, Altavista, and Warne.

Hiwassee soils, having developed on old river terraces, are characterized by a well-developed profile. Slopes range from 3 to 40 percent, but most are under 20 percent. External drainage is slow to rapid, and internal drainage medium. The surface 8 to 12 inches is usually dark-brown to reddish-brown friable silt loam, underlain by a reddish-brown to deep-red friable clay, clay loam, or sticky clay. These soils are characteristically underlain by water-worn gravel; the particles ¼ inch to 6 inches in diameter. Where the depth to the gravel bed is great, the soil material immediately above it often becomes mottled with yellow.

Masada soils are closely associated with the Hiwassee but in most cases have developed at slightly lower levels on slopes of 3 to 35 percent, but largely on slopes of less than 18 percent. Surface drainage is slow to rapid and subsoil drainage medium to rapid. The soils are characterized by a gray to brownish-gray friable surface soil, 8 to 12 inches deep, and a firm friable yellowish-brown to light-red subsoil. The soils are permeable to plant roots, moisture, and air and have good water-holding capacity and moderate fertility. The underlying material consists of water-worn rounded quartz gravel that is usually held together with reddish or yellowish clay and fine sandy material.

State soils, though limited in extent, are important in the agriculture of the county. They have developed on the somewhat younger and lower terraces in association with the Altavista, Congaree, and Transylvania on one side and with the Hiwassee or Masada on the other. The 9- to 12-inch surface soil is grayish-brown to brown friable silt loam to cobbly loam, and underlying this is a light reddish-brown to yellowish-brown heavy but crumbly and friable silty clay. The lower subsoil becomes more yellow with depth and may be slightly mottled in some areas. Surface and internal drainage are medium. Fertility is medium, and the response to good management is very good.

Altavista soils occupy the nearly level parts of low stream terraces. Slopes range from 0 to 8 percent, mostly under 4 percent. External drainage is slow to medium and internal drainage medium. The friable 8- to 12-inch surface soil is gray, light brown, or brownish yellow; the subsoil is yellow to yellowish brown, friable to compact, and 28 to 52 inches deep. Soils of this series are permeable and have good water-holding capacity and moderate to good fertility. They are easily conserved and are well suited to most crops produced within the area.

The Warne series is represented in the county by only one type, the silt loam. This is developed on low almost level stream terraces in association with the Altavista and Worsham and with soils of the first-bottom group. Both external and internal drainage are very slow. The surface soil is gray to grayish brown, friable, and 7 to 9 inches deep. The plastic and sticky subsoil, 45 to 50 inches deep, grades from grayish yellow to steel gray. The soil is strongly acid, moderate in fertility level, and responds well to soil treatment. When drained it is very productive of most of the crops grown within the area.

In group 5, soils developed from colluvial material, are members of the Tate, Tusquitee, and Worsham series and also of Stony colluvium (Ramsey soil material), which more accurately represents a land condition than a soil series or type. The colluvial material giving rise to these soils has accumulated near the heads of small streams, at the base of steep slopes, and at the foot of slopes on which erosion has been active. It contains a mixture of highly metamorphosed rocks, sedimentary in origin and acid in reaction. The profile development of these soils has not reached an advanced stage, and the thickness of the surface layer varies considerably. The soils are suitable for crops, and their area is not extensive.

Tate soils have developed on slopes of 2 to 15 percent under slow to medium external and medium internal drainage. They are characterized by a grayish-brown to reddish-brown friable surface soil 15 to 25 inches deep, and a yellow or yellowish-brown friable subsoil 25 to 55 inches deep. Soils of this series are fertile, have good moisture relations, respond readily to treatment, and are well suited to production of crops and pasture.

Tusquitee soils have developed under conditions of slow to medium surface and medium internal drainage on slopes of 2 to 30 percent, largely less than 20 percent. The surface soil is grayish-brown to dark-brown very friable loam to stony loam 12 to 30 inches deep. The subsoil to a depth of 32 to 85 inches is yellowish-brown to light reddish-brown friable clay loam. Areas containing considerable stone on the surface and throughout the profile have been designated as stony phases. The Tusquitee soils are friable, fertile, and easy to manage. They respond well to treatment and are considered very good for agricultural use.

The Worsham soil, though primarily of colluvial origin, may occur on the uplands, especially near the heads of springs or small streams. It has developed on slopes of 0 to 15 percent under conditions of very slow to medium surface drainage and very slow internal drainage. The gray to yellowish-gray friable loam surface soil is underlain by a yellow to brownish-yellow somewhat plastic and sticky subsoil. In places considerable stone is found on the surface and throughout the profile. Poor drainage is due to the surface relief and to the heavy clay or clay loam of the lower subsoil. Fertility is moderate, but fair to good crops can be expected in dry seasons or when the soil is adequately drained.

Stony colluvium (Ramsey soil material) is a mixture of silt, sand, clay, and stone washed out of the uplands and deposited on slopes of 2 to 15 percent, mostly along small drainageways. It represents a land condition rather than a series. There is no uniform development of the soil profile—the layers vary in color, texture, structure, and thickness. This soil is usually not used for agricultural purposes, but a few small areas are pastured.

Soils of group 6, those of the first bottoms, are members of the Congaree, Transylvania, Chewacla, Wehadkee, and Buncombe series. They are not extensive, but are important in the agriculture of the county because they can be farmed intensively to truck and other cash crops or used for grain. They are developed most extensively between Andrews and Murphy, in the valley of the Valley River, and they are differentiated principally by color and drainage conditions within the profiles. Crystalline rocks of the Great Smoky conglomerate formation are the primary source of parent material.

Congaree soils have a grayish-brown to brown friable silt loam or fine sandy loam surface soil 10 to 20 inches thick, and underlying it, a 15- to 30-inch layer of brown to light-brown soil material of about the same texture and consistence. Below this and continuing to the water table is a yellowish loamy fine sand and gravel. These soils are often micaceous. Having developed on slopes of 0 to 3 percent, they have very slow to slow external drainage and medium internal drainage. They are moderate in fertility, acid in reaction, and good in water-holding capacity. They respond well to treatment and can be used intensively for crops.

The Transylvania series is represented by the silt loam texture only. This differs from Congaree silt loam in having a darker surface color and a somewhat heavier subsoil. The surface soil is a dark-brown friable silt loam 10 to 15 inches deep; the friable subsoil, 30 to 40 inches deep, is brownish yellow to yellowish brown. The soil has developed on slopes of 0 to 3 percent under conditions of slow external drainage and medium internal drainage. It is permeable and fertile, has good water-holding capacity, and may be used intensively for most crops produced in the area.

Chewacla soils have a brownish-gray to brown mellow 10- to 16-inch surface soil and a mottled brownish-gray and gray friable subsoil 34 to 48 inches deep. They differ from the Congaree primarily in internal drainage. Their slow subsoil drainage makes them best suited to the production of hay and pasture crops. Under artificial drainage or in a dry season, corn, truck, small grain, and similar crops can be grown satisfactorily.

The Wehadkee soil, having developed in swales and lower-lying parts of the stream bottoms, is characterized by a grayish-brown to nearly black friable surface soil 10 to 15 inches deep, and a mottled light-gray and rusty-brown plastic and sticky subsoil 30 to 40 inches deep. The water table is often only 18 to 20 inches below the surface. Under normal conditions, the silt loam, the only type mapped in the county, is used primarily for pasture and grass hay crops, because adequate drainage is usually very difficult to obtain.

TABLE 2.—*Characteristics of the soil series of Cherokee County, N. C.*

Soil series	Relief	Drainage	Surface soil (A horizon)	Subsoil (B horizon)	Parent material
MOUNTAIN UPLANDS					
Habersham	Very steep	Rapid	Gray to yellowish-brown friable fine sandy loam to clay loam.	Light-red to brownish-red friable fine sandy clay loam or fine sandy clay.	Siliceous rock, chiefly graywacke.
	Steep	Medium to rapid			
	Hilly	Medium			
Porters	Very steep	Rapid	Brown to grayish-brown friable loam	Yellowish-brown to dark yellowish-brown friable loam to clay loam.	Acid sedimentary rocks and highly metamorphosed graywacke.
	Steep	Medium to rapid			
Ramsey	Very steep	Rapid	Brownish-yellow to brownish-gray friable stony loam.	Yellowish-brown to brownish-yellow friable clay loam to fine sandy clay loam.	Sandstone, conglomerate, shale, slate, and quartzite.
	Steep	Medium to rapid			
	Hilly	Medium			
Ranger	Very steep	Rapid	Brownish-gray to bluish-gray friable loam, considerable slate.	Light-brown to brownish-gray friable silt loam to silty clay loam.	Slate and schist.
	Steep	Medium to rapid			
Talladega	Very steep	Rapid	Brown, light-brown, or light-red friable loam to shaly clay loam.	Yellowish-red, light-red, or salmon-red to red friable micaceous clay to clay loam.	Mica schist and talc schist.
	Steep	Medium to rapid			
	Hilly	Medium			
INTERMOUNTAIN UPLANDS					
Fannin	Hilly	Medium	Brown to light-brown friable loam	Brownish-red, yellowish-red to salmon-red stiff brittle clay loam to clay.	Mica schist and talc schist.
	Rolling	do			
Habersham	Hilly	do	Gray to yellowish-brown friable fine sandy loam to clay loam.	Light-red to brownish-red friable fine sandy clay loam or fine sandy clay.	Siliceous rock, chiefly graywacke.
Talladega	Steep	Medium to rapid	Brown, light-brown, or light-red friable silt loam.	Light-red to red friable micaceous clay to clay loam.	Mica schist and talc schist.
	Hilly	Medium	Reddish-brown to light reddish-brown friable loam to silt loam.	Light-red to red friable micaceous clay to clay loam	Do.
	Rolling	do			
HIGH STREAM TERRACES					
Hiwassee	Hilly	Medium	Dark-brown to reddish-brown friable loam.	Reddish-brown to deep-red friable clay or silty clay.	Old alluvium.
	Rolling	Slow to medium			
	Undulating	do			
Masada	Hilly	Medium	Gray or brownish-gray friable loam	Yellowish-brown to light-red friable clay or clay loam.	Do.
	Undulating	Slow to medium	Brownish-gray friable loam	do	Do.

LOW STREAM TERRACES

Altavista	Rolling	Slow to medium	Yellow or light yellowish-brown friable silt loam.	Yellow friable to compact silt or clay	Old alluvium.
	Undulating	do	Gray, light-gray, or light-brown friable silt loam.	Yellow friable to compact silty clay or clay.	Do.
	Level or nearly level.	Slow	Dark-gray to brown friable silt loam	Yellowish-brown friable to compact silty clay or clay.	Do.
State	Undulating	Slow to medium	Grayish-brown to brown friable silt loam.	Light reddish-brown to yellowish-brown friable clay loam.	Do.
Warne	Level or nearly level.	Very slow	Gray to grayish-brown friable silt loam.	Grayish-yellow grading to steel-gray mottled plastic and sticky clay or silty clay.	Do.

COLLUVIAL SLOPES

Tate	Rolling	Slow to medium	Grayish-brown to reddish-brown friable silt loam.	Yellow or yellowish-brown friable clay or clay loam.	Colluvium.
	Undulating	do			
Tusquitee	Hilly	Medium	Grayish-brown to dark-brown friable loam.	Yellowish-brown to reddish-brown friable clay or clay loam.	Do.
	Rolling	Slow to medium	do	Yellowish-brown to light reddish-brown friable clay or clay loam.	Do.
	Undulating	do			
Worsham	Rolling	Very slow	Gray to yellowish-gray friable loam	Yellow to brownish-yellow brittle sticky fine sandy clay.	Do.

FIRST BOTTOMS

Buncombe	Level to nearly level.	Rapid	Light grayish-brown to grayish-brown loamy fine sand.	Light-brown fine sand	Mixed sand, silt, and clay of recent alluvial origin.
Chewacla	do	Very slow to slow	Brownish-gray to brown friable silt loam.	Mottled brownish-gray and gray friable silt loam to clay.	Do.
Congaree	do	Slow to medium	Grayish-brown to brown very friable silt loam to fine sandy loam.	Brown to light-brown friable silt loam to silty clay loam.	Do.
Transylvania	do	do	Dark-brown friable silt loam	Brownish-yellow to yellowish-brown friable clay loam.	Do.
Wehadkee	do	Very slow to slow	Grayish-brown to nearly black friable silt loam.	Light-brown fine sand	Do.

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The Buncombe soil is represented by the loamy fine sand, which occupies positions adjacent to stream channels or slightly ridged and hummocky areas. It is closely associated with the Congaree and Chewacla, but differs in being sandy throughout, having more rapid drainage, and being subject to leaching. The soil is easily tilled and, although normally only moderately productive, gives satisfactory yields in wet years.

In general the soils of the 19 series represented in the county have a prevailingly brown to reddish-brown or red subsoil. The surface texture is mainly loam, fine sandy loam, silt loam, and clay loam. Over a large part of the county rock fragments and some large boulders occur on the surface and imbedded in the solum. Bedrock, in places, lies only a few inches below the surface, and outcrops of it are common.

The structure of the surface soil is moderately loose; that of the subsoil, predominantly friable or brittle. Most of the soils are steep or stony and difficult to till; the rest are generally favorable for tillage. When the hilly and steep areas are cleared and cultivated, they become eroded unless properly managed. Most of the soils in the southern and southwestern parts of the county, in addition to being friable, are slick or greasy to touch, owing largely to their high content of finely divided mica flakes or to the presence of talcose material.

The characteristics of the soil series occurring in the county are given in table 2. Descriptions of their 84 mapping units are presented in the section on Soil Types and Phases.

SOIL TYPES AND PHASES

In the following pages the soils of the county are described in detail and their agricultural relations are discussed. Their location and distribution are shown on the soil map (cover page 3), and their acreage and proportionate extent are given in table 3. Their use suitability, present management, management requirements, estimated average crop yields, crop adaptations, and fertilizer requirements are discussed in the section Soil Use, Management, and Productivity. For detailed descriptions of a few of the more important soil types, the reader may turn to the section on Morphology and Genesis of Soils.

TABLE 3.—*Acreage and proportionate extent of the soils of Cherokee County, N. C.*

Soil type [1]	Acres	Percent
Altavista silt loam:		
Level dark-colored phase	56	(2)
Rolling phase	92	(2)
Undulating phase	583	0 2
Buncombe loamy fine sand	195	1
Chewacla gravelly loam	372	.1
Chewacla silt loam	3,442	1 2
Chewacla-Tate silt loams	8,898	3 0
Congaree fine sandy loam	1,320	5
Congaree silt loam	1,202	.4
Fannin clay loam		
Eroded hilly phase	879	.3
Eroded rolling phase	473	2
Severely eroded hilly phase	408	.1
Severely eroded rolling phase	143	(2)
Fannin loam, hilly phase	1,179	.4
Fannin stony clay loam, eroded hilly phase	370	.1
Fannin stony loam, hilly phase	561	.2
Habersham clay loam, severely eroded hilly phase	1,618	0 6
Habersham fine sandy loam		
Hilly phase	3,812	1 3
Rolling phase	841	3
Steep phase	4,832	1 6
Habersham loam:		
Eroded hilly phase	2,268	.8
Eroded rolling phase	428	.1
Habersham stony clay loam, severely eroded hilly phase	1,188	.4
Habersham stony fine sandy loam:		
Hilly phase	2,211	8
Rolling phase	227	.1
Steep phase	17,381	5 9
Very steep phase	1,216	.4
Habersham stony loam.		
Eroded hilly phase	2,389	.8
Eroded steep phase	1,111	.4

See footnotes at end of table, p. 19.

TABLE 3.—*Acreage and proportionate extent of the soils of Cherokee County, N. C.*—Continued

Soil type [1]	Acres	Percent
Hiwassee clay loam, eroded undulating phase	54	(²)
Hiwassee gravelly clay loam:		
Eroded hilly phase	315	0.1
Eroded rolling phase	195	.1
Hiwassee loam:		
Hilly phase	243	.1
Rolling phase	539	.2
Undulating phase	328	.1
Masada gravelly clay loam:		
Eroded hilly phase	781	.3
Eroded rolling phase	520	.2
Masada gravelly loam:		
Hilly phase	675	.2
Rolling phase	1,345	.5
Masada loam, undulating phase	286	.1
Porters loam, steep phase	235	.1
Porters stony loam:		
Steep phase	910	.3
Very steep phase	2,347	.8
Ramsey stony loam:		
Eroded steep phase	170	.1
Hilly phase	186	.1
Steep phase	13,348	4.6
Very steep phase	81,899	28.0
Ramsey-Talladega stony clay loams, eroded steep phases	366	.1
Ramsey-Talladega stony loams:		
Steep phases	2,620	.9
Very steep phases	527	.2
Ranger slaty silt loam:		
Steep phase	893	.3
Very steep phase	1,879	.6
Rough gullied land (Talladega soil material)	157	.1
Rough stony land (Ramsey soil material)	17,828	6.1
State cobbly loam	623	.2
State silt loam	582	.2
Stony colluvium (Ramsey soil material)	668	0.2
Talladega-Habersham stony clay loams:		
Severely eroded hilly phases	1,498	.5
Severely eroded steep phases	590	.2
Talladega-Habersham stony loams:		
Eroded hilly phases	1,526	.5
Eroded steep phases	1,053	.4
Hilly phases	2,095	.7
Steep phases	23,624	8.1
Very steep phases	1,204	.4
Talladega shaly clay loam:		
Eroded hilly phase	3,373	1.2
Eroded rolling phase	426	.1
Eroded steep phase	1,150	.4
Severely eroded hilly phase	1,825	.6
Talladega silt loam:		
Hilly phase	7,458	2.5
Steep phase	19,492	6.7
Very steep phase	711	.2
Talladega stony loam:		
Hilly shallow phase	1,506	.5
Steep shallow phase	10,374	3.5
Very steep shallow phase	9,070	3.1
Tate silt loam:		
Rolling phase	2,098	.7
Undulating phase	5,210	1.8
Transylvania silt loam	921	.3
Tusquitee loam, rolling phase	322	.1
Tusquitee stony loam:		
Hilly phase	1,323	.5
Rolling phase	2,871	1.0
Undulating phase	595	.2
Warne silt loam	303	.1
Wehadkee silt loam	870	.3
Worsham loam	778	.3
Total	292,480	100.0

[1] Where data are given for phases only, the normal type is not mapped in the county.
[2] Less than 0.1 percent.

Altavista silt loam, undulating phase.—Small usually scattered bodies of this phase occur on stream terraces in association with State and Congaree soils. The small areas border mainly the Valley and the Hiwassee Rivers and Peachtree and Mills Creeks. The largest of these are near Coalville and Andrews and south of Peachtree and Murphy. Most of the soil has been cleared of the native vegetation, which included shortleaf pine, pitch pine, scarlet oak, and black oak, with a few Southern red, post, and white oaks mixed.

The parent material is old alluvium washed from upland areas and deposited as moderately low stream terraces. Slopes range from 0 to 7 percent. Surface drainage is slow to medium and internal drainage is medium. The gray, light-gray, or light-brown friable surface soil is 8 to 12 inches thick. A friable but compact yellow subsoil continues to a depth of 28 to 52 inches.

Following is a description of a profile in a forested area:

0 to 2 inches, partly decomposed leaves, roots, and twigs mixed with some mineral matter.

2 to 12 inches, gray, light-gray, or light-brown friable silt loam having crumb structure.

12 to 32 inches, yellow friable but compact silty clay or clay containing a few mica flakes.

The lower part of the subsoil is in places mottled with gray. Other variations result mostly from a few mapped inclusions. There is a small included acreage of the level phase (slope, 0 to 3 percent) that is less well drained and often slightly darker in surface color. Approximately 10 acres of the eroded undulating phase has slightly less organic matter in the somewhat more shallow surface layer.

Most of Altavista silt loam, undulating phase, is cultivated or used for pasture and hay. The content of organic matter is somewhat low, productivity is moderate, moisture relations are excellent, and the reaction is strongly acid. It is well suited to the production of corn, wheat, and hay and requires no special conservation practices; it responds well to applications of fertilizer and lime.

Altavista silt loam, rolling phase.—This soil occurs in close association with the undulating phase, differing from it primarily in relief. A somewhat more shallow surface soil and a lower organic-matter content are other distinguishing differences. Areas occur southwest of Peachtree, northwest of Fairview Church, and northwest of Woodville. The friable yellow or light yellowish-brown surface soil is underlain by a friable but compact yellow subsoil. Slopes range from 7 to 15 percent, and external and internal drainage are medium.

Included are approximately 10 acres that have a somewhat finer textured surface layer resulting from erosion and the later mixing of the surface and subsoil by plowing. More careful management is required on this included soil to prevent further damage by erosion.

Altavista silt loam, rolling phase, has about the same use suitability as the silt loam, undulating phase. It is moderately productive, relatively easy to work, has good water-holding capacity, is free from stones, is somewhat low in organic-matter content, and is moderately fertile. It is well suited to the production of corn, small grain, hay, and truck crops and can be farmed intensively, especially if contour tillage and soil conservation practices are followed.

Altavista silt loam, level dark-colored phase.—Areas of this soil occur near the Valley River north of Gaging Station and north of Marble. It has developed on slopes of 0 to 3 percent under conditions of slow external and medium internal drainage. A dark-gray to brown friable surface layer underlain by yellowish-brown friable but compact subsoil is characteristic. This soil is permeable, acid in reaction, and of moderate fertility. It responds well to treatment with both phosphorus and lime, can be used intensively without special management practices, and is well suited to the production of corn, small grain, hay, and truck crops.

Buncombe loamy fine sand.—Narrow strips of this type occur nearest the streams on first bottoms, as along the Valley, Hiwassee, and Nottely Rivers. It is alluvial in origin and subject to stream overflow. The total acreage is small. Slopes range from 0 to 3 percent. Drainage is slow externally and rapid internally. Native vegetation was mostly pine, birch, and sycamore. The light grayish-brown to grayish-brown friable surface soil is underlain by light-brown loose fine sand. The sand is generally coarser at greater depth and the material is commonly stratified.

The soil is strongly acid, deficient in content of organic matter, and low in fertility. It is permeable to plant roots and water, but its water-holding capacity is poor; therefore the land is droughty.

Corn, rye, sorgo, and watermelons are the principal crops grown. Average yields are low, but the soil responds well to lime, fertilizer, and green manure.

Chewacla silt loam.—Areas of this soil occur west of Holiness Church and southwest of Woodville. This alluvial soil has developed on the first bottoms of many streams from parent material that is usually washed from nearby formations. The land is subject to overflow, and slopes do not exceed 3 percent. Artificial drainage is often necessary for best agricultural results. Although most areas have been cleared, the native vegetation included wild cherry, buckeye, maple, willow, oak, and an undergrowth of briers and weeds.

A profile description is as follows:

0 to 16 inches, gray to brown friable loam of weak-crumb structure.
16 to 24 inches, slightly mottled brownish-gray to gray or bluish-gray silty clay loam; friable when moist but moderately plastic and sticky when wet. Mottling usually increases with depth, and in places the water table is high enough to keep the lower subsoil saturated part of the year.
24 to 34 inches, gray splotched with rust-brown silty clay; moderately plastic and sticky when wet.
34 inches +, gravel, sand, silt, or clay; massive in structure and often saturated with water.

Some variations exist in this type, particularly in depth to the water table, in the degree of mottling, and in the depth to the mottling. The depth to the water table varies from about 24 to 40 inches. The subsoil in many places shows stratification that causes variation in texture as well as in thickness of the soil layers.

A small acreage of Congaree silt loam is included. The individual areas are so small and so closely mixed with this soil that they could not be mapped separately.

Chewacla silt loam is acid to strongly acid and is fairly well supplied with organic matter and plant nutrients. When adequately drained, it is well suited to the production of corn, small grain, hay, and pasture. The more poorly drained areas can be used for hay or pasture. When necessary, this soil may be used in relatively short rotations of corn, truck crops, and small grain. It responds well to applications of lime and fertilizer and is easy to cultivate.

Chewacla gravelly loam.—A gravelly and more shallow loam surface soil and a more friable and generally more shallow subsoil differentiate this soil from Chewacla silt loam. It occurs along the smaller streams, mainly in the eastern part of the county, and having developed on slopes of 0 to 3 percent, it has moderate external drainage and slow internal drainage. Areas occur north of Andrews and northeast of Mount Nebo School.

The surface soil is friable gravelly brownish-gray to brown loam underlain by mottled gray and brown friable fine sandy clay to clay loam. Variations may occur in the depth to water table, in the degree of mottling, in the content of gravel, and in the texture of the subsoil and substratum.

Most of this land is cleared and in use. Corn, rye, pasture, and hay are the crops ordinarily produced and good yields can be expected where the soil is drained. The gravel causes some difficulty in cultivation.

Chewacla-Tate silt loams.—Included in this complex are narrow strips of Chewacla silt loam and Tate silt loam, undulating phase, too small to be indicated separately on the soil map, and, in addition, spots where the surface soil is colluvial and the subsoil is alluvial. Areas occur northwest of Moccasin Church and south of Maggie Chapel. The complex occurs along many small streams throughout the county and in patches at or near the heads of streams. Usually the strips of Chewacla soil are nearest the streams and those of the Tate next to the hilly or steep uplands. Slopes range from 0 to 7 percent. The two soils have similar soil characteristics.

The silt loams in this complex are acid in reaction, fairly well supplied with organic matter, free from stones or gravel, permeable to moisture and air, and moderately fertile. The soils, especially the areas more nearly resembling the Chewacla, are easy to conserve, and respond well to applications of fertilizer and lime and to artificial drainage.

Most areas have been cleared and are being used for the production of corn, soybeans, potatoes, hay, and pasture (pl. 1, *B*).

Congaree fine sandy loam.—This soil has developed from recent alluvium in first-bottom positions, mostly along the Hiwassee, Valley, and Nottley Rivers. It is usually nearer the stream banks than Congaree silt loam, as the more sandy alluvium is deposited closest to the watercourses. Areas are located southwest of Peachtree and south of Maltby. A few narrow strips occur along some of the smaller streams.

The surface soil is grayish-brown to brown and friable; the friable subsoil is light brown to brown. Slopes do not exceed 3 percent. External drainage is very slow to slow and internal drainage medium. Most bodies have been cleared, but the native vegetation included oaks, yellow-poplar, white ash, wild cherry, sweetgum, maple, dogwood, and birch.

A profile description is as follows:

- 0 to 12 inches, grayish-brown to brown friable loam having medium-crumb structure.
- 12 to 40 inches, brown to light-brown friable loam to clay loam having soft-crumb to massive structure.
- 40 inches +, mixed sand, silt, clay, and gravel, stratified to some extent.

Variations in this type are caused largely by stratification. Areas near the stream usually have a coarser textured subsoil, while those farther away have a finer texture and often show a slight degree of development.

Congaree fine sandy loam is one of the most desirable soils in the county for corn, small grain, soybeans, potatoes, and legume hay because of the ease of cultivation and nearly level relief. Most of it is being farmed intensively. It is strongly acid and moderate in fertility but responds well to applications of both lime and fertilizer.

Congaree silt loam.—A finer textured surface soil and a usually finer textured subsoil showing some development distinguish this soil from Congaree fine sandy loam. The brown to grayish-brown friable surface soil is underlain by a brown to light-brown friable subsoil. Both surface soil and subsoil usually contain considerable finely divided mica flakes. Development has taken place on slopes of 0 to 3 percent under the influence of very slow surface drainage and medium internal drainage. Areas occur northwest of Moccasin Church and northeast of Maggie Chapel.

In places small bodies of Transylvania silt loam are included within areas of this soil, because the two have developed in close association. Also included are a few small strips or bars of Congaree fine sandy loam, Buncombe loamy fine sand, and Chewacla silt loam. Most variations result from stratification or from the more recent depositions on the surface.

Congaree silt loam, nearly all of which has been cleared, is well adapted to the production of corn, small grain, and legumes. Moderately fertile and moderately to strongly acid, it responds well to applications of lime and fertilizer. It has nearly level relief, is free of stone, is easy to work and manage, and can be used for intensive agriculture.

Fannin loam, hilly phase.—Practically all of this soil, the most extensive in the Fannin series, is in the intermountain uplands in the southern part of the county. Most of it has developed from weathered material derived from mica schist and talc schist. Areas occur east of Martin Creek Church and Tomotla.

The surface soil is brown to light brown and friable; and in some places grayish; the subsoil is stiff brittle smooth micaceous clay, yellowish red to salmon red. Slopes range from 15 to 30 percent, and internal drainage is medium. Most of this phase is under a forest cover of mixed hardwoods and shortleaf pine, the undergrowth being mountain-laurel and other small shrubs. If it is necessary to clear and cultivate this soil, careful management must be practiced to prevent damage by erosion.

Following is a representative profile:

0 to 10 inches, brown to light-brown smooth friable loam.

10 to 25 inches, yellowish-red stiff brittle silty clay or clay loam that breaks easily to nutlike fragments.

25 to 38 inches, yellowish-red silty clay loam or clay loam being slick or greasy to touch; the lower part is less stiff and breaks to weaker or less well-defined fragments. Soft partly decomposed mica schist is below this layer.

The entire profile is moderately to strongly acid, and natural fertility is low. The surface layer is 5 to 14 inches thick. The total thickness of profile over bedrock is 20 to 45 inches. Included are small areas or patches having a profile resembling that of the Talladega soils. These are distinguished from the surrounding soils by a subsoil having a less stiff brittle consistence and nutlike structure.

Chiefly because of its hilly slope, low fertility, and moderately shallow depth to bedrock, Fannin loam, hilly phase, is not well suited to crops requiring tillage. With proper management, including adequate fertilization and long rotations mainly of pasture and close-growing crops, productivity can be maintained.

Fannin clay loam, eroded rolling phase.—A great part of this soil has been under cultivation, and 50 to 75 percent of the surface soil has been lost through erosion. The plow layer on much of the soil is a mixture of the original surface layer and subsoil material. In places, especially on the more exposed knobs, it is almost entirely subsoil material. As a result of erosion and mixing, the plow layer is finer textured and redder than that of Fannin loam, hilly phase. Other differences distinguishing this from the hilly phase are a smoother surface, with few slopes exceeding 15 percent, and a subsoil more regular in its stiff brittle consistence and nutlike structure. Areas are south of Peachtree and southwest of Maggie Chapel.

Included with this phase are a few areas that have not been cleared of native forest vegetation. The original surface soil on these has not been affected materially by accelerated erosion. A few small areas have sufficient stone throughout their profile to interfere materially with cultivation.

Corn, wheat, rye, lespedeza, field peas, and clover are common crops on this eroded rolling phase. The soil is moderately productive and is suited to crops requiring tillage if adequate measures for maintaining the fertility and preventing erosion are taken. It responds well to lime and fertilizer. Moderately long rotations, used with contour tillage, strip cropping, and similar methods of careful tillage, are advisable.

Fannin clay loam, severely eroded rolling phase.—This soil differs from Fannin loam, hilly phase, in having less slope (7 to 15 percent), and in lacking the normal loam surface soil. More than 75 percent of the original surface soil has been lost by accelerated erosion, and the present plow layer is yellowish-red clay loam subsoil material. Small gullies are frequent, and surface drainage is rapid.

All this soil has been cleared, but more than half is used for pasture, and a considerable part is idle. Sassafras, briers, pine, or locust grow on most of the idle acreage. Very little is used for crops, natural fertility is low, moisture-holding capacity is limited, and tilth is unfavorable. In addition, this phase is subject to soil loss by runoff when cultivated; if properly fertilized and seeded, it is suitable for pasture. Long rotations consisting chiefly of pasture and close-growing crops should be used on areas required for crops. Contour tillage and strip cropping can be expected to aid in restraining soil erosion.

Fannin clay loam, eroded hilly phase.—This soil differs from the hilly phase of Fannin loam chiefly in having lost a notable part of its original surface layer through erosion. Most of this phase is in the southern part of the county. Some of the larger areas are near Campbell Folk School, in the vicinity of Marble, and along the foothills north of Coalville.

The 4- to 6-inch plow layer, a yellowish-red friable clay loam, is a mixture of surface and subsoil materials. Quartz stones occur in places, but they are not sufficiently abundant to prohibit tillage. Surface drainage is rapid and internal drainage medium; slopes are 15 to 30 percent.

This land is better suited to permanent pasture, but with good management, wheat, corn, field peas, and rye can be grown in long rotations with close-growing legumes for hay and pasture. Strip cropping and contour tillage should be practiced. The soil is moderately to strongly acid, low in organic-matter content, relatively low in fertility, and susceptible to erosion. It responds well to lime and complete fertilizer.

Fannin clay loam, severely eroded hilly phase.—Represented in this phase are rather small hilly areas of Fannin loam that have lost nearly all of the surface soil through accelerated erosion, and in many places, some of the subsoil. Small gullies and rills are common, and some are difficult to cross with machinery. Slopes range from 15 to 30 percent.

Most of this phase occurs in the higher parts of the intermountain uplands in association with other members of the Fannin series and the Talladega soils. Representative areas occur southwest of Davidsonville and north of Martin Creek School.

The plow layer is brownish-red or yellowish-red friable clay loam; the underlying subsoil is friable clay loam to clay of the same color and consistence. Surface drainage is rapid and internal drainage medium. The soil is moderately to strongly acid. It is less permeable than the uneroded phase, and its capacity for holding moisture available to plants is less.

Owing to the steep relief and severely eroded condition, this soil is not well suited to either crops or pasture. Areas required for pasture should be limed, fertilized, and properly seeded. Most of the land is idle or in unimproved pasture.

Fannin stony loam, hilly phase.—On the steeper parts of the intermountain uplands this soil occurs in association with other members of the Fannin series and the Talladega soils. It is not extensive and lies almost entirely in the extreme southern part of the county. Areas are west of Sheep Knob, north of Maggie Chapel, and in the vicinity of Davidsonville and Bellview. Slopes are 15 to 30 percent; surface drainage is medium to rapid and internal drainage medium. All areas have a mixed forest growth of red, post, and white oaks, maple, dogwood, a few dead chestnut, shortleaf pine, and scattered white pine.

The surface soil is yellowish-gray to brownish-gray loose and friable stony loam. There is a small organic accumulation in the surface 2 inches. The brownish-red or yellowish-red friable clay loam or clay subsoil contains considerable finely divided mica flakes and grades into partly decomposed mica schist and talc schist. Stones, 3 to 8 inches in diameter and usually of quartz, are on the surface and mixed throughout the profile in sufficient abundance to interfere materially with cultivation. The thickness of the soil layers and the quantity of fine sandy material in the surface soil vary somewhat. Parent rock is of the Great Smoky conglomerate formation, and much of it contains some mica, slate, graywacke, and sandstone.

This soil is moderately to strongly acid and somewhat low in fertility but permeable to water, air, and plant roots. It is not well suited to either crops or pasture, chiefly because of its steep slope and stoniness. Should necessity require the clearing of this land, moderate to good pasture can be obtained if sufficient quantities of lime and complete fertilizer are added.

Fannin stony clay loam, eroded hilly phase.—Represented in this phase are areas formerly of Fannin stony loam, hilly phase, that have been cleared and cultivated, and as a result have lost 40 to 75 percent of the original surface soil by accelerated erosion. Slopes range from 15 to 30 percent. Surface drainage is rapid and internal drainage medium. Areas are south of Shuler Mountain, and southeast of Davidsonville.

The plow layer is light-brown to light reddish-brown friable stony clay loam. There is some variation in the thickness of this layer and in the degree of erosion. A few included areas are severely eroded. The subsoil is brownish-red or yellowish-red friable stony clay to clay loam. Small mica flakes throughout the soil mass impart a slick or greasy feel, and the large quantity of quartz rock scattered over the surface and throughout the profile interferes with cultivation. The organic-matter content and fertility are low, but the soil is permeable to moisture, air, and plant roots.

All areas of this phase have been cleared and cropped at some time, but the land is now in pasture or lying idle. The soil supports fairly good pasture but is not well suited to crops. When cultivated, corn is the principal crop. Yields are very low, except where liberal quantities of lime and fertilizer are used. Where cultivation is necessary, long rotations should be used, and the land should be in pasture, hay, or clover crops at least three-fourths of each rotation. The most severely eroded parts should not be cultivated, as they are very poorly suited to any use other than forest.

Habersham fine sandy loam, hilly phase.—This soil has developed over siliceous rock, mostly graywacke, in both the mountain and intermountain uplands and is ordinarily associated with the less steep phases of the Ramsey and Talladega soils. Slopes are 15 to 30 percent; surface drainage is medium to rapid and internal drainage medium. The phase is not extensive, but areas are southwest of Patrick Shear School, north of Clark School, southwest of Franklin Gap, and south of Hiwassee Dam.

Native vegetation included deciduous hardwoods—principally Southern red, black, scarlet, and white oaks, hickory, dogwood, maple, locust, and sourwood—and a few scattered white pine and shortleaf pine.

The loose friable fine sandy loam surface soil is gray to yellowish brown, and underlying it is a light-red to brownish-red friable subsoil.

A profile in a wooded area is describe as follows:

0 to ½ inch, a very thin layer of leafmold, roots, and twigs.
½ to 5 inches, yellowish to yellowish-brown loose friable fine sandy loam.
5 to 15 inches, yellowish-brown reddish-tinged loose friable fine sandy loam.
15 to 38 inches, light-red to brownish-red heavy friable fine sandy clay.
38 to 47 inches, a mixture of red clay and soft rock over parent rock of sandstone or graywacke.

In some places the soil is underlain by soft gray sandy rock material mixed with red clay, and in others the red subsoil rests on solid fine sandy rock, probably graywacke, sandstone, quartzite, or other highly metamorphosed sedimentary rock. The variations are chiefly in the total thickness of the soil over rock, but in some localities the subsoil color varies to brown, pale reddish brown, or bright red, and the texture to clay.

Nearly all of the soil is in forest, but if clearing is necessary, moderate yields of corn, rye, wheat, hay, and pasture can be expected under proper management. The soil is moderately to strongly acid, low in organic matter, practically free of stone, and friable throughout its depth, and it should respond well to lime, fertilizer, manure, and moderately long rotations that include leguminous hay crops and pasture. Because it is subject to erosion when cleared, contour tillage, strip cropping, or similar soil conserving practices should be followed.

Habersham fine sandy loam, steep phase.—Having developed on slopes of 30 to 60 percent, this phase has rapid external drainage and medium internal drainage. It differs from the hilly fine sandy loam in having steeper relief and a somewhat more shallow solum. The loose friable gray to yellowish-brown fine sandy loam surface soil is underlain by a light-red to brownish-red fine sandy clay loam or fine sandy clay subsoil. Bodies of this phase occur in association with the Talladega and with other members of the Habersham series. Representative areas are north of Patrick Shear School, on the west side of the Hiwassee River in the vicinity of Hiwassee Dam, and near Oak Grove Church.

Except for about 50 acres of eroded and approximately 25 acres of severely eroded soil included in mapping, nearly all this phase is in forest, mainly deciduous hardwoods. The included areas have been cleared and cultivated and, as a result, have been damaged by accelerated erosion. They have a somewhat more shallow surface layer than is typical for the phase.

This soil is too steep for cultivated crops, and careful management practices must be followed to prevent erosion, even on the land in pasture. Cleared areas can be used for pasture, but if they are severely damaged by erosion, they should be reforested. Good yields of timber can be expected under proper forest management.

Habersham fine sandy loam, rolling phase.—A smoother surface is the chief characteristic distinguishing this from the hilly phase of Habersham fine sandy loam, but the profile is also somewhat deeper. The phase has developed primarily in intermountain uplands on slopes of 7 to 15 percent. It occurs almost entirely in the western part of the county, the largest areas being in the vicinity and southwest of Wolf Creek Church. Surface and internal drainage are both medium.

This phase is moderately to strongly acid and permeable to water, air, and roots. The loose friable fine sandy loam surface soil is gray, grading to brownish yellow or yellowish brown; the subsoil is friable light-red to brownish-red fine sandy clay loam or fine sandy clay.

Practically all this land is in forest, chiefly deciduous hardwoods. A few small areas have been cleared and cultivated, and more could be cleared because the relief and the friable and permeable condition of the soil are favorable to the production of crops. Moderate to good yields of corn, sweetpotatoes, rye, and sorgo can be expected under proper management. A rotation including leguminous hay and cover crops is advisable for maintaining the organic-matter and nitrogen content. Contour tillage and strip cropping will help prevent damage by erosion. The soil should respond well to applications of lime and fertilizer.

Habersham loam, eroded hilly phase.—Represented in this phase are former areas of Habersham fine sandy loam that have been cleared and subjected to moderate erosion. Having developed on slopes of 15 to 30 percent, the soil has rapid external and medium internal drainage. It occurs in association with Ramsey and Talladega soils, and with other members of the Habersham series. Areas are north of Cumberland Gap, near White Church, and west of Unaka.

The surface soil, finer textured than that of Habersham fine sandy loam, has resulted through mixing of the rest of the original surface layer of fine sandy loam with the clay loam subsoil in tillage operations. The resulting surface layer is brown to reddish-brown friable loam. Underlying is a light-red to brownish-red friable fine sandy clay loam or fine sandy clay. There are some variations in the color and thickness of the surface soil and in the color of the subsoil. In some places a few stones are on the surface and throughout the profile.

Nearly all of this eroded hilly phase is cleared and used for farm crops or pasture. Approximately 50 percent is in open pasture and 15 percent in cropland. Corn, wheat, potatoes, rye, field peas, and lespedeza are most commonly grown. The soil is low in organic matter and fertility and moderately to strongly acid, but it responds well to applications of lime, fertilizer, and green manure. Although it is best suited to pasture, moderate to good crop yields may be expected if good management practices are followed. Because the soil is very erodible, contour tillage, strip cropping, and such soil-saving practices should be followed to prevent further damage by erosion.

Habersham loam, eroded rolling phase.—Differentiating this phase from the hilly phase of Habersham fine sandy loam are slopes of 7 to 15 percent, the loss of 50 to 75 percent of the original surface soil by accelerated erosion, a more brown surface color, and a somewhat better developed subsoil. The soil is associated with the stony types and other phases of the Habersham series. Most areas lie in the western part of the county. Representative bodies occur west of Liberty Church, west of Turkey Pen, and in the vicinity of Wolf Creek Church. The plow layer is brown to reddish-brown friable loam and the subsoil light-red to brownish-red friable fine sandy clay. Surface drainage is medium to rapid and internal drainage medium.

A small acreage of Habersham clay loam, severely eroded rolling phase, has been included with this soil in mapping. This differs mainly in the degree of erosion, but a somewhat greater number of stones are scattered on the surface and mixed with the soil in many places.

The soil included in Habersham loam, eroded rolling phase, is low in organic-matter content, medium to low in fertility, and moderately to strongly acid. It responds well to applications of lime and fertilizer, however, and is easy to manage because of its favorable relief. Approximately 75 percent is being farmed. Corn, wheat, rye, potatoes, sweetpotatoes, oats, and sorgo are the crops most commonly produced. Moderate to good yields can be expected when crop rotations include legumes, ample fertilizer is applied and further damage by erosion is prevented.

Habersham clay loam, severely eroded hilly phase.—Represented in this phase are those areas occurring in association with other members of the Habersham series that have been improperly managed. Some of these are southwest of Patrick Shear School and west of Liberty Church. The soil has developed on slopes of 15 to 30 percent; external drainage is rapid to very rapid and internal drainage is medium.

The plow layer is a light reddish-brown to brownish-red friable clay loam underlain by light-red to brownish-red friable fine sandy clay. The soil differs from Habersham loam, eroded hilly phase, in having a more shallow solum, a finer textured redder surface soil, some extensive gullying, and more rapid surface drainage. The difference in surface soil has resulted through the loss of the original surface layer and the later mixing of some surface soil and subsoil material in plowing.

Most of this land was cleared and then used a long time for crops and pasture. Now, much of it is in pasture or in abandoned or idle fields. The soil is low in organic-matter content, low in fertility, moderately to strongly acid in reaction, and susceptible to further damage by erosion. It should be planted to trees. If it is necessary to cultivate, gullies must be filled in and liberal quantities of lime and fertilizer applied. To increase the organic-matter content, legumes, rye, and similar crops should be grown to plow under. With careful management, corn, wheat, rye, clover, lespedeza, and like crops can be produced satisfactorily.

Habersham stony fine sandy loam, steep phase.—Throughout the central and western parts of the county this soil occurs in close association with the Ramsey, Talladega-Habersham complex, and other phases of the Habersham. It occupies the largest acreage of any of the Habersham soils. Areas are south of Jones Knob and south of Jesus Christ Church. Slopes range from 30 to 60 percent; surface drainage is rapid and internal drainage medium. The gray to yellowish-brown very friable stony fine sandy loam surface soil is underlain by a light-red or brownish-red friable stony fine sandy clay loam. The chief variations are in the thickness of the soil layers and color of the subsoil.

Nearly all of this land is in forest, and, because of its steep slopes and stoniness, it should remain so. It produces a moderate to good tree growth, and good returns can be expected if selective cutting is practiced and desirable species are encouraged.

Habersham stony fine sandy loam, rolling phase.—This soil differs from hilly Habersham fine sandy loam in having slopes of 7 to 15 percent, in containing considerable stone on the surface and throughout the profile, and in having a somewhat deeper profile. It is found in association with the smoother areas of the Ranger and Talladega soils. Surface and internal drainage are both medium. The surface soil is gray to yellowish-brown loose friable fine sandy loam, and the underlying subsoil is light-red or brownish-red friable stony fine sandy clay loam. This soil is friable; moderately to strongly acid; permeable to roots, air, and water; and somewhat low in fertility and organic matter. Areas occur southwest of Sheep Knob and southeast of Unicoi Gap and Mount Olive Church.

Approximately 50 acres of this soil that has a somewhat more shallow surface layer as a result of erosion and about 50 acres of Habersham stony clay loam, eroded steep phase, have been included in mapping. The included soils are similar to this one in most other profile characteristics.

Little of Habersham stony fine sandy loam, rolling phase, has been cleared, but areas could be cleared and used for agricultural purposes, because the soil is much easier to manage without serious erosion than any part of the hilly phase. Its stoniness causes some difficulty in tillage operations, but the soil responds well to applications of both lime and fertilizer. With good management, satisfactory yields of corn, sweetpotatoes, rye, sorgo, hay, pasture, and similar crops can be expected. Severely eroded areas must receive special attention if they are to be reclaimed.

Habersham stony fine sandy loam, hilly phase.—Differentiating this phase from hilly Habersham fine sandy loam are stones on the surface and throughout the soil profile in numbers sufficient to make tillage operations difficult. The soil has developed on slopes of 15 to 30 percent. Surface drainage is medium to rapid and internal drainage medium.

The soil occurs closely associated with other members of the Habersham series, especially in the western part of the county. Areas are north of Letitia, east of Sunny Point School, and south of Harris Chapel. The gray to yellowish-brown loose friable stony fine sandy loam surface soil is underlain by light-red to brownish-red friable stony fine sandy clay loam to fine sandy clay.

This Fourth-class soil is moderately to highly productive for timber. As long as it remains in forest the conservation of soil and plant nutrients is not a serious problem. Because of its stoniness and steep slopes, it is not suited to cultivated crops. If necessary, it could be cleared and used for pasture.

Habersham stony fine sandy loam, very steep phase.—Having developed in the steeper parts of the intermountain uplands and in the mountain uplands on slopes of more than 60 percent, this phase has rapid to very rapid external drainage and medium internal drainage. It differs from Habersham fine sandy loam, hilly phase, in relief and depth of profile, in having a somewhat less developed profile, and in being stony. It is usually associated with the Ranger and Talladega soils. Areas occur north of New Prospect Church and southwest of Sunny Point School. The gray to yellowish-brown very friable stony fine sandy loam surface layer is underlain by light-red to brownish-red friable stony fine sandy clay loam subsoil.

Included with this phase are about 50 acres of Habersham stony loam, eroded very steep phase, and about 100 acres of Habersham fine sandy loam, very steep phase. These have been included because of their limited extent and similar profile characteristics.

Nearly all of Habersham stony fine sandy loam, very steep phase, is in forest, the tree growth consisting chiefly of deciduous hardwoods, with which are mixed a few scattered pine. Because of its steep slopes and stoniness, this soil is not suited to crop production and only poorly suited to pasture. It should remain in forest.

Habersham stony loam, eroded steep phase.—Represented in this phase are areas formerly of Habersham stony fine sandy loam on which probably 50 to 75 percent of the original surface soil has been lost by sheet erosion. This eroded soil differs from Habersham stony fine sandy loam, hilly phase, in having steeper slopes (30 to 60 percent), a somewhat more shallow and less well-developed profile, a finer textured surface layer, and a redder surface color. Surface drainage is rapid to very rapid and internal drainage medium. The plow layer is brown to reddish-brown loose friable stony loam under which there is a light-red to brownish-red friable stony fine sandy clay loam. The soil is found in the steeper parts of the intermountain uplands and in the mountain uplands. Areas are located east of New Prospect Church, south of Suit, and south of Copper Ridge.

Included with this soil because of limited extent are about 100 acres having a more shallow surface layer as the result of severe erosion.

All areas of Habersham stony loam, eroded steep phase, have been cleared and cultivated at some time. An estimated 60 percent is in open pasture, 35 percent in idle cropland, and only about 5 percent in cultivation. Because of its steep relief, excessive drainage, stoniness, and low organic-matter content and fertility level, the soil should be kept in permanent pasture or reforested. It is moderately to strongly acid but responds well to applications of both lime and fertilizer. Erosion is a serious hazard. When the soil is pastured or cultivated, careful management is required to prevent further damage by erosion.

Habersham stony loam, eroded hilly phase.—A moderately eroded surface layer, considerable stone on the surface and throughout the profile, a redder surface soil color, and a somewhat more shallow solum differentiate this from the hilly phase of Habersham fine sandy loam. The soil usually occurs in rather small areas scattered throughout the western or west-central part of the county. Examples are southeast of Old Appalachia, southeast of Reeds Chapel, and southeast of Unicoi Gap. Slopes range from 15 to 30 percent; surface drainage is rapid and internal drainage medium. The brown to reddish-brown loose stony loam plow layer is underlain by a light-red to brownish-red friable stony fine sandy clay loam to fine sandy clay.

The land has been cleared and used for cultivated crops or pasture at some time. Now an estimated 60 percent is in open pasture, approximately 25 percent in idle cropland, and 15 percent under cultivation. The stone in the soil interferes with but does not prohibit cultivation. Corn, wheat, oats, rye, clover, and potatoes are grown to a limited extent, but this land is best suited to pasture because of its steeper slope and stoniness. With proper management, good yields of forage can be expected. The soil is moderately to strongly acid, somewhat low in organic matter and fertility, and susceptible to erosion. If the land is cultivated, contour tillage, strip cropping, and such practices should be followed, and liberal quantities of lime and fertilizer applied.

Habersham stony clay loam, severely eroded hilly phase.—Small bodies of this phase occur in association with other members of the Habersham series. A severely eroded surface layer, a more shallow profile, and a redder surface color differentiate this soil from Habersham stony loam, eroded hilly phase. Sheet erosion is predominant, but numerous small gullies may be present in places. External drainage is rapid to very rapid; internal drainage, medium. Slopes range from 15 to 30 percent. The plow layer is light reddish-brown to brownish-red friable stony clay loam. Underlying this is light-red to brownish-red friable stony fine sandy clay to fine sandy clay loam. Areas are south of Davis Creek School and northwest of White Church.

It is estimated that approximately 60 percent of this land is in open pasture and 35 percent in idle cropland. Approximately 5 percent is used for crops, but yields are usually low. Considering the moderately to strongly acid reaction, low fertility, the content of organic matter, the considerable quantity of stone on the surface and throughout the profile, and the severe damage by erosion, this soil is probably best used for pasture or forest. If it is cultivated, rotations should be long, and at least three-fourths of each one should be allotted to sod-forming crops. Contour tillage and strip cropping are means of preventing further damage by erosion. This soil responds well to applications of lime and fertilizer, and especially well to the plowing under of green-manure crops.

Hiwassee loam, undulating phase.—This soil has developed on high terraces from old alluvium and occurs in association with soils of the Masada and Altavista series. Slopes range from 2 to 7 percent. Surface drainage is slow to medium, and internal drainage is medium. Representative areas are northwest of Sales Ford and northeast of Fairview Church, and in the vicinity of Andrews.

Nearly all this soil is cleared and used for agriculture. The native vegetation probably was of the mixed hardwood type. Trees most frequently found are shortleaf and pitch pines; black, red, post, and white oaks; and some maple, black cherry, birch, sourwood, ash, and dogwood.

Characterizing the phase is a dark-brown to reddish-brown friable loam surface soil underlain by a subsoil of reddish-brown to deep-red friable firm silty clay loam to silty clay.

The following profile was observed east of Marble:

0 to 12 inches, dark-brown to reddish-brown friable loam of fine granular structure.

12 to 16 inches, reddish-brown or brownish-red moderately friable firm silty clay loam of medium-crumb structure; sticky when wet.

16 to 70 inches, deep-red to maroon-red moderately friable to stiff brittle silty clay to clay loam; fine nutlike structure; moderately plastic when wet.

70 to 100 inches +, water-worn yellowish or light-red gravel and sand cemented with red clay and sandy material; underlain by loose sand, gravel, and cobbles.

There are variations in the color of surface soil; in the thickness of the subsoil; in the degree of development of the soil profile; and in the quantity of gravel within the soil.

The soil is moderately fertile, somewhat low in content of organic matter, and moderately to strongly acid. It responds well to treatment and is very permeable to plant roots, moisture, and air. The water-holding capacity is good. Because of its favorable slope range and ease of cultivation, it may be used intensively for the production of cash crops. Nearly all areas have been cleared and used for corn, wheat, lespedeza, rye, potatoes, clover, and similar crops. Rotations that include leguminous hay or cover crops are advisable for maintaining the content of organic matter. Contour tillage and such soil-conserving practice should be followed to prevent damage by erosion.

Hiwassee loam, rolling phase.—This soil differs from the undulating phase of Hiwassee loam in its stronger relief, a profile usually somewhat less developed, and a surface soil somewhat thinner and slightly lower in content of organic matter. Slopes range from 7 to 15 percent; surface and internal drainage are both medium. Areas occur north of Murphy, north of Peachtree, and southwest of Andrews.

The soil is moderately to strongly acid, free from stone or gravel, and moderately well supplied with plant nutrients, but slightly low in organic-matter content. The surface soil is dark-brown to reddish-brown friable loam, and the subsoil is reddish-brown grading into deep-red moderately friable to stiff but brittle clay loam. The surface soil and subsoil are permeable to plant roots, water, and air, and the water-holding capacity is good. A few small eroded areas have been included with this soil. They have a somewhat more shallow surface and, due to erosion, a lower organic-matter content.

Corn, wheat, lespedeza, rye, potatoes, and clover are well suited to this land, and nearly all areas have been cleared and used for crops. The soil responds well to applications of manure or green manure. Because the relief is somewhat sloping, contour tillage and strip cropping are advisable.

Hiwassee loam, hilly phase.—Steeper relief, a somewhat more shallow profile, and greater susceptibility to erosion differentiate this soil from the undulating phase of Hiwassee loam. Slopes range from 15 to 40 percent. Surface drainage is medium to rapid, and internal drainage is medium.

This soil is permeable to air, roots, and water and moderately to strongly acid. The surface layer is dark-brown to reddish-brown friable loam, and the subsoil, reddish-brown grading into deep-red moderately friable to stiff but brittle clay loam. Areas occur north of Valleytown Cemetery, northwest of Murphy, and northwest of Oak Grove Church.

Practically all of this land is in forest, primarily mixed hardwoods, but a few small cleared patches are included. Because of the hilly relief and susceptibility to erosion, the soil is best suited to the production of trees. If it is necessary to clear the soil, moderate to good yields can be expected under proper management. The soil is only moderately fertile, and somewhat low in organic-matter content, but it responds well to applications of lime and fertilizer. Farming should be done in long rotations that include pasture, hay, or other sod-forming crops two-thirds to three-fourths of each period.

Hiwassee clay loam, eroded undulating phase.—In most profile characteristics this soil is similar to Hiwassee loam, undulating phase. It differs, however, in being moderately eroded, redder in surface color, and slightly shallower in profile, and in having a finer textured surface soil. Erosion and the mixing of surface and subsoil material in tillage operations account for the finer surface texture. Slopes range from 2 to 7 percent; surface and internal drainage are medium. The plow layer, a brownish-red friable clay loam, is underlain by reddish-brown to deep-red moderately friable to stiff but brittle clay loam to clay. Areas occur west of Valley River Church.

The soil is moderately to highly productive for the common crops of the area. All areas have been cleared and are being farmed to corn. wheat, oats, rye, pasture, and hay. Its gentle slope and the absence of stone favor cultivation, but the finer textured surface soil is somewhat more difficult to till than that of the loam, and it probably cannot be worked under as wide a range of moisture conditions. The soil is somewhat low in organic-matter content and moderately susceptible to further erosion, but it responds well to remedial treatment.

Hiwassee gravelly clay loam, eroded rolling phase.—Considerable gravel on the surface and throughout the profile, steeper slopes (7 to 15 percent), a finer textured surface, and a moderately eroded surface layer distinguish this soil from the undulating phase of Hiwassee loam. Surface drainage is medium to rapid and internal drainage medium. The soil occurs in association with other members of the Hiwassee series. There are areas southwest of Maggie Chapel, northeast of Marble, and southwest of Andrews.

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The soil is moderately to strongly acid, moderately low in content of organic matter, and low in fertility. The brownish-red moderately firm plow layer of sticky gravelly clay loam is underlain by reddish-brown to deep-red moderately friable to stiff but brittle gravelly clay loam to clay.

Included are approximately 50 acres of Hiwassee gravelly clay loam, severely eroded rolling phase, similar in most profile characteristics but somewhat more shallow and slightly heavier in the surface layer. Because the included soil is more seriously eroded, it is more difficult to work and lower in fertility. Special management practices are needed to restore its productivity.

All of Hiwassee gravelly clay loam, eroded rolling phase, has been cleared and cultivated, and is now used for wheat, rye, clover, lespedeza, and some corn. Moderate to good yields can be expected if management is good. The soil is permeable to air, water, and roots, but somewhat more difficult to manage than the undulating loam because of its gravel content and eroded condition. Tillage operations must be carried on within a relatively narrow moisture range. Contour tillage and strip cropping are advisable to prevent further damage by erosion.

Hiwassee gravelly clay loam, eroded hilly phase.—Developed on the steeper slopes of the high terraces (15 to 40 percent), this phase has rapid surface drainage and medium internal drainage. It differs from undulating Hiwassee loam in having steeper slopes, a moderately eroded condition, more rapid surface drainage, a redder and finer textured surface soil containing considerable gravel, and a somewhat more shallow profile. Areas are northeast of Murphy and Fairview Church and south of Townhouse Ridge. A very small part of the soil is so severely eroded that special management is required to restore productivity.

The soil is low in organic matter and fertility, moderately to strongly acid, and very susceptible to erosion. The plow layer is brownish-red moderately firm and sticky gravelly clay loam underlain by reddish-brown to deep-red moderately friable to stiff but brittle gravelly clay loam to clay.

The soil is poorly suited to clean-cultivated crops because of its strong slopes and gravelly nature but is moderately well suited to hay and pasture. It responds well to lime and fertilizer, and good to very good yields can be expected under proper management. If it is necessary to cultivate this soil, clean-tilled crops should not be in the rotation more than once every 5 or 6 years, and contour tillage and strip cropping should be followed to prevent further damage by erosion.

Masada loam, undulating phase.—This soil has developed from old alluvium on high stream terraces. It is associated with the Hiwassee soils; areas occur south of Martin Creek School and Peachtree and north of Marble. Slopes range from 2 to 7 percent. Surface drainage is slow to medium and internal drainage medium. The native vegetation includes white, red, and post oaks, shortleaf pine, sourwood, maple, and dogwood. The brownish-gray friable loam surface soil is underlain by yellowish-brown to light-red friable firm fine sandy clay subsoil.

The following profile is of a cultivated area:

0 to 12 inches, brownish-gray to moderately yellowish-brown friable loam of medium-crumb structure.

12 to 60 inches, yellowish-brown grading to yellowish-red or light-red friable firm fine sandy clay; moderately fine nutlike structure and moderately plastic and sticky consistence when wet.

60 inches+, water-rounded gravel and sand, cemented with clay and very fine sandy material; rather compact in place but fairly permeable to water; the underlying gravel bed generally is looser with increasing depth and the gravel pieces are generally larger.

The soil is somewhat more friable, especially in the subsoil, than the undulating phase of Hiwassee loam. The parent material is similar in both soils, but that of the Masada seems to have been deposited on more uneven beds of gravel. In the depth to the gravel beds, there may be considerable variation from place to place. Included because of their limited extent are a few areas of Masada clay loam, undulating phase, which, except for the heavier surface soil, are similar in profile characteristics and management requirements. Somewhat more careful management is required for the included soil because of its eroded condition.

Masada loam, undulating phase, is well suited to most crops commonly grown in the county, and moderate to good yields can be expected. It is moderately fertile but rather low in organic matter; permeable to moisture, air, and plant roots, and yet good in water-holding capacity. It responds well to lime and fertilizer and is easy to cultivate and maintain.

Masada gravelly loam, rolling phase.—Areas of this soil—the most extensive of the Masada series in the county—occur largely along the Valley, Hiwassee, and Nottely Rivers. Representative bodies are south of Arrwood Mill in the vicinity of Parker Branch. It is associated with other soils of the stream terraces. Slopes range from 7 to 15 percent. Drainage is medium externally and medium to rapid internally. This soil differs from Masada loam, undulating phase, in having a somewhat grayer surface soil, many pieces of gravel on the surface and throughout the profile, and steeper slopes.

The surface layer is gray or brownish-gray friable gravelly loam underlain by yellowish-red to light-red friable firm fine sandy clay. The soil varies considerably in depth from place to place, probably because of the unevenness of the underlying gravel. Some variations also occur in the degree of profile development.

Approximately 75 acres of Altavista cobbly fine sandy loam are included with this phase because of small area, cobbly or stony condition, and somewhat similar management requirements. The surface soil is grayer, however, and the subsoil more yellow.

Masada gravelly loam, rolling phase, is used to some extent for corn, wheat, rye, hay, lespedeza, potatoes, sweetpotatoes, and pasture. An estimated 55 percent is in forest. Some 20 percent is in crops, 25 percent in open pasture, and nearly 10 percent in idle cropland. The soil responds well to lime and fertilizer, can be used intensively, and is relatively easy to conserve. It is moderately acid to strongly acid and is permeable to plant roots, moisture, and air. Its water-holding capacity is not so good as that of Masada loam, undulating phase.

Masada gravelly loam, hilly phase.—Steeper slopes (15 to 40 percent), a grayer surface soil. more rapid external drainage. and many pieces of gravel on the surface and throughout the somewhat more shallow and less well-developed profile distinguish this soil from the undulating phase of Masada loam. Most of the soil is in hardwood forest but there are a few pines. Areas occur southeast of Maltby and Campbell Folk School, and in the vicinity of Prison Camp. This phase is somewhat low in organic matter, moderately to strongly acid, and moderately fertile.

The surface soil is gray or brownish-gray friable gravelly loam, underlain by yellowish-red to light-red friable firm fine sandy clay to silty clay loam. Some variations exist in the color of the subsoil and in the depth of the soil to gravel beds.

Included with this hilly phase as mapped are a few bodies of the hilly phase of Masada gravelly fine sandy loam, which differs primarily in having a fine sandy loam surface soil. Its total area is small.

Mainly because of its hilly relief and gravelly condition, Masada gravelly loam, hilly phase, is poorly suited to crops and pasture, and its best use is for forest. If it is necessary to clear the soil, care must be exercised to prevent damage by erosion.

Masada gravelly clay loam, eroded rolling phase.—In most profile characteristics this soil is similar to Masada loam, undulating phase. It differs, however, in having more rapid external and internal drainage, a somewhat redder and heavier plow layer, a slightly more shallow and less well-developed profile, and many pieces of gravel on the surface and throughout the profile. The soil covers only a small total area and is associated with other units of the Masada series. Slopes range from 7 to 15 percent. The heavier plow layer generally results through mixing of subsoil material with the eroded surface soil. There are some variations in the color and depth of the soil profile. Areas occur northeast of Murphy, south of Campbell Folk School, and east of Maggie Chapel.

This phase is apparently low in organic matter but moderately fertile. The content of gravel fragments ranges from 20 to 30 percent. The soil is moderately to strongly acid; permeable to moisture, roots, and air; and moderate in water-holding capacity. Most areas have been cleared for agricultural uses. Corn, wheat, clover, rye, and potatoes are commonly grown. The soil is susceptible to erosion, but it responds well to fertilizer and lime. With proper management, moderate to good yields can be expected.

Masada gravelly clay loam, eroded hilly phase.—This phase differs materially from Masada loam, undulating phase, in that it occupies steeper slopes (15 to 40 percent), has a finer textured redder surface soil, contains many pieces of gravel on the surface and throughout the profile, has more rapid external and internal drainage, and has a profile somewhat more shallow and less well developed. External drainage is rapid and internal drainage medium to rapid. It is associated with the other members of the Masada series, and areas occur southwest of Regal Station and south of Ammon Bottom. The soil is moderately to strongly acid and somewhat low in fertility and content of organic matter. It is friable, permeable, and susceptible to erosion. The surface layer is light-red friable gravelly clay loam. Underlying is a yellowish-red to light-red friable firm fine sandy clay to clay loam.

Included are about 10 acres more severely eroded, approximately 50 acres on steep rather than hilly relief, and 50 acres of Masada gravelly fine sandy clay loam, eroded hilly phase. These differ primarily in the texture of the surface soil. They are included because their extent is limited and their management requirements are similar to those of this soil.

Masada gravelly clay loam, eroded hilly phase, is moderately productive of the common crops of the area, but somewhat more difficult to manage than Masada loam, undulating phase, because of its hilly relief, susceptibility to erosion, and gravelly condition. It responds well to lime and fertilizer. Rotations that contain sod-forming crops (grasses and legumes) for two-thirds to three-fourths of each rotation period are advisable.

Porters loam, steep phase.—The principal areas of this inextensive soil lie on the east side of Pack Mountain and in the southern corner of the county. It is derived from weathered material of highly metamorphosed acid sedimentary rocks, and occurs on mountain uplands in association with the Ramsey soils. Having formed on slopes of 20 to 60 percent, the soil has medium to rapid external drainage. Internal drainage is medium. Nearly all areas have a forest cover of oak, hickory, poplar, black gum, maple, buckeye, dogwood, sourwood, and white pine, and among these, dead chestnut trees.

The surface soil is brown to grayish-brown very friable loam; the subsoil is yellowish-brown to dark yellowish-brown friable clay loam or clay. Both the surface soil and the subsoil are open and permeable.

The following is a profile as it occurs in a wooded area:

0 to 3 inches, dark-gray organic loam of granular structure; contains a rather large quantity of partly decomposed leaves, twigs, and roots.
3 to 15 inches, grayish-brown to brown very friable loam of moderate fine-crumb structure.
15 to 40 inches, yellow-brown to dark yellowish-brown friable permeable clay loam having weak nut structure.
40 inches +, partly decomposed acid sedimentary rocks.

The depth of the soil to parent rock ranges from about 15 to 54 inches or more. In coves the surface soil is slightly deeper than elsewhere and very dark brown or nearly black. The subsoil in these places is brownish yellow. Soil with these characteristics would have been mapped Burton loam, steep phase, had the areas been more extensive.

The land should remain in forest because tree growth is normally good to excellent and slopes are generally too steep for farming. Probably 20 percent of the land has been cleared and cultivated or used for pasture. The soil is permeable and readily absorbs moisture and holds it for plant use. Fertility is good. Corn, potatoes, hay, and similar crops can be grown satisfactorily under proper management, but the soil should not be planted to a cultivated crop more than once in every 4 to 6 years. The soil is moderately susceptible to erosion and strongly to very strongly acid. It responds well to treatment with lime and fertilizer.

Porters stony loam, steep phase.—Large quantities of angular rock fragments, 4 to 6 inches in diameter, differentiate this soil from the steep phase of Porters loam. They are scattered over the surface and intermixed with the soil mass in numbers sufficient to interfere with cultivation, but they do not materially lower the value of the soil for pasture. The soil occurs on slopes of 20 to 60 percent; surface drainage is medium to rapid and internal drainage medium. Areas are located on Pack and Angelico Mountains in the northern and western parts of the county, and on Valley River Mountains along the boundary line between Cherokee and Clay Counties.

The friable loam surface soil is underlain by a subsoil of yellowish-brown to dark yellowish-brown friable clay loam to clay. In some places large boulders occur on the surface, and in others bedrock is reached within a depth of only 15 to 20 inches. Most of this soil is in woodland, and because of its steep slope and stoniness, is best suited to that use. The land is moderately fertile, however, permeable to water and roots, and moderately to strongly acid. If necessary, some areas of it might be used for pasture. Good yields could be expected under proper management.

Porters stony loam, very steep phase.—A much steeper relief (above 60 percent), considerable stone on the surface and throughout the profile, and rapid to very rapid external drainage distinguish this soil from the steep phase of Porters loam. It is the most extensive Porters soil in the county and it occurs in close association with other soils of its own series and with those of the Ramsey. The surface soil is brown to grayish-brown stony loam and the subsoil yellowish-brown to dark yellowish-brown very friable clay loam. Areas occur southwest of Owl Creek Gap and west of Charlotte Cove and Arumon Knob.

Included with this phase because of limited extent and similarity in profile characteristics is a total of about 50 acres of Porters loam, very steep phase. Most of Porters stony loam, very steep phase, is in woodland. The land would be susceptible to erosion, if cleared, and with its other unfavorable features would not be satisfactory for pasture or crops.

Ramsey stony loam, steep phase.—This shallow soil has formed over sandstone, shale, slate, and quartzite on slopes of 30 to 60 percent in the mountain uplands. It is a rather extensive phase and is associated with the Talladega, Porters, Ranger, and Habersham soils. Areas, all entirely in forest, lie north of Johnsonville, on Bates Mountain, south of Martin Creek School, and southwest of Sheep Knob. External and internal drainage are rapid. Native vegetation includes Northern red, black, Southern, red, mountain, post, and white oaks, black gum, cucumbertree, linden, ash, maple, poplar, locust, dogwood, sourwood, and a few shortleaf pine.

The surface soil, brownish-yellow to brownish-gray friable stony loam, overlies yellowish-brown to brownish-yellow friable and permeable clay loam to fine sandy clay loam. Despite a high proportion of shale (a very fine-textured rock) in the parent rock, the surface soil is loam to heavy loam in texture. The subsoil, where present, generally is poorly developed.

The following is a representative profile:

0 to 1 inch, dark-colored layer containing a large quantity of organic matter and a small quantity of mineral matter.

1 to 4 inches, brownish-gray friable stony loam of weak medium-crumb structure.

4 to 10 inches, brownish-yellow very friable stony loam of moderate coarse-crumb structure.

10 to 30 inches, yellowish-brown to brownish-yellow friable and permeable clay loam to fine sandy clay loam.

30 to 32 inches, gray loose weathered rock mixed with some soil material; underlain by the parent rock.

The profile varies somewhat throughout the extent of this soil, especially in degree of development and depth to the parent rock. In a very few spots, the parent rock effervesces on application of hydrochloric acid, but the soil itself is acid. In some places the subsoil is greenish tinged when moist and a drab gray when dry. In coves and slight swales where organic matter has accumulated, the surface soil is usually dark gray. Near the boundary between the two, this soil approaches Talladega stony loam, steep shallow phase, in physical characteristics. In areas where the soil is derived from material that has weathered from slate and schist, the surface soil is lighter in color and the subsoil is much thinner.

Included with this phase because of small extent and similar profile characteristics and management requirements are a few areas of Ramsey loam, steep phase.

Practically none of Ramsey stony loam, steep phase, has been cleared, and it should remain in forest. It is acid to strongly acid, and the content of organic matter is low. The cleared areas should be kept in well-managed pasture, but if it is necessary to cultivate, the crop requiring tillage should be followed by a sod crop the next season.

Ramsey stony loam, eroded steep phase.—This soil differs from the closely associated steep phase of Ramsey stony loam mainly in having more rapid surface drainage, a shallower A horizon, and a lower organic-matter content. It does not occupy an extensive area; the individual bodies, generally small, occur mainly in the southern part of the county, as south of Martin Creek School and Shady Grove Church. A few gullies have formed.

Variations are mainly in depth to parent rock. In places, however, the surface soil and subsoil are light reddish-brown or brownish-red clay loam. Included because of limited extent and similar profile characteristics are approximately 20 acres of Ramsey soil that differs in being severely eroded and practically free of stones.

This eroded land is not suited to cultivation because of its steep slope, stoniness, shallow profile, and low fertility. Approximately 70 percent of the soil is in open pasture, 25 percent in idle cropland, and 5 percent in forest. Cultivated areas should be returned to forest. Clean-cultivated crops should never be grown, but if necessity demands their planting, they should be included only once in each 6- to 8-year rotation. Moderate pasture yields may be obtained under a careful management that includes adequate applications of lime and fertilizer.

Ramsey stony loam, very steep phase.—Steeper slopes (60 percent or more), a more shallow and less well-developed profile, a color usually somewhat lighter, and more rapid external drainage differentiate this soil from the steep phase of Ramsey stony loam. The greatest extent of this soil is in the northern part of the county. Areas occur south of Flint Gap and north of Buck Knob.

The surface soil is brownish-yellow to brownish-gray friable stony loam. Underlying it is yellowish-brown to brownish-yellow friable loam to light clay loam. In some places there is a poorly formed subsoil, but in most places it is absent. Areas at the head of coves and in slight swales usually have a dark-gray surface color. The quantity of stone on the surface and in the soil and the depth of the profile to bedrock vary considerably from place to place. In a very few localities the parent rock will effervesce on applications of hydrochloric acid. The soil itself is moderately to strongly acid. Because of its steep slope, shallow profile, and stoniness, the soil is not satisfactory for cropland or pasture. It is entirely in forest—a use for which it appears to be well suited.

Ramsey stony loam, hilly phase.—This soil occupies only a small total area, principally on some of the lesser slopes of the mountain uplands. It differs from Ramsey stony loam, steep phase, in having slower external drainage, a somewhat better developed profile, and usually less stone on the surface and throughout the profile. The yellow to brownish-gray friable stony loam surface soil is underlain by yellowish-brown to brownish-yellow friable clay loam. External drainage is medium and internal drainage rapid. Slopes range from 15 to 30 percent. Areas are near the boundary between North Carolina and Tennessee at Fains and north of Ebenezer Church.

Included with this soil as mapped are small areas of Ramsey stony loam, eroded hilly phase. The included hilly phase is similar to this soil in most profile characteristics, but has been moderately eroded.

Because of its hilly relief and stony condition, Ramsey stony loam, hilly phase, is considered a Fourth-class soil. It is moderately to highly productive of pasture but not suitable for cultivation. Careful management is necessary to maintain satisfactory pasture yields and prevent damage by erosion.

Ramsey-Talladega stony loams, steep phases.—This complex of steep phases represents areas of Ramsey and Talladega stony loams so closely associated that it is not feasible to separate them on the map of the scale used. The Ramsey soil is described as Ramsey stony loam, steep phase, and the Talladega soil as Talladega stony loam, steep shallow phase. The soils of this complex may differ slightly from the descriptions because of the close association and the mixed parent materials. Slopes range from 30 to 60 percent.

Approximately 25 acres of Chandler silt loam, hilly phase, and about 100 acres of Chandler silt loam, steep phase, are included in this complex as mapped. Chandler soils resemble the Talladega in that they contain much finely divided mica and are included chiefly because of their small extent, but partly because of their similarity.

Talladega soils in the complex vary considerably in the quantity of mica contained, particularly that in the surface and subsoil. A considerable part of these soils in the central-southern part of the county west and southwest of Murphy contain less mica than is normal for the series. The Ramsey soils in this complex, as they occur in the central-southern part of the county, are somewhat less siliceous and darker colored than typical, and small slatelike fragments occur in some places in that area.

The complex occurs mainly in a strip running southwest-northeast from a point just east of Letitia to Panther Top in the south-central part of the county. Other areas are east of Dickie Top and south of Andrews.

Chiefly because of its steep slopes and low fertility, this complex is very poorly suited to crops and poorly suited to pasture. On most farms the soil can be best used for the production of forests. Very little of the land has been cleared. The native vegetation includes hardwoods and pines, hardwoods predominating in the native forest and pines where the soils have been cleared, cultivated, and then turned back to forest.

Ramsey-Talladega stony loams, very steep phases.—This complex has rapid to very rapid external drainage because it has developed on slopes of 60 percent or more. Internal drainage is rapid. It occurs in association with the steep phase of Ramsey stony loam, and the steep shallow phase of Talladega stony loam. The largest areas are near the upper part of Peachtree Creek. Other bodies are south of Oak Grove School and Fate Puett Cove.

The members of this complex of very steep phases are Ramsey stony loam, very steep phase, and Talladega stony loam, very steep shallow phase. The phases, as they occur in the complex, are very much the same in appearance and profile characteristics as when they occur individually. In many places, however, they grade toward each other in physical characteristics, owing to the intermixing of parent material. The profiles are generally very shallow, and many rock fragments are on the surface and in the soil. This complex is entirely in forest, and because of steep slopes and stoniness, it is not suited to crops.

Ramsey-Talladega stony clay loams, eroded steep phases.—Eroded steep tracts of Ramsey and Talladega stony clay loams are represented in this complex, which occurs in the hilly and steep parts of the intermountain areas on slopes of 30 to 60 percent. The soils are somewhat similar to the Ramsey-Talladega stony loams, steep phases, in many respects, but they have been cleared and eroded. Erosion has exposed the original subsoil in many places, and this condition accounts for the differences between the two complexes.

The complex occurs in the central-southern part of the county and extends in a southwest-northeast direction from near Letitia to Panther Top.

A generalized profile description of Ramsey stony clay loam, eroded steep phase, follows:

0 to 8 inches, light brownish-gray to pale-brown friable stony light clay loam or fine sandy clay loam; very weak crumb structure.

8 to 20 inches, light yellowish-brown friable light stony clay loam of weak blocky structure; underlain by highly siliceous rock, usually at a depth of 20 to 40 inches.

Talladega stony clay loam, eroded steep phase, the other member of the complex, has the following generalized profile:

0 to 6 inches, light reddish-brown friable light stony clay loam or light silty clay loam of weak-crumb structure.

6 to 18 inches, reddish-yellow or reddish-brown friable light stony clay loam or light stony silty clay loam of weak blocky structure.

18 to 24 inches, mottled yellow, brown, and reddish-brown friable light stony clay loam that rests on unconsolidated bedrock, usually at a depth of 24 to 40 inches.

The soils of the complex are somewhat variable in depth to bedrock, in degree of erosion, in texture of the surface layers, and also in the quantities of mica in the surface and subsoil. The Talladega soils are generally not so micaceous as is normal for the series, and the degree of difference between the surface and subsoil layers and the stoniness varies from place to place.

Though the complex is not suitable for crops, most of it has been used for this purpose, at least for a short time, which accounts for the eroded condition. The soil is usually very strongly acid and very low in organic matter, phosphorus, and nitrogen. The control of water is very difficult where the land is cultivated. These deficiencies should be taken into consideration in planning management practices on farms where this land must be used for crops. At present most areas are idle; some are in forest or pasture and a few are cultivated.

Ranger slaty silt loam, steep phase.—On strong slopes of 30 to 60 percent in mountain uplands, this soil has developed in association with the Ramsey and Talladega soils. It is derived from weathered slate and fine-grained schist material and occurs principally in the southern part of the county, as northeast of Sheep Knob. The native vegetation, mostly hardwood, includes oak, chestnut, poplar, hickory, and locust. External and internal drainage are both rapid.

The surface soil is brownish-gray to bluish-gray friable silt loam containing many slate fragments. The subsoil consists of light-brown to brownish-gray friable heavy silt loam to light silty clay loam.

The following describes a profile of this soil:

0 to 1 inch, gray to dark-gray friable loam containing considerable well-decomposed and partly decomposed organic matter, mainly from leaves and twigs.

1 to 10 inches, bluish-gray, gray, or brownish-gray friable silt loam containing a fairly large number of slate fragments.

10 to 25 inches, light-brown to brownish-gray friable heavy silt loam or silty clay loam in which there are many small slate fragments.

25 inches+, greenish-gray partly weathered slate.

In places bedrock appears as small outcrops; in others it is only a few inches below the surface. There may be some variation in the color of the surface soil and in the degree to which the subsoil has developed. A total of about 25 acres of Ranger slaty silty clay loam, eroded steep phase, differing from this soil mainly in its moderate degree of erosion and slightly heavier surface soil, is included.

Ranger slaty silt loam, steep phase, is permeable to roots, moisture, and air, and moderately well supplied with organic matter, but somewhat low in fertility. Because of its steep slope and susceptibility to erosion, it is not suited to cultivation. Under proper management, apple orchards and grass do well. Most of this soil should be used for forest.

Ranger slaty silt loam, very steep phase.—On steeper slopes of high mountain areas this soil has developed in association with soils of the Ramsey and Talladega series. It differs from the steep phase of Ranger slaty silt loam in having a somewhat more yellow subsoil. External drainage is rapid to very rapid, and internal drainage is rapid. Slopes are 60 percent or more in gradient. The surface soil is brownish-gray to bluish-gray friable slaty silt loam, and underlying it is light-brown to brownish-gray friable silt loam to light clay loam. Areas of this soil are northwest of Coleman Gap, southwest of John West Cove, and north of Snowbird Mountains.

All this phase is in forest consisting largely of hardwood trees. The soil is friable and permeable, retains moisture well, and is moderately well supplied with organic matter but is somewhat low in fertility. It is not suited to cultivation or pasture because of its steep slopes, shallow profile, and stoniness.

Rough gullied land (Talladega soil material).—In this land type are soils so severely sheet eroded and gullied that they are no longer considered suitable for agriculture. Small patches of virtually uneroded soil remain in places, but usually the land has been so mutilated by erosion that it is practically destroyed, and slow processes, as those of reforestation, are generally required for its rebuilding. Runoff of surface water is very rapid. Slopes are 15 to 60 percent. Most areas of this land type are in the southwestern part of the county along the boundary between North Carolina and Tennessee. There the erosion resulted because fumes released in copper refining at Ducktown, Tenn., have killed the vegetation. Nearly all of this rough gullied land is either lying idle or slowly reverting to forest. To conserve it, pine and locust trees should be planted and given every protection from fire and grazing.

Rough stony land (Ramsey soil material).—Included in this land type are areas having rough and steep to very steep relief and numerous rock outcrops and large boulders (pl. 3, *A*). Soil, where present, belongs mainly to the Ramsey series. Slopes range from 30 to 60 percent or more. External and internal drainage are rapid.

Rough stony land (Ramsey soil material) is not very extensive; most of it is on the steeper slopes, ridges, and peaks of Valley River, Snowbird, and Fort Butler Mountains. Nearly all of it is in forest, but the tree growth varies considerably from place to place, depending on the quantity of soil present. The native vegetation includes oak, hickory, poplar, maple, buckeye, locust, linden, and a few white pine and dead chestnut trees. Included with this rough stony land is a total of about 5 acres of rock outcrop. These exposures of bare rock were large enough to map to scale but were included with this land type because of limited extent.

State silt loam.—Though this soil has developed over alluvial material, its present position is so high that there is little danger of overflow even during high floods. It occurs on low stream terraces and is associated with soils of the first bottoms on the one side and with soils of the high stream terraces, as Masada and Hiwassee soils, or with soils of the uplands, on the other. Areas are southwest of Peachtree and south of Valleytown. The prevailing slopes are 0 to 7 percent. External drainage is slow to very slow and internal drainage medium. All areas have been cleared and most are under cultivation. The native vegetation probably included ironwood, maple, beech, hickory, buckeye, poplar, and some hemlock.

The grayish-brown to brown friable silt loam surface soil is underlain by light reddish-brown to yellowish-brown friable silty clay subsoil. Variations are largely in the thickness of the soil layers, in the presence of gravel pebbles and a few cobbles here and there on the surface and in the soil, and in the color of the lower subsoil, which in places is somewhat more reddish than usual. Included is a small acreage which differs mainly in having a level or nearly level surface, the slope being 3 percent or less.

A profile of State silt loam is described as follows:

0 to 12 inches, grayish-brown to brown friable silt loam of moderately fine granular structure.
12 to 30 inches, light reddish-brown or yellowish-brown friable heavy silty clay to silty clay loam; fine nut structure.
30 inches +, yellowish-brown to strong yellowish-brown friable loam; moderate fine nut structure; underlain by sand and gravel.

This is considered one of the best soils in the county for general farming. It has good tilth, favorable moisture relations, and a good supply of essential plant nutrients. Practically all of it is used for corn, small grain, hay, and other subsistence crops. The soil is moderately to strongly acid and is friable and permeable. Good results can be expected from applications of lime and fertilizer. The soil material and the supply of plant nutrients are relatively easy to conserve, even under intensive farming.

State cobbly loam.—This type differs from State silt loam primarily in texture and the percentage of cobbles and gravel pieces on the surface and throughout the profile. The cobbles, 3 to 6 inches in diameter, are present in numbers sufficient to interfere with tillage. The soil has developed on slopes of 0 to 7 percent in low-terrace positions and is in many places associated with Altavista soils. Areas occur in the vicinity of Valleytown. During extremely high floods, a few areas may be subject to overflow.

The surface soil is light-brown to brown friable cobbly loam underlain by light reddish-brown to yellowish-brown friable clay loam to clay. The principal variations result from differences in the quantity of cobbles on the surface, but in places the subsoil color may vary from grayish brown to yellowish brown or to strong yellowish brown. Approximately 50 acres of this soil differs in that it occupies slopes of 3 percent and less.

Though this soil is friable and permeable, its water-holding capacity is excellent. Corn, soybeans, alfalfa, wheat, rye, oats, lespedeza, crimson clover, tobacco, and potatoes, and similar crops are grown, but the soil is somewhat less productive than State silt loam and slightly more difficult to handle. It can be used intensively for agricultural purposes, however, and its value could be greatly increased by the removal of part of the stone. It is moderately to strongly acid and responds well to applications of both lime and fertilizer.

Stony colluvium (Ramsey soil material).—This separation, representing a condition rather than a soil type, has formed on the mountain uplands from a mixture of sandstone, slate, and quartzite of recent colluvial-alluvial deposition, and it therefore has no definite profile. Though the parent material is largely the same as that of Ramsey soils, some stony colluvium from the Habersham and Talladega soils is included. Characterizing the separation is a large quantity of well-rounded, subrounded, and angular rock fragments, a few inches to several feet in diameter, with intermixed fine material. The depth to underlying rock may be several feet. Slopes range from 2 to 15 percent.

Most of the stony colluvium is at or near the headwaters of streams and at the base of steep mountain slopes. Important areas occur north of State Prison Camp, along Synder, Shuler, and Copper Creeks, and along the Tellico River.

Included are a few areas of stream wash, which have been deposited chiefly along the small streams. This washed material consists of small partly rounded rock fragments and gravel and some sand. Also included with this separation are a few small strips of gravelly and stony first-bottom soil that would have been separated as Chewacla gravelly loam, had they been larger.

Some areas of Stony colluvium (Ramsey soil material) have been cleared for pasture. On a few small patches where some stones have been removed, corn, potatoes, and vegetables are grown. A few apple trees are on small areas where the stones are not so thick. Most areas are covered with a forest of sycamore, birch, black walnut, butternut, and alder. This land is best used for pasture or forest. It is moderately productive, usually well drained, and very permeable, but it is not suited to cultivated crops because of its stoniness.

Talladega silt loam, steep phase.—This phase occurs on both the mountain and intermountain uplands. Like other Talladega soils, it has formed from weathered materials, chiefly schist that is for the most part micaceous (pl. 3, *B*). Slopes are 30 to 60 percent, and runoff is rapid, even under a forest cover. Natural erosion—the kind that takes place under a forest vegetation—is responsible for the removal of soil material about as fast as the underlying rocks weather. The Talladega soils therefore are generally shallow to bedrock. In this respect, however, they vary considerably within short distances.

The soil is mapped south of Andrews, in the vicinity of Kinsey School, and south of Wells cemetery. It is associated with other Talladega soils, and with those of the Fannin, Ramsey, Habersham, and Ranger series. Small areas of these associated soils were included with this phase in mapping. Most of the phase is still in deciduous forest, chiefly of oak with a mixture of other trees.

The following describes a profile in a wooded area:

0 to 8 inches, light yellowish-brown or light brownish-gray friable silt loam of weak fine-crumb structure; finely divided mica flakes impart a slick feel; the surface inch is stained dark with organic matter.

8 to 20 inches, reddish-yellow to reddish-brown micaceous friable light silty clay loam; weak blocky structure.

20 to 48 inches, mottled yellow, brown, and reddish-brown friable silty clay loam containing fragments of schist; underlain by unconsolidated bedrock.

The phase is variable in several respects. The depth of the soil over bedrock ranges from about 18 inches to as much as 42, and in many places there is very little difference between the surface and subsoil layers. A number of areas have small rock fragments on the surface and throughout the soil profile; a few included bodies resemble Fannin stony loam.

The soil is moderately permeable. Water, air, and roots penetrate it easily. It is strongly to very strongly acid throughout and generally low in organic matter and fertility. Cultivated areas erode easily. This soil is very poorly suited to crops requiring tillage, chiefly because of steep slopes, and careful management is required to maintain productivity of areas used for permanent pasture. Most of the land is in forest, to which it is well suited.

Talladega silt loam, hilly phase.—Areas of this soil are mapped northeast of Vengeance Creek Church, in the vicinity of Martin Creek Church, northeast of Peachtree, and in the central-southern part of the county. In many respects it is similar to the steep phase of the same soil type. The two are closely associated, though a greater part of this soil is in the intermountain areas of the county. The principal difference is in slope, 15 to 30 percent for this phase, and 30 to 60 percent for the steep phase. In general, this soil also is a little deeper over bedrock. There is considerable difference between the two in suitability for use and in management requirements. Other Talladega soils and members of the Fannin and Habersham series are associated with this soil, and small areas are mapped as inclusions. Several bodies of the phase are somewhat less micaceous than is typical for the series, and the depth of the soil to bedrock varies considerably from place to place.

The following is a description of a profile in a forested area:

0 to 8 inches, light yellowish-brown or light brownish-gray friable silt loam; weak fine-crumb structure.

8 to 21 inches, reddish-yellow or reddish-brown micaceous light silty clay loam of weak blocky structure.

21 to 50 inches, mottled yellow, brown, and reddish-brown friable light silty clay loam containing rock fragments; underlain by unconsolidated bedrock.

The soil is strongly to very strongly acid throughout, and finely divided mica flakes are in all layers of the profile. Many areas include a rather high percentage of small shalelike rock fragments on the surface and throughout the profile, and in like manner a few larger stones are distributed in other bodies. The soil is moderately permeable to water, air, and roots, but erosion quickly follows clearing and cultivating unless the soil is very carefully managed.

Most of this land is still in forest. If cleared, properly prepared, adequately limed and phosphated, and then seeded to a suitable mixture of grass and clover, it is capable of supporting fair to good pasture. Whether or not it should be used for forest, pasture, or even for crops under long rotations and good management is a matter that must be determined on the basis of many factors, some of which are peculiar to the individual farm.

Talladega silt loam, very steep phase.—On slopes of 60 percent or more this soil occurs generally in association with Talladega silt loam, steep phase, and Ramsey soils. It has rapid to very rapid external drainage and rapid internal drainage. Areas are south of Locust Gap, north of Mission Mountain, and southeast of Oak Grove School.

The surface soil is light reddish-brown friable silt loam; the subsoil, light-red to red friable clay loam. The subsoil varies somewhat in thickness and degree of development from place to place.. Some platy fragments of schist and slate are mixed in the profile.

The land is all in forest and because of steep slopes and susceptibility to erosion, it should remain forested. The natural vegetation includes pine, oak, maple, sourwood, dogwood, black gum, and in many places a thick growth of mountain-laurel and some rhododendron. Tree growth is only moderate, and good management should include selective cutting.

Talladega shaly clay loam, eroded steep phase.—From 40 to 75 percent of the original surface soil of this phase has been lost through erosion. Slopes range from 30 to 60 percent; surface drainage is rapid to very rapid and internal drainage rapid. The soil occupies comparatively small areas scattered throughout the south-central part of the county in association with other soils of the same series. Areas occur south and west of Maggie Chapel, north of Martin Creek School, and north of Mumblehead Top.

The soil differs from the steep phase of Talladega silt loam in containing many shale fragments, in being moderately eroded, and in having a somewhat more shallow profile, a heavier plow layer, and more rapid external drainage. The plow layer, a light-red to light brownish-red friable clay loam, contains many shale particles. The subsoil is friable light-red to red silty clay. Both plow soil and subsoil are micaceous. A few stones, mostly quartzite, are on the surface in places. The thickness of the surface soil varies somewhat, and there is some range in the depth of profile to the parent material. The content of organic matter is increasing in areas undergoing reforestation, but in cleared areas, either cultivated or pastured, it is low.

A total of about 275 acres is severely eroded, and practically none of the original surface soil remains. This severely eroded soil is included because of its relatively small extent. Also included are about 25 acres of Fannin soil that differs from this phase chiefly in having a somewhat finer textured subsoil.

All of Talladega shaly clay loam, eroded steep phase, has been cleared and used at some time for cropping. Probably 50 percent is in open pasture, 35 percent in idle cropland, 10 percent in an almost pure stand of second-growth shortleaf pine, and only about 5 percent in cultivation. The cleared areas should be returned to forest, mainly because the steep slopes are greatly susceptible to erosion. If it is necessary to pasture the land or produce an occasional cultivated crop on it, careful management practices must be observed to prevent further serious damage by erosion. The soil is moderately to strongly acid, permeable and friable throughout, and low in fertility. It should respond well to applications of both lime and fertilizer.

Talladega shaly clay loam, eroded hilly phase.—This soil differs from Talladega silt loam, steep phase, in containing many shalelike fragments, in being moderately eroded, in having a finer textured surface soil, and in occupying less sloping areas. To plow depth it is light brownish-red friable clay loam, and the subsoil is light reddish-yellow to reddish-brown friable clay loam or light silty clay loam. Runoff is very rapid, and internal drainage is moderately rapid. Slopes range from 15 to 30 percent. The soil occurs in comparatively small areas scattered throughout the southern part of the county, mainly in intermountain uplands. Most of it, however, is in a relatively narrow strip that extends in a southwest-northeast direction in the central-southern part. Areas are southeast of Martin Creek School, southeast and southwest of Murphy, and southeast of Beaver Creek Church.

The soil is variable in several respects. The depth to bedrock ranges from little more than a foot to as much as 4 feet. Many of the areas southwest of Murphy are less micaceous than typical, and small rock fragments occur rather frequently on the surface and throughout the profile. Variations in the extent of erosion are marked by corresponding variations in the texture of the plow soil.

The phase is low in organic matter, strongly to very strongly acid, moderately friable and permeable, and highly susceptible to erosion. Most of it has been cleared and cultivated at some time. An estimated 10 percent of the acreage has reverted to forest; 40 percent is in open pasture, 30 percent in idle cropland; and approximately 20 percent in crops. Corn, wheat, rye, lespedeza, and grass for pasture are the principal crops. Yields are generally low. The soil responds well to treatment with lime and fertilizer, but other good management is necessary to maintain soil productivity and control water on the land when soil is cultivated. This includes judicious selection and rotation of crops, tillage along contours, and in some instances, terracing and strip cropping.

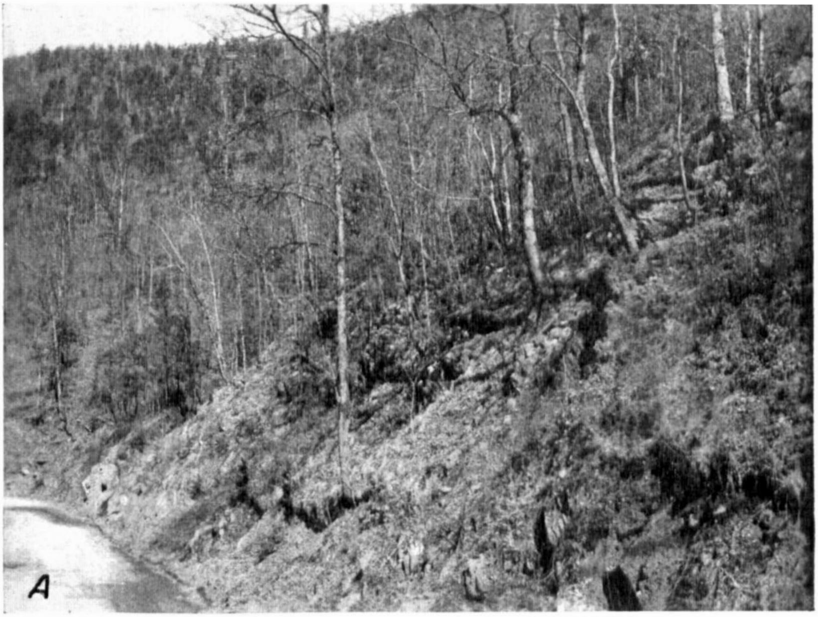
Talladega shaly clay loam, severely eroded hilly phase.—In most places this phase has lost 75 percent or more of its original surface soil by accelerated erosion. There are some small gullies, but sheet erosion is more frequent. Having slopes of 15 to 30 percent, this soil has very rapid external drainage and moderate internal drainage. Areas are southeast of Texana, southwest of Martin Creek School and Holiness Church, and in the central-southern part of the county.

The soil to plow depth is reddish-brown to light reddish-yellow clay loam that grades into light-red to reddish-brown friable light clay loam. The soil differs from that of the steep phase of Talladega silt loam in being shaly and severely eroded and in having milder slopes. The soil has considerable range in depth over bedrock, in degree of erosion, and in the quantity of mica it contains. In mapping, it was necessary to include small areas of other associated soils.

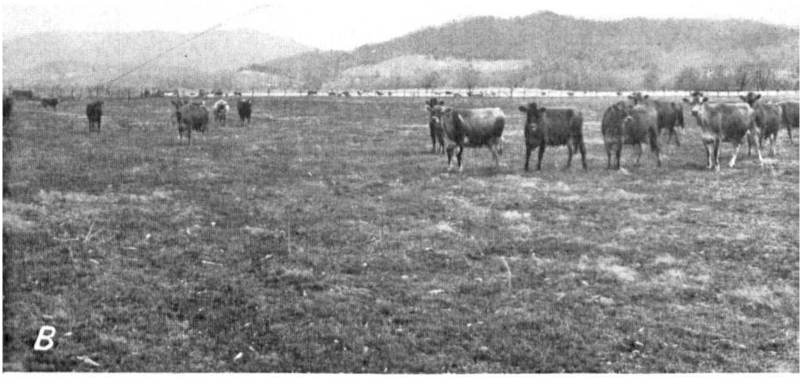
Because of hilly slopes, severe erosion, low fertility, low content of organic matter, and high susceptibility to erosion, this is considered a Fifth-class soil. It would be well to use it for forests, pasture, or when in line with proper farm management, for close-growing crops. On areas used for pasture or crops, there should be liberal applications of lime and fertilizer. These should be effective in maintenance of productivity if combined with long rotations in which a prominent place is given to grass and legumes. Where cropped, proper control and use of water on the land may require contour tillage, strip cropping, and terracing as supporting practices.

Talladega shaly clay loam, eroded rolling phase.—This soil is closely associated with the hilly phases of the Talladega and Fannin soils and is found almost entirely in the southern part of the county. Areas occur southwest of Shady Grove Church and along Cane Creek. It is a soil very similar to Talladega shaly clay loam, eroded hilly phase, in most profile characteristics, but it differs in having rolling surface relief (slopes 7 to 15 percent), in being redder to plow depth, and, in general, in having a somewhat better developed profile. External and internal drainage are medium. The soil to plow depth is light-red to light brownish-red clay loam and below is a light-red to red friable clay loam to clay. This phase is somewhat low in organic matter, moderately to strongly acid, and moderate to low in fertility.

A few areas of Talladega shaly clay loam, severely eroded rolling phase, and of Talladega shaly loam, rolling phase, are included because of their limited extent. The severely eroded phase requires special attention to prevent further damage by erosion. The other



A, Rough stony land (Ramsey soil material), 4 miles southeast of Andrews.
B, Profile of Talladega silt loam, steep phase.



A, Hay with corn in background on Transylvania silt loam, 2 miles west of Andrews.
B, Cattle grazing on Wehadkee silt loam, 1 mile east of Coalville.
C, Drainage by open ditch on Wehadkee silt loam, 1 mile east of Coalville.

included phase, the rolling, is uncleared and has a fairly deep profile and a rather high content of organic matter. Variations in the rolling phase are generally due to the depth of the profile to bedrock or to the character of the parent rock. In areas of these soils nearest to the North Carolina-Georgia boundary the surface soil contains a fairly large percentage of very fine sand and is usually lighter in color than elsewhere.

Most of the eroded rolling phase of Talladega shaly clay loam is cleared land and approximately 35 percent is used for crops. Corn, wheat, rye, lespedeza, alfalfa, and clover are commonly grown, and good yields can be expected where adequate applications of lime and fertilizer are made. The soil is free of stone and has a favorable relief for agricultural use. It is rather erodible. Contour tillage, strip cropping, and similar soil-conserving practices are beneficial in preventing additional damage by erosion.

Talladega stony loam, steep shallow phase.—Because of its shallow profile and stoniness, this soil is not suitable for agricultural use. It is almost entirely in poor forest growth, chiefly shortleaf pine and Virginia pine with a few scraggly deciduous trees intermixed. In places there is an undergrowth of mountain-laurel.

Most of this soil has developed in the mountain uplands from parent material of the same type as that of the very steep phase of Talladega silt loam—a soil with which it is closely associated. The depth to bedrock is seldom more than 12 inches. Most areas are in the southern part of the county. There are representative bodies south of Shoal Creek School, west of Beaver Creek Church, and north of Upper Peachtree Church. External drainage is rapid and internal drainage very rapid. Slopes range from 30 to 60 percent. Included with this phase is a total of about 100 acres of moderately eroded soil.

The surface soil of Talladega stony loam, steep shallow phase, is light yellowish-brown to reddish-brown friable stony loam. Underlying it is a light-red to red friable shallow silty clay loam. The soil material has a slick or greasy feel when rubbed between the fingers. In some places, hard flat fragments of schist rock are mixed with the shaly fragments scattered on the surface. Angular quartz rocks of various sizes occur in some places.

Talladega stony loam, hilly shallow phase.—The depth of this soil to bedrock is seldom more than 15 inches, and there is a fairly large quantity of stone on the surface and throughout the profile. It differs from the steep phase of Talladega silt loam in these respects and in its milder surface relief (15 to 30 percent). It has medium to rapid external and internal drainage. Areas occur mainly in the southern part of the county. Representative bodies are southwest of Mount Zion Church, north of Arrwood Mills, and west of Little Brasstown Church.

Included with this phase is a total of about 50 acres in which the land differs either in range of slope or in degree of accelerated erosion. These included soils, moderately or severely eroded, or rolling in relief, are very similar in most profile characteristics.

The surface soil of the hilly shallow phase of Talladega silt loam consists of light yellowish-brown to reddish-brown friable stony loam. Beneath this surface layer is a light-red to red light and friable clay loam. Some variations exist in depth of the profile to bedrock and in the quantity of stone on the surface and mixed with the soil.

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This Fifth-class soil has little value for crop or pasture. Its best use seems to be for forest, as tree growth is moderate to good where there is sufficient soil material. The included soils are in the same class as this soil and have the same use and management.

Talladega stony loam, very steep shallow phase.—Having slopes of 60 percent or more, this shallow soil has rapid to very rapid external drainage. Internal drainage is medium. The surface soil, yellowish-brown to reddish-brown friable stony loam, is underlain by light-red to red friable stony clay loam to clay loam. The profile is usually somewhat thinner than that of Talladega stony loam, steep shallow phase, and there is little or no subsoil development. It differs from Talladega silt loam, steep phase, in having steeper slopes, more rock fragments on the surface and throughout the profile, and a shallower depth to bedrock.

This soil occupies areas in the mountain uplands, where it is associated with Ramsey and Ranger soils. The largest areas are south of Murphy and on the very steep mountain slopes along the north side of the highway from Topton to Tomotla. Approximately 100 acres of Talladega shaly clay loam, eroded rolling phase, are included because of limited extent. The included soil is somewhat deeper to the parent material and produces a better growth of timber.

All of this very steep shallow phase of Talladega stony loam is in forest consisting of a poor growth of mixed pine and hardwood trees. There is a rather heavy undergrowth of mountain-laurel, rhododendron, galax, and other plants. Owing largely to its very steep slope, stoniness, and shallow profile, this phase is not suitable for crops and pasture.

Talladega-Habersham stony loams, steep phases.—Represented in this complex of steep phases are areas of Talladega stony loam, steep shallow phase, and Habersham stony fine sandy loam, steep phase, that are too closely associated and too small to map separately. The soils have formed on slopes of 30 to 60 percent of weathered material from siliceous rocks (mainly graywacke and mica schist). External and internal drainage are rapid. This complex is found rather extensively in the county, mainly in the central part. Representative bodies are north of Murphy, south of Mount Nebo School, northeast of Texana, and northeast of Patrick Shear School.

Though the soils have formed from different parent materials, their management requirements are similar. Both are moderately to strongly acid, contain considerable stone on the surface and throughout, and have rather shallow poorly developed profiles. They are permeable to moisture and air and have a moderate water-holding capacity. The organic-matter content of the topmost inch or two is usually high, but the soils are somewhat low in fertility. When cleared of forest, these soils are susceptible to accelerated erosion.

Practically none of the land in this complex is cleared. It is not suited to crops and pasture, largely because of steep slopes and stoniness, and is apparently best used for forest.

Talladega-Habersham stony loams, eroded steep phases.—Comprising this complex are eroded areas of Talladega-Habersham stony loams, steep phases, that have been cleared, cultivated, and subjected to accelerated erosion. Approximately 50 to 75 percent of the original surface of each soil has been removed by sheet erosion. This complex differs from Talladega-Habersham stony loams, steep phases, primarily in color, texture, and thickness of the surface soil.

The complex has slopes of 30 to 60 percent. External drainage is rapid to very rapid and internal drainage medium. It is most extensive in the central-western part of the county and along the North Carolina-Tennessee boundary in the southwestern part of the county. Most of the areas are small and scattered. They occur in close association with other Talladega-Habersham complexes. Erosion of this complex along part of the North Carolina-Tennessee boundary has resulted because fumes from copper mines at Copper Hill, and Ducktown, Tenn., have killed the vegetation.

This land is low in content of organic matter, moderately to strongly acid in reaction, and very susceptible to erosion. Stones are numerous on the surface and throughout the profile. Small patches are being used for crops, but most of the land is idle, in open pasture, or being reforested. Management is difficult, but the soil would probably respond well to applications of lime and fertilizer. Very careful management would be necessary to produce pasture, and cultivated crops should not be grown. The land is best suited to forest.

Talladega-Habersham stony loams, hilly phases.—Small scattered bodies of this complex occur throughout the hilly areas of the central-western part of the county in close association with other Talladega-Habersham complexes. This differs from Talladega-Habersham stony loams, steep phases, in having hilly surface relief (15 to 30 percent), in development on less sloping areas, and in having less rapid external drainage. Further, the phases of this complex are generally somewhat deeper and better developed in profile. Many schist and quartzite rock fragments are scattered over the surface and mixed through the soil. There are some variations in the depth of the soil over bedrock and in the quantity of rock fragments on the surface and in the soil mass. Areas are north of Suit, north of Wolf Creek Church, and southeast of Kildeer Mountain.

All this land is in forest. It is a Fourth-class soil and is best suited to pasture. The hilly relief, stoniness, and somewhat low fertility make it unsuitable for cultivated crops, but under good management, moderate pasture yields can be obtained. The soils of the complex are moderately to strongly acid, low in organic matter, and moderate in water-holding capacity. They respond well to treatment with lime and fertilizer, and applications to pasture are especially beneficial because they encourage the growth of clover.

Talladega-Habersham stony loams, eroded hilly phases.—Small scattered areas of this complex occur throughout the central-western part of the county in association with Habersham soils and with other Talladega-Habersham complexes. Areas are southeast of Kildeer Mountain and southeast of Hibbard Mountain. The soils are developed on slopes of 15 to 30 percent and have rapid surface and internal drainage. The Habersham soil predominates. The phases included in this complex differ from those of Talladega-Habersham stony loams, steep phases, in that they have a moderately well-developed surface soil, somewhat milder surface relief, and, in general, a somewhat deeper and better developed profile. The many rock fragments on the surface and throughout the profile make cultivation difficult.

Nearly all of this land has been cleared and used for crops at some time. Approximately 20 percent is now used for cropland, 50 percent is in open pasture, and 30 percent is idle cropland. Corn, rye, wheat, and lespedeza are the chief crops. The soils are somewhat low in organic matter and fertility, but are friable, permeable, and moderate to good in water-holding capacity. They respond well to applications of lime and fertilizer, but careful management is required to prevent damage by erosion. Because they are highly susceptible to erosion, advisable rotations are those that include sod-forming crops at least three-fourths of each period or cycle. Contour tillage, strip cropping, and similar soil-conserving practices are necessary for best results. The soils apparently are best suited to pasture or forest.

Talladega-Habersham stony loams, very steep phases.—Soils of this complex have rapid to very rapid surface drainage and medium internal drainage.

This complex differs from Talladega-Habersham stony loams, steep phases, in having steeper slopes (60 percent or more) and a somewhat more shallow and less well-developed profile. The complex is not extensive and is used almost entirely for forest. Areas are north of Flax Creek Church and north and west of Tanbark Gap.

The phases comprising this complex are relatively low in organic matter and fertility. They have a shallow profile, steep slopes, and contain numerous stones. Mainly because of these features, they are not suited to cultivation or pasture. The timber growth on them is only moderate, except in spots where the soil profiles are deeper than usual.

Talladega-Habersham stony clay loams, severely eroded steep phases.—In close association with Talladega-Habersham stony loams, eroded steep phases, this complex occurs on mountain uplands. It has formed on slopes of 30 to 60 percent over mixed siliceous rock (mainly graywacke) and mica schist. External drainage is very rapid and internal drainage medium. The complex differs from Talladega-Habersham stony loams, steep phases, in being severely eroded and in having finer textured surface soil and a more shallow profile. Erosion, both sheet and gully, has removed 75 percent or more of the original surface soil. Many rock fragments, up to 10 inches or more in diameter, are scattered over the surface and mixed with the soil mass. There are variations in the content of stone and also in the depth of the profile to bedrock. Most areas are in the southwest, south-central, and western parts of the county, some of the tracts being in the vicinity of Unaka, south of Tanbark Gap, and north of Beech Creek.

Most of this complex is relatively low in both organic matter and fertility, but it is friable and permeable, and moderate in water-holding capacity. An estimated 60 percent is in open pasture, 30 percent in idle cropland, and 10 percent in crops.

Because of steep slope, stoniness, low fertility, and severely eroded condition, most open areas should be returned to forest. If this land is needed for pasture, liberal applications of fertilizer and lime, controlled grazing, and similar special management practices must be observed to reclaim the soil and to produce satisfactory yields. Cultivated crops should not be planted unless their planting is necessary in preparing the land for seeding to grasses. When cultivated, contour tillage, strip cropping, and similar soil-conservation measures must be followed to prevent further damage by erosion.

Talladega-Habersham stony clay loams, severely eroded hilly phases.—These mixed materials are usually found in small areas associated with the eroded hilly phases of the Talladega-Habersham stony loams that have the same slope (15 to 30 percent). They differ in having a lighter surface color and a finer textured surface soil. The profile is somewhat more shallow also, as the soil is in a severely eroded condition. The larger areas of this inextensive complex lie in the vicinity of Mount Nebo School, Shady Grove Church, and Friendship Church. Smaller areas are in the central-western part of the county. Included are approximately 50 acres of a severely eroded rolling phase that have lost 75 percent or more of the surface by accelerated erosion of both the sheet and gully types.

Very little of Talladega-Habersham stony clay loams, severely eroded hilly phases, is used for cultivated crops. An estimated 45 percent is in pasture, 40 percent in idle cropland, and 5 percent in crops. Wheat, rye, and similar crops are most commonly planted, but yields are low and crop failures frequent. Because of severe erosion, numerous stones, and low fertility, these soils should be returned to forest. If it is necessary to reclaim this land, liberal applications of lime, fertilizer, and green manure must be added, and contour farming and strip cropping followed to prevent further damage by erosion. Long rotations that include sod-forming crops more than three-fourths of each period are advisable.

Tate silt loam, undulating phase.—Having developed on colluvial deposits derived from weathered igneous and metamorphic rock, this soil has grayish-brown to reddish-brown friable silt loam surface layer underlain by yellow or yellowish-brown friable clay loam. It has formed on slopes of 2 to 7 percent under conditions of very slow to slow surface and medium internal drainage. The colluvial deposits (parent material) are not old, and therefore the soil has only a moderately well-developed profile. In a few spots there is some very recent wash and, consequently, little or no development.

The following is a profile in a cultivated area:

0 to 9 inches, grayish-brown silt loam containing varying quantities of fine mica flakes and having a moderate crumb structure.

9 to 25 inches, brown or reddish-brown friable silt loam somewhat compact in place; contains varying quantities of mica flakes; has moderate coarse-crumb structure.

25 to 40 inches, yellow or yellowish-brown friable clay loam having weak medium-nut structure.

40 inches +, mottled gray and brown friable massive clay loam.

This soil usually occupies narrow strips that slope toward the stream in the direction of stream flow, as for example, southwest of Murphy, southeast of Martin Creek Church, and south of Sheep Knob. Variations are mainly the result of water action; the areas nearest the streams often have some gravel on the surface and usually contain larger stones in the profile. Where the soil is formed of colluvium derived from Talladega-Fannin soils, the content of mica is usually high, but if it is washed from the Hiwassee, it is reddish brown throughout the solum. Some variations may be noted in the surface texture, especially when the soil is derived from material washed from

Habersham soils. Included in mapping are small patches or strips of Chewacla or Wehadkee soils that occur in some places.

The native vegetation included post oak, locust, hickory, poplar, sourwood, buckeye, chestnut oak, and maple, with some white pine, and hemlock mixed, but nearly all the land is cleared and cultivated. Approximately 60 percent of the soil is used for crops, 5 percent is idle cropland, and 25 percent is in open pasture. The most common crops are corn, potatoes, cabbage, crimson clover, soybeans, hay, wheat, and sorgo. The soil is fertile, somewhat low in organic content, moderately to strongly acid, permeable, and friable. It has an excellent water-holding capacity and favorable slope and is well adapted to the production of most farm crops grown in the area. Excellent response can be expected from the use of lime, fertilizer, and manure. The soil can be farmed intensively with little danger of injury from erosion.

Tate silt loam, rolling phase.—This soil differs from the undulating phase of Tate silt loam in having steeper slopes (7 to 15 percent) and a thinner surface soil in some places. Surface drainage is slow and internal drainage medium. The soil generally occupies narrow strips between the stream-bottom areas and the uplands. It occurs in association with the undulating phase of Tate silt loam, and the chief areas are along Moccasin Creek and southwest of Murphy. There is some variation in the quantity of stone on the surface and in the soil. Approximately 15 acres of this soil is moderately eroded.

Practically all this land is cleared and farmed. It is slightly susceptible to erosion, but with contour tillage and similar practices, little serious damage need be expected. Though somewhat low in content of organic matter, the soil is moderately fertile. It is moderately to strongly acid, permeable and friable, and excellent in water-holding capacity. For the common crops of the area it is moderately to highly productive and responds well to lime and fertilizer.

Transylvania silt loam.—Though this soil has developed from recent alluvium deposited in first bottoms in close association with Congaree silt loam, it differs from the Congaree in having a darker and deeper surface soil and a little better developed profile. Having formed on slopes of 0 to 3 percent, the soil has slow external drainage. Internal drainage is medium. Most areas are along the larger streams, usually in the slightly higher stream-bottom positions. Tracts occur along the Valley River near Andrews and along Peachtree Creek. Most areas have been cleared and are cultivated. The native vegetation probably included several varieties of oak, poplar, hemlock, birch, cherry, sugar maple, buckeye, beech, cucumbertree, sourwood, gum, ash, and dogwood.

The surface soil is dark-brown friable silt loam underlain by brownish-yellow or yellowish-brown silty clay to silty clay loam. The subsoil is compact but friable. A profile in a cultivated area has the following characteristics:

0 to 12 inches, dark brownish-gray to dark-brown friable silt loam of medium-crumb structure.

12 to 36 inches, brownish-yellow to yellowish-brown friable silty clay loam, compact in place and having a weak medium-nut structure.

36 to 50 inches, yellowish-brown to yellow fine sandy loam to loose loamy sand, usually underlain by lighter colored sand and gravel.

In this soil some variations occur in the color of the surface layer and in the depth of profile. In a few spots some stone and gravel may be present. Most variations are due to stratification and to more recent deposits on the surface. Included with this soil are a few small strips of Congaree silt loam and fine sandy loam.

Much of Transylvania silt loam is cleared, and approximately 55 percent is being used for cultivated crops. It is estimated that nearly 20 percent is in open pasture and 25 percent in forest. The soil is well adapted to corn, soybeans, small grain, legumes for hay and similar crops, but the larger percentage is being used for corn (pl. 4, *A*). It is moderately fertile, moderately to strongly acid, and responds well to applications of both lime and fertilizer. Being nearly level in relief and free of stones, it is easy to work and manage and can be used intensively for agriculture.

Tusquitee loam, rolling phase.—This soil has developed on colluvial material transported by gravity or on local wash from higher surrounding slopes—usually from Ramsey or Porters soil materials. Slopes are 7 to 15 percent; external drainage is slow and internal drainage medium. Most areas are in the northern and eastern parts of the county, and representative bodies are south of Turkey Pen Hollow. Nearly all areas have been cleared and cultivated, but the native vegetation included post, white, black, and red oaks, hickory, maple, sourwood, yellow pine, mountain-laurel, and numerous bushes.

The entire soil is permeable and friable and allows ready absorption and free percolation of water. The surface layer is grayish-brown to dark-brown friable loam. It is underlain by a yellowish-brown to light reddish-brown friable clay loam. Differences in structure, texture, and color between the surface soil and subsoil are slight in many places, and in some areas it is difficult to distinguish one from the other. Locally, a few angular rock fragments are scattered over the surface and mixed with the soil. The loam to clay loam subsoil ranges from brown, yellowish brown or brownish yellow, to reddish brown. Nearly 200 acres are included that have formed on slopes of 2 to 7 percent, although this type is described as having developed on slopes of 7 to 15 percent. The following description is of a profile in a forested area:

0 to 2 inches, a covering of well-decomposed leafmold in which there is a large quantity of partly decomposed twigs and leaves.

2 to 15 inches, grayish-brown to brown friable loam of a weak medium-crumb structure; contains numerous roots.

15 to 36 inches, yellowish-brown, brown, or reddish-brown friable clay loam having a moderate-nut structure.

36 inches +, yellowish-brown to strong yellowish-brown friable clay loam.

The principal crops are corn, potatoes, cabbage, sorgo, garden vegetables, apples, and some tobacco. Very little fertilizer is used as a rule, except for tobacco and potatoes. Though the land occurs in small bodies, usually as narrow strips, it is very productive and important, especially on the smaller farms. The soil is moderately fertile and excellent in water-holding capacity, and its slopes are favorable for agricultural use. It responds well to lime and fertilizer and can be cultivated intensively. With reasonable care there should be little or no damage from erosion. Approximately 30 percent is used for cultivated crops, 5 percent is in idle cropland, and 15 percent is in open pasture.

Tusquitee stony loam, rolling phase.—From the standpoint of acreage, this is the most important of the Tusquitee soils. It has the same mode of occurrence and drainage conditions as the rolling phase of Tusquitee loam and resembles that soil in profile characteristics. The surface soil is usually slightly darker, however, and there is considerable stone, 6 to 12 inches in diameter, on the surface and throughout the profile. In places, there are large boulders imbedded in the soil or on the surface. Slopes range from 7 to 15 percent. The content of stone varies, and there is considerable mica in those areas associated with Talladega soils. Most of the soil is associated with areas of the Ramsey, Porters, and Habersham soils and with some areas of the Ramsey-Talladega complex. The most extensive areas of this phase are along the highway from Topton to Rhodo, and along Hanging Dog Creek.

Approximately 75 percent of this land has been cleared, and of this, about 40 percent is in cropland, 5 percent in idle cropland, and 25 percent in open pasture. Corn, potatoes, apples, rye, small grain, and legumes are the most commonly grown crops. The organic-matter content is somewhat low, but the soil is productive and moderately fertile. It responds well to lime and fertilizer and especially well to additions of green manure. It is friable and permeable and has excellent water-holding capacity and favorable slope for agricultural use. There is enough stone on the surface, however, to interfere seriously with tillage. In places where it is too stony to use a plow or cultivator, corn and similar crops are dug-in and worked with hoes. The soil can be farmed intensively with little danger of damage by erosion. It is greatly improved if the stones can be removed from the surface.

Tusquitee stony loam, undulating phase.—A less sloping surface (2 to 7 percent), a browner surface soil, considerable stone on the surface and throughout, a profile usually somewhat deeper and better developed, and somewhat slower external drainage distinguish this soil from the rolling phase of Tusquitee loam, a soil with which it is closely associated. The surface soil is brown to dark-brown friable stony loam underlain by yellowish-brown or brown friable stony loam. There may be considerable variation in the quantity and size of the stone on the surface. Areas developed in association with the Habersham soils are usually browner. The total acreage is small, and the largest area lies southeast of Unaka. Other bodies are south of Mount Carmel Church and south of McClellan.

Most of this land has been cleared and is used for corn, potatoes, and vegetables. It is a moderately fertile, friable, and permeable soil, moderately to strongly acid, and has an excellent water-holding capacity. The response to lime, fertilizer, and green manure is excellent, and good yields can be expected under good management. The soil can be cultivated intensively without serious damage; its value is greatly increased if part of the stone is removed.

Tusquitee stony loam, hilly phase.—This soil differs from Tusquitee loam, rolling phase, chiefly in being more stony and in having stronger slopes (15 to 30 percent). In general, the surface soil is browner, ranging from brown to dark brown. The subsoil consists of yellowish-brown to light reddish-brown friable clay loam. External and internal drainage are medium. The soil occurs in a number of small areas throughout the eastern and northern parts of the county. Some of the larger areas lie southwest of Topton, along Hanging Dog Creek, and in the vicinity of Bailing Springs Church.

This soil is not suited to cultivated crops because of its steep slope and stoniness. Probably not more than 20 percent has been cleared, and only about half of this is used for crops, principally potatoes and corn and some for apple orchards. About 10 percent is in pasture. With careful management moderate to good pasture can be produced. The principal forest growth on the rest of the land is oak, dead chestnut, maple, poplar, buckeye, and walnut. The soil is friable and permeable and moderately well supplied with organic matter and mineral nutrients. It responds well to lime and fertilizer. If it is necessary to cultivate this land, as many stones as possible should be removed, and contour tillage and strip cropping should be followed to prevent damage by erosion. Rotations containing sod-forming crops from two-thirds to three-fourths of each period are advisable.

Warne silt loam.—Developed from alluvial material on slopes of 0 to 3 percent in low terrace positions, this soil hase very slow internal and external drainage. It occurs in association with Altavista and Congaree soils. Nearly all areas have been cleared, but the native vegetation was probably hardwoods, including several species of oak, and basswood, poplar, hemlock, birch, cherry, maple, beech, cucumber-tree, sourwood, and dogwood. The soil is usually found in small areas and is not extensive. The larger areas are in the vicinity of Andrews and north of Peachtree.

The surface soil is gray to grayish-brown friable silt loam underlain by grayish-yellow grading to steel-gray plastic and sticky clay. The color of the surface layer varies somewhat and so does the density and compactness of the subsoil. The soil is free of stone and gravel, and except in the lower subsoil, moderately permeable to plant roots, moisture, and air. It is moderately fertile and moderately to strongly acid, but has poor internal drainage.

The following is a profile description in a cultivated area:

0 to 9 inches, gray or grayish-brown fairly heavy friable silt loam of moderate medium-crumb structure.

9 to 30 inches, grayish-yellow or yellowish-gray stiff but brittle clay; moderately plastic and sticky but easily crumbled when dry.

30 to 45 inches, steel-gray mottled with yellow and rust-brown tough plastic sticky silty clay, hard when dry; material of this layer is almost impervious to air and water.

Most areas of this land are used for corn, soybeans, hay, and pasture. The better drained areas are used primarily for the cultivated crops and the more poorly drained ones are generally used for hay and pasture. Artificial drainage would improve the productivity and workability of this soil and broaden its range of use. Where so improved it responds well to lime and fertilizer and can be farmed intensively.

Wehadkee silt loam.—In association with the Congaree and Chewacla soils, this alluvial soil has developed in the more poorly drained first-bottom areas on slopes of 0 to 3 percent. Surface drainage is very slow to slow, and subsoil drainage is very slow. In places the water table may be only 12 to 18 inches below the surface. The native vegetation includes hemlock, alder, silver maple, birch, willow, beech, and an undergrowth of bulrush and mixed grasses. The soil usually occurs in narrow strips along the streams; areas are north of Martin Creek School and southwest of Tomotla.

The color of the surface soil varies considerably, the range being from grayish brown to nearly black. The light-gray heavy silty clay subsoil is often mottled with rust brown. Variations in the subsoil are usually due to stratification of the alluvial deposits and to variation in the depth to water table. Along some of the small drainageways the soil has been covered with a thin layer of reddish soil material washed from adjacent hilly lands. In places where the streams have originated in micaceous soil areas, the soil may contain a considerable quantity of finely divided mica flakes.

A profile description in a cultivated area shows the following features:

0 to 15 inches, dark-gray to grayish-brown silt loam; friable when moist but slightly plastic and sticky when wet; moderate-crumb structure.

15 to 30 inches, light-gray mottled with rust-brown heavy silty clay; plastic and sticky when wet, hard when dry.

30 inches +, stratified sand, gravel, and clay material, usually saturated with water.

Included with this soil because of their limited extent are a few areas of Chewacla silt loam. The included areas have developed in close association with this soil, and management for them is similar.

Most of Wehadkee silt loam is used for pasture (pl. 4, *B*) or allowed to grow up to water-loving plants that are occasionally pastured. Pastures can be improved by the addition of lime and fertilizer. Areas that can be drained are productive and well suited to corn, but it is very difficult to establish drainage adequate for tillage. This soil is moderately high in organic-matter content and moderate in fertility. It is friable and permeable if well drained by artificial means.

Worsham loam.—This soil has formed chiefly from colluvial and alluvial parent material, although in places the parent material is residual. It occurs in lower positions near streams and is usually associated with soils of the upland group. Occupying slightly depressed positions or locations that may receive some seepage water, it has slow to medium surface and very slow internal drainage. Slopes range from nearly level to 15 percent. The areas are mainly in the vicinity of Martin Creek School, near Valleytown, and northwest of Fairview Church. Maple, oak, shortleaf pine, and an undergrowth of willow and sycamore are included in the natural vegetation.

The surface soil is gray to yellowish-gray friable loam, and underlying it is a yellow to brownish-yellow rather heavy but brittle silty clay. Considerable variation occurs in the thickness of the various layers and in the density of the clay subsoil. The soil is usually free of stone, but in some places there are a few quartz fragments on the surface, and in others there is a thin layer of white angular quartz fragments at varying depths. Some variation is caused by the parent material from which this soil is formed, because it is at least partly of colluvial origin. Approximately 25 acres of this soil has a slope range of 0 to 3 percent and about 50 acres has a slope range of 7 to 15 percent. Because of their limited extent, these were not differentiated. They differ only in surface relief.

The following is a profile description of Worsham loam in a cultivated field:

0 to 10 inches, gray to brownish-gray friable loam having a moderate-crumb structure and containing considerable organic matter.
10 to 25 inches, yellow or brownish-yellow rather heavy but brittle silty clay; friable when moist, moderately plastic and sticky when wet, and hard when dry.
25 to 40 inches +, mottled yellow and gray clay; moderately plastic and sticky.

Corn, wheat, rye, soybeans, hay, and pasture are the most common crops. Approximately 20 percent of the land is used for crops; 10 percent is idle cropland, and 30 percent is in open pasture. Poor drainage is the most serious hazard to crop production. The soil is moderately fertile, contains considerable organic matter, is not susceptible to erosion—except on the stronger slopes—and is easy to work when drained. It is moderately to strongly acid. Good response to lime and fertilizer can be expected.

SOIL USE, MANAGEMENT, AND PRODUCTIVITY

The major use, management[8] requirements, and productivity of the soils as they relate to the agriculture of the county are here considered together in order that their interrelations may be more readily understood. The soils are divided into five land classes on the basis of suitability for agricultural use, and the soils in each class are then subdivided into groups according to similarities in management requirements. Soil management practices are described in detail for each management group, and the relation between water control on the land and soil management is discussed. Productivity is indicated by estimated average yields of the principal crops for two levels of management—that followed by the majority of farmers and that considered the best that could be feasibly followed.

SOIL USE AND MANAGEMENT[9]

The five classes into which the soils of the county have been grouped are, in the order of decreasing suitability for use in the present agriculture, the First-, Second-, Third-, Fourth-, and Fifth-class soils.

The physical suitability or desirability of an individual soil for agricultural use is determined by its characteristics. Of the many contributing characteristics, productivity, workability, and conservability are the three most important. The ideal soil is one that is very productive for a large number of important crops, easily worked, and capable of being conserved with minimum effort. All the soils of this county fall short of this ideal in widely varying degrees. For example, a soil may be highly productive and easily conserved, but short of the ideal because it is difficult to work.

The relative physical suitability of the soils for agricultural use was determined on the basis of the experience of farmers, extension workers, experiment station personnel, teachers of vocational agri-

[8] Soil management refers to selection and rotation of crops; application of soil amendments, as lime, manure, crop residues, and commercial fertilizer; tillage methods; engineering measures for water control on the land; and similar practices.
[9] Suggestions for the use and management of the soils of Cherokee County are a contribution from the Department of Agronomy, North Carolina Agricultural Experiment Station.

culture, and others who work with the soil. For example, a farmer knows that some soils on his farm are more desirable than others, and his information, with that from others, allows comparisons of soil characteristics within farms and among farms. By these comparisons the soils have been ranked in the order of suitability for the agriculture of the area under present conditions. When information based on experience with the soil was lacking, the soil was ranked by comparisons with other soils of similar characteristics for which information was available. Because livestock raising is an important project on many farms, the suitability of the soils for pasture was considered in determining their rank.

In the following pages the five land classes are separately discussed. Each discussion is followed by a table in which the soils are listed in management groups according to their similiarities in management requirements. For each soil percentage figures show the estimated total area in crops, idle cropland, open pasture, and forest. Separate discussions of the management groups follow each table. In these are presented the common characteristics, present use and management, and management requirements for each group.

Crop adaptations and suggested rotations for the soils are listed according to management groups in table 9. Fertilizer requirements for crops and crop rotations also are given by management groups, with dates of suggested application. Fertilizer requirements for each rotation are based on the particular needs of the crop and the nutrient deficiencies of the soil type for that crop. The requirements are not necessarily intended for absolutely rigid application, because variations will occur within the soil type, owing to degree of erosion, previous treatment, and type of rotation followed.

FIRST-CLASS SOILS

The First-class soils are very good to excellent for agriculture. Though somewhat different in their characteristics, they are relatively similar in chemical properties and in suitability for farming. Each is moderately well supplied with plant nutrients and has fairly high natural productivity, as compared with other soils of the county. Even the most fertile, however, is responsive to additions of certain amendments for some crops. All are well drained, but their physical characteristics are such that they tend to insure a rather even and generally adequate supply of moisture for plant growth. Good tilth is easily maintained, and tillage can be done satisfactorily in a comparatively wide range of moisture conditions.

The soils are moderately well supplied with organic matter and are permeable to air, moisture, and roots. None has any adverse condition or property, as stoniness or unfavorable relief, and in each the problem of conserving fertility and soil material is relatively simple. With special management practices, each is capable of sustaining intensive use. About 54 percent of the total extent of First-class soils is in crops, 5 percent in idle cropland, 20 percent in open pasture, and 21 percent in woodland.

The First-class soils, listed by management groups, and the estimated percentage of each soil used for crops, idle cropland, open pasture, and forest in 1940, are given in table 4.

TABLE 4.—*Estimated percentage of First-class soils in crops, idle cropland, open pasture, and forest, by management groups, in Cherokee County, N. C., 1940*

Management group and soil	Crops	Idle cropland	Open pasture	Forest
	Percent	*Percent*	*Percent*	*Percent*
Group 1-A:				
Congaree fine sandy loam	60	0	20	20
Congaree silt loam	55	0	20	25
Transylvania silt loam	55	0	20	25
Group 1-B:				
Altavista silt loam, level dark-colored phase	70	0	20	10
Hiwassee clay loam, eroded undulating phase	50	15	35	0
Hiwassee loam:				
Rolling phase	50	10	30	10
Undulating phase	50	5	25	20
Masada loam, undulating phase	50	5	25	20
State silt loam	60	0	20	20
Tate silt loam:				
Rolling phase	25	10	20	45
Undulating phase	60	5	25	10
Tusquitee loam, rolling phase	30	5	15	50

MANAGEMENT GROUP 1-A

The soils of management group 1-A are of alluvial origin. The Congaree soils occupy the lower first bottoms. The Transylvania occurs in somewhat higher positions and is differentiated from the Congaree by darker color and a somewhat better developed profile. The surface and subsoil layers of both are friable and open, but they retain sufficient moisture for the production of any of the common crops that can be grown in the area. They are moderately fertile, respond well to treatment, and are not subject to severe losses of plant nutrients by leaching. Because they occupy favorable positions and are easily tilled and conserved, they can be farmed intensively. Though the acreage is limited, a large quantity of the corn, truck crops, and other row crops can be produced.

No special tillage practices are required for the soils of group 1-A. They may be worked relatively soon following rain with little or no danger of puddling. Lighter implements can be used, and deep plowing is not necessary. The land is generally broken late in winter or early in spring.

Corn, small grains, truck crops, lespedeza, red clover, and soybeans are well suited to these soils, but no particular crop rotation is in general use. If it is necessary to grow the bulk of the farm grains on these soils, corn can be planted each year, but crimson clover or rye should be sown as winter or intercrop cover to maintain the content of organic matter. Beans, potatoes, cabbage, or similar crops of high acre value should be followed by small grain, hay, or clover in order to get the full benefit from the residual fertilizer. Where lime is applied in quantities sufficient to grow legumes, potatoes should not be grown. Limestone may be added for the corn or truck crops. All crops respond well to fertilizer, but applications should be arranged so that most of the nitrogen is applied to corn, beans, cabbage, and small-grain crops, and little or none to the hay.

Erosion is not a hazard, but stream channels should be kept open to reduce the danger of flood. Surface drainage is slow to very slow, and internal drainage medium. Special crop adaptations and recommended crop rotations and soil amendments are given in tables 9 and 10.

MANAGEMENT GROUP 1–B

The soils of management group 1–B occur on stream terraces and colluvial slopes. They are similar in most profile characteristics, but differ somewhat in surface color and texture. All have developed on slopes of less than 15 percent. They have a well-drained permeable profile practically free of stones, and damage by erosion has been moderate to light.

Most of the land in this group is used for crops or pasture. The percentage in forest is relatively small. Corn, small grain, truck crops, alfalfa, lespedeza, peas, soybeans, tobacco, and potatoes are commonly grown. Rotations are not generally practiced. Crops are sometimes rotated, but frequently the same crop is grown 2 to 5 years in succession. Truck crops, corn, and tobacco normally receive the bulk of fertilizer. Very little is applied to small grains and, as a rule, pasture and hay receive relatively light applications of phosphate and potash.

Because of favorable physical properties, the soils are well suited to intensive row cropping. Contour tillage is advisable to prevent damage by erosion, and crop yields may be increased by additions of organic matter. The fertilizer and lime requirements of the soils of this group are similar, and each responds well to treatment. Corn, small grain, and truck crops should receive the bulk of the nitrogen as a side dressing, but mineral nutrients should be well distributed throughout each rotation period. Manure, when available, is usually more economically used on upland soils, but it would be very beneficial to corn, tobacco, or alfalfa.

Special crop adaptations and suggested rotations for soils of this group are shown in table 9, and the quantity and analysis of fertilizer needed for the various crops within each rotation and the suggested time of application in table 10.

The general recommendations given for group 1–B will be modified by previous treatment, the condition of the soil, or similar factors. In choosing a rotation, for example, one should keep in mind the needs of the farm and the farm operator as well as the soil. The type of rotation used on a particular farm and the treatment given each crop may be modified by several agronomic problems. Potatoes usually should not be grown in the same rotation with alfalfa, because alfalfa has a high lime requirement and soil-borne diseases are encouraged by a nearly neutral soil. Cabbage, as a rule, should not follow a sod crop, because of wireworm hazard. Care must be exercised in the production of tobacco. If the nitrogen content of the soil is too high, there is danger of lowering the quality of the crop.

Some of the suggested rotations are: (1) Cabbage or potatoes, small grain, and red clover; (2) corn followed by crimson clover; and (3) tobacco, followed by orchard grass for 3 years. Other rotations are suggested in table 9, and many other satisfactory rotations could be devised.

Contour tillage is suggested for these soils, but no other special practices are necessary in their management. Terraces might be used to advantage on some of the slopes. All these soils are easily plowed and cultivated and can be worked under a relatively wide range of moisture conditions with light to moderately heavy implements. At present they are being used intensively, and they produce a large percentage of the grain crops grown in the county.

SECOND-CLASS SOILS

Certain soils have been considered Second class because of relief, degree of erosion, poor drainage, or stony or gravelly condition of the surface soil. Each soil is moderately deficient in one or more of these factors, and their detrimental effect upon the physical suitability of the soil for agricultural use is greater than it is for any of the First-class soils, but less than for any of the Third-class soils. In general, the soils are good to very good for pasture and fair to good for cropland. Within a limited range, they differ in productivity, workability, and conservability.

It is estimated that approximately 39 percent of the Second-class soils is used for crop production, 7 percent is idle cropland, 27 percent is used for open pasture, and 27 percent is in forest. Much of the forest land is suitable for clearing, and more of the open pasture could be used for cropland.

Second-class soils are listed by management groups in table 5, and the estimated percentage of each soil in crops, idle cropland, open pasture, and forest in 1940 is given.

TABLE 5.—*Estimated percentage of Second-class soils in crops, idle cropland, open pasture, and forest, by management groups, in Cherokee County, N. C., 1940*

Management group and soil	Crops	Idle cropland	Open pasture	Forest
	Percent	*Percent*	*Percent*	*Percent*
Group 2-A:				
Altavista silt loam, undulating phase	80	0	20	0
Chewacla gravelly loam	30	5	40	25
Chewacla silt loam	45	5	25	25
Chewacla-Tate silt loams	40	5	25	30
Group 2-B				
Habersham stony fine sandy loam, rolling phase	20	5	30	45
Masada gravelly loam, rolling phase	20	10	25	45
State cobbly loam	25	10	35	30
Tusquitee stony loam:				
Rolling phase	40	10	25	25
Undulating phase	40	5	30	25
Group 2-C:				
Hiwassee gravelly clay loam, eroded rolling phase	50	10	40	0
Masada gravelly clay loam, eroded rolling phase	50	10	40	0
Group 2-D:				
Altavista silt loam, rolling phase	25	10	25	40
Habersham fine sandy loam, rolling phase	20	10	30	40

MANAGEMENT GROUP 2-A

Management group 2-A includes the rather poorly drained soils of the first-bottom areas and low terraces. The Chewacla soils and the Chewacla-Tate complex are subject to flooding, especially during heavy rains, but the Altavista soil is seldom covered by floodwater. Of the four soils in this group, the complex of Chewacla-Tate silt loams is the most extensive. Altavista silt loam, undulating phase, is almost a First-class soil, but some evidence of imperfect drainage may be noted in the lower subsoil.

Most of the soils of group 2-A occur in small rather scattered areas throughout the county, but they are important to the individual farms because of their relatively high fertility, ease of cultivation, and ease of conservation. Surface drainage is usually rather slow and subsoil drainage is slow.

No special tillage practices are necessary for these soils, but reasonable effort should be made to avoid tilling when the soil is too wet or too dry. Light to moderately heavy farm implements and work animals are sufficient. The land is usually broken late in winter or early in spring. Cultivated areas are drained by open ditches in many places but where the water table is sufficiently low, tile drainage would probably be more satisfactory. Drainage channels should be kept open. It is estimated that approximately 75 percent of these soils has been cleared and used for crops and pasture. As a general practice, little or no fertilizer is applied, except to corn or truck crops.

The Altavista and Chewacla soils are well suited to the production of corn, small grain, truck crops, lespedeza, red clover, soybeans, and potatoes. Such rotations as (1) corn, lespedeza or soybeans; (2) corn, crimson clover, potatoes; or (3) continuous hay; and (4) continuous pasture, are particularly suitable.

The members of group 2–A are moderately fertile, moderately to strongly acid, and friable and permeable to both water and air. Following satisfactory drainage, good to excellent results can be expected from applications of lime and fertilizer. Table 9 gives special crop adaptations and suggested rotations for the soils of this group, and table 10 suggested fertilizer requirements for each crop within each rotation and suggested dates of application. The soils should be tested regularly for lime and fertilizer requirements so that the most efficient use may be made of applications. Tests often show a potash deficiency in the soils of this group, especially where legume hay is being produced.

MANAGEMENT GROUP 2–B

The Masada and State soils of management group 2–B have formed on terraces, the Tusquitee on colluvial slopes, and the Habersham on the uplands. Though differing in origin, all four have similar profile characteristics and management requirements. Each is developed on slopes under good surface and internal drainage conditions. The soils are friable and permeable. The considerable quantity of gravel or stones on the surface and throughout the profile usually interferes with but does not prevent tillage. Approximately 60 percent of the total extent of soils in this group has been cleared. About half the cleared land is used for pasture and the rest for crops.

Corn, small grain, hay, pasture, and lespedeza are suited to the soils of this group. Some truck crops are produced. Though most farmers alternate crops to a certain extent, the same row crop is often grown on a field year after year. Small grain usually follows corn, which is in turn followed by hay or pasture, but rotations are not generally practiced. Contour tillage and strip cropping are advised to prevent damage by erosion. If it is practical, the removal of stone and gravel will greatly increase the value of the land and make cultivation easier.

The soils of this group can be plowed by ordinary farm implements early in spring or late in fall. Some provision is required to prevent stones from damaging implements and crops, but no other special tillage practices are necessary. The soils can be cropped intensively in suitable rotations, but care should be exercised to maintain their fertility level and organic-matter content. They should be used for hay and pasture as much as possible. Such rotations as (1) cabbage or potatoes, small grains, and red clover; (2) corn, small grains, lespedeza, and lespedeza; and (3) continuous hay, are satisfactory.

The soils respond well to applications of lime and fertilizer, and good yields may be expected. In general, nitrogen should be applied to corn and small grains as a top dressing. The mineral fertilizer should be supplied to all crops. Manure is beneficial, especially to corn, and plowing under green manure adds greatly to the productivity of the soils of this group. Fertilizer requirements vary with the rotation as well as with the condition of the soil. For estimated fertilizer requirements and suggested dates of application table 10 should be referred to. For information on special crop adaptations and rotations see table 9.

MANAGEMENT GROUP 2–C

Only two soils, Masada gravelly clay loam, eroded rolling phase, and Hiwassee gravelly clay loam, eroded rolling phase, are included in management group 2–C, and neither is extensive within the county. Though somewhat similar in profile characteristics and management requirements, they differ considerably from other soils belonging to the Second land class.

Each is well suited to the production of corn, small grains, and mixed hay. Truck, alfalfa, lespedeza, and like crops will do well, but they are somewhat difficult to harvest because the soils are gravelly. Satisfactory rotations are: (1) Corn, small grains, and lespedeza 2 years; (2) beans or corn, mixed hay 2 years, and pasture 2 years; and (3) continuous hay. On less gravelly areas, truck crops, alfalfa, and tobacco could well be included in the rotations.

Both soils are somewhat low in organic-matter content. Fertilizer is generally used on corn and occasionally on hay. When available, manure is beneficial, especially for corn, and both the tilth and productive capacity of these soils are greatly improved by additions of green manure. Owing to the fine-textured surface layer, tillage operations must be carried on within a relatively narrow moisture range, and care must be exercised to prevent further damage by erosion. In customary tillage practices, the land is broken in spring, and the rows or furrows are run the most convenient way.

Table 9 gives crop adaptations and rotations for these soils; fertilizer requirements for each crop within a rotation will be found in table 10, together with suggested dates of application.

MANAGEMENT GROUP 2–D

The soils of management group 2–D vary considerably in origin but have similar profile characteristics. The Altavista, developed in low-terrace positions, has somewhat slow internal drainage but is otherwise similar to the First-class soils. The Habersham is developed in the intermountain uplands and characteristically has a friable, permeable, and well-drained profile.

Though the bodies are not extensive, the soils are important in the agriculture of some local areas. It is estimated that 40 percent of these soils is in forest, 25 percent in cultivated crops, and 27 percent in pasture. They are well suited to the production of corn, small grains, truck crops, lespedeza, alfalfa, clover, soybeans, potatoes, sweetpotatoes, and tobacco. They are friable, permeable, and moderately fertile, but somewhat subject to erosion. Some care must be exercised to prevent damage by erosion and to maintain the organic-matter content. Suggested rotations include: (1) Cabbage or potatoes, small

810513—51——5

grains, and red clover; (2) corn, and lespedeza or soybeans; and (3) corn, tobacco, and mixed hay 2 years.

The fields are usually plowed early in spring, and tillage operations can be carried on within a relatively wide moisture range. The soils respond well to applications of lime and fertilizer and under proper management, moderate to good yields can be expected. In a livestock system of farming where legume hay is important, liberal applications of lime will be necessary. Under such a system, therefore, potatoes probably should not be included. Most nitrogen applications should be made to the corn, small grains, and truck crops.

THIRD-CLASS SOILS

Third-class soils are of moderately low value for agricultural use. Under normal conditions and with good management practices, they are moderately to very productive. Usually they are well suited to the production of grass and hay and should be kept in a sod-forming crop from one-half to two-thirds of each rotation period.

A number of variations may be noted among the soils of this class, but they have generally similar characteristics. Among the limiting or undesirable features are strong slopes, low plant-nutrient and organic-matter content, unfavorable texture, structure, or consistence, eroded condition, or inadequate natural drainage. Approximately 18 percent of the soils of this group is in crops, 12 percent in idle cropland, 30 percent in open pasture, and 40 percent in forest.

Third-class soils are listed by management groups in table 6, and the estimated percentage of each soil in crops, idle cropland, open pasture, and forest in 1940 is given.

TABLE 6.—*Estimated percentage of Third-class soils in crops, idle cropland, open pasture, and forest, by management groups, in Cherokee County, N. C., 1940*

Management group and soil	Crops	Idle cropland	Open pasture	Forest
Group 3-A:	*Percent*	*Percent*	*Percent*	*Percent*
Buncombe loamy fine sand	20	20	40	20
Warne silt loam	20	10	50	20
Worsham loam	20	10	30	40
Group 3-B:				
Fannin clay loam, eroded rolling phase	40	20	40	0
Habersham loam, eroded rolling phase	35	25	40	0
Talladega shaly clay loam, eroded rolling phase	35	25	40	0
Group 3-C:				
Habersham fine sandy loam, hilly phase	5	0	15	80
Hiwassee loam, hilly phase	5	0	15	80
Masada gravelly loam, hilly phase	5	0	15	80

MANAGEMENT GROUP 3-A

Buncombe loamy fine sand, the most extensive soil of management group 3-A, is found on the first bottoms along the larger streams. It is characterized by its coarse texture and very permeable profile. The Warne soil has developed on low terraces, and the Worsham on colluvial slopes, but often with some residual influence. In general, these soils have somewhat similar management requirements, though their profile characteristics are different. The Warne and Worsham soils need surface and subsoil drainage. The Buncombe soil is low in organic-matter content and fertility, and because of its excessive drainage, is often somewhat droughty.

Corn, truck crops, small grains, hay, and pasture are suited to the soils of group 3–A, which respond well to lime and fertilizer, especially when drainage is adequate. Moderate to good yields can be expected. The Buncombe soil responds especially well to additions of organic matter, which decreases droughtiness and increases fertility. Such rotations as (1) corn followed by crimson clover; (2) corn followed by lespedeza or soybeans; (3) corn, small grains, and lespedeza for 2 years; and (4) continuous pasture would be well suited to these soils. Special crop adaptations and suggested rotations for the soils of this group are given in table 9.

Table 10 indicates fertilizer requirements for each crop within the various rotations and gives suggested dates for planting and fertilizer applications. Somewhat heavier applications of nitrogen are suggested for corn, truck crops, and small grains.

No special tillage practices are required for these soils. They can be plowed late in fall or early in spring and require only light to medium farm implements. The soils can be worked within a relatively wide moisture range, and good tilth can be maintained easily.

MANAGEMENT GROUP 3–B

Soils of management group 3–B are similar in physical characteristics but differ in color and parent material. The Fannin and Talladega soils are developed over mica gneiss and schist on slopes of 7 to 15 percent. The Fannin soil has a much better developed B horizon than the Talladega, which has considerable shale on the surface and throughout the profile. The Habersham soil has developed over siliceous rock on slopes of 7 to 15 percent and has only a moderately developed B horizon. Each of these soils is friable and permeable. They have low to moderate fertility but respond well to treatment. The water-holding capacity is good, but each is somewhat susceptible to accelerated erosion.

All areas of these soils have been cleared and used for agricultural purposes at some time. It is estimated that approximately 35 percent of the land in group 3–B is in crops, 25 percent in idle cropland, and 40 percent in open pasture. Corn, small grain, alfalfa, lesdepeza, tobacco, mixed hay, and pasture are well suited to the soils. Clean-cultivated crops should not be planted more than half of each rotation period. Contour cultivation, strip cropping, and similar practices should be followed to prevent damage by erosion. Suitable rotations include: (1) Corn, small grain, and alfalfa 4 years; (2) tobacco followed by orchard grass 3 years; (3) peas or beans, corn, small grains, and lespedeza 2 years; (4) continuous hay. (See table 9.)

Fertilizer requirements for individual crops within each rotation and suggested dates of application are given in table 10. Applications heavier than those suggested may be applied on the more severely eroded areas or when higher crop yields are desired. Corn and small grains should receive most of the nitrogen fertilizer; the mineral nutrients should be distributed throughout the rotation. The best quality of tobacco is usually grown on the poorer areas when the nitrogen level is not high. The soils should be tested regularly for lime and fertilizer requirements, especially if alfalfa or other legumes are to be produced.

The moisture range in which these soils can be tilled is rather narrow, especially on the Fannin and Talladega, because of the fine surface texture. If plowed when too wet, the soils tend to puddle, bake, and form clods; if plowed too dry, tillage is difficult, as the soil tends to break into large pieces. Land is generally broken in spring and prepared soon after for corn, tobacco, and like crops. Small grains and hay crops often can be disked in.

MANAGEMENT GROUP 3–C

Of the three soils in management group 3–C, Habersham fine sandy loam, hilly phase, is the most extensive. It usually occurs in the intermountain areas where it has developed over siliceous rock. Hiwassee and Masada soils have developed on the high terrace positions. These soils all have somewhat similar physical characteristics and management requirements but differ to some extent in texture and color. They are friable, permeable, low to moderate in fertility, and respond well to treatment.

Only a small acreage (about 20 percent) has been cleared and most of this is used for pasture. Because of the hilly relief and susceptibility to erosion, most areas should not be cleared. If cleared, they should remain in sod-forming crops from two-thirds to three-fourths of each rotation period. Contour tillage, strip cropping, and similar practices should be followed to prevent erosion.

Small grains, lespedeza, tobacco, mixed hay, pasture, and potatoes are the crops more suitable to the soils of this group. Under cultivation, rotations such as the following will be satisfactory: (1) Cabbage or potatoes, mixed hay 2 years, and pasture 2 years; (2) peas or beans, corn, small grain, and lespedeza 2 years; (3) tobacco followed by orchard grass 3 years; (4) continuous hay or pasture. (See table 9.)

For the most efficient use of these soils it is essential to maintain a good cover and the fertility level. Table 10 indicates the fertilizer requirements of the individual crops within each rotation and suggested dates for planting and applying fertilizer. Most of the nitrogenous fertilizer should be added to the small grain or truck crops as top dressing, and the mineral fertilizer should be distributed throughout the rotation period. Experience may prove the addition of more potash desirable, especially to the tobacco and potato crops after the land has produced a few crops of legume hay. Considerable power is required to till the soils of this group, and the moisture range for tillage is relatively narrow. Care must be exercised in tillage operations to maintain soil structure.

FOURTH-CLASS SOILS

Fourth-class soils are poorly suited to crops requiring tillage because of unfavorable physical characteristics, but they are at least moderately productive of pasture. Most of the soils of this group have hilly surface relief and considerable stone on the surface and throughout the profile. As a result of one or more unfavorable features each of the soils is difficult to cultivate or to conserve, or both. On the other hand, each soil is sufficiently fertile and retentive of moisture to maintain a moderately good to very good cover of pasture plants.

Though these soils are not well suited to cultivation a considerable acreage is used for cropland, and because this cannot be avoided on farms that do not have enough land of the better classes, farmers must exercise greater care in their management. Where adequate areas of fair to good cropland (First-class or Second-class soils) are available, most of the soils in the Fourth class are used for pasture or forest. Of the Fourth-class soils, nearly 48 percent is in forest, 27 percent in open pasture, 15 percent in idle cropland, and 10 percent in cropland.

The Fourth-class soils are listed by management groups in table 7, and the estimated percentage of each soil used in 1940 for crops, idle cropland, open pasture, and forest is given. In tables 9 and 10 rotations and soil amendments are recommended.

TABLE 7.—*Estimated percentage of Fourth-class soils in crops, idle cropland, open pasture, and forest, by management groups, in Cherokee County, N. C., 1940*

Management group and soil	Crops	Idle cropland	Open pasture	Forest
Group 4-A:	*Percent*	*Percent*	*Percent*	*Percent*
Fannin loam, hilly phase	0	0	5	95
Porters loam, steep phase	5	0	15	80
Talladega silt loam, hilly phase	0	0	3	97
Group 4-B:				
Fannin clay loam, eroded hilly phase	10	20	20	50
Habersham loam, eroded hilly phase	15	30	50	5
Group 4-C:				
Fannin stony clay loam, eroded hilly phase	30	20	50	0
Habersham stony loam, eroded hilly phase	15	25	60	0
Hiwassee gravelly clay loam, eroded hilly phase	30	20	50	0
Masada gravelly clay loam, eroded hilly phase	30	20	50	0
Talladega-Habersham stony loams, eroded hilly phases	20	30	50	0
Talladega shaly clay loam, eroded hilly phase	20	30	40	10
Group 4-D:				
Fannin stony loam, hilly phase	0	0	5	95
Habersham stony fine sandy loam, hilly phase	0	0	3	97
Ramsey stony loam, hilly phase	0	0	0	100
Stony colluvium (Ramsey soil material)	0	0	0	100
Talladega-Habersham stony loams, hilly phases	0	0	2	98
Tusquitee stony loam, hilly phase	10	0	10	80
Group 4-E:				
Fannin clay loam, severely eroded rolling phase	5	35	60	0
Habersham clay loam, severely eroded hilly phase	5	40	45	10
Habersham stony clay loam, severely eroded hilly phase	5	35	60	0
Group 4-F.				
Wehadkee silt loam	30	10	40	20

MANAGEMENT GROUP 4-A

The soils of management group 4-A occur in both the mountain and intermountain uplands. Less than 5 percent of their total area has been cleared and cultivated. Included are Fannin loam, hilly phase, Porters loam, steep phase, and Talladega silt loam, hilly phase, each having a friable profile and moderate to good water-holding capacity but relatively low fertility and low organic-matter content.

Because of their steep slopes and susceptibility to erosion, these soils should not be cleared. If cleared through necessity, cultivated crops should not be planted more than one-third to one-fourth of each rotation period and contour tillage, strip cropping, or similar soil-conserving practices should be followed to prevent serious erosion. With careful management, moderate to good pasture and hay yields can be expected.

Cleared areas are suited to the production of small grains, mixed hay, lespedeza, and pasture. Suggested rotations (see table 9) include: (1) Cabbage or potatoes, mixed hay 2 years, and pasture 2 years; (2) continuous hay or continuous pasture; (3) small grain followed by lespedeza 3 years.

Fertilizer requirements for each crop within a rotation and suggestions for maintaining the fertility of these soils are given in table 10. The use of lime and complete fertilizer is essential if good yields are to be maintained. Small grains, truck crops, and corn will respond to relatively heavy applications of nitrogen.

No special tillage practices are used. The land is generally plowed in spring and rows are run on the contour. Hillside plows are necessary for breaking the land, and considerable hand labor is required for cultivation. Fannin loam, hilly phase, and Talladega silt loam, hilly phase, are especially susceptible to accelerated erosion and, therefore, should receive careful management.

MANAGEMENT GROUP 4-B

The eroded hilly phases of Fannin clay loam and Habersham loam comprise the two soils in management group 4-B. Both have been cleared and cultivated at some time. An estimated 14 percent of the two soils is in crops, 27 percent in idle cropland, and 48 percent in open pasture.

The soils of this group are not suited to cultivation because of steep slopes and susceptibility to erosion. If they are cultivated, the suggestions for management given for group 4-A can be followed. These soils are in an eroded condition, however, and a more careful management is necessary to prevent further damage by erosion.

MANAGEMENT GROUP 4-C

The soils of management group 4-C differ somewhat in color and origin, but all have developed on slopes of 15 to 30 percent. Each has a loam to clay loam surface texture and considerable gravel, slate, or stone on the surface and throughout the profile. All have been cleared and cultivated at some time and as a result are subjected to moderate erosion.

It is estimated that approximately 50 percent of these soils is in open pasture, 30 percent in idle cropland, and nearly 20 percent in crops. They are not suited to cultivated crops because of steep slopes and eroded condition and only moderately suited to pasture. If it is necessary to cultivate these soils, follow the suggestions given for soils of management group 4-A. Tillage is more difficult than that for group 4-A because of stoniness, and the soils must be carefully managed to prevent further loss by erosion.

MANAGEMENT GROUP 4-D

The soils of management group 4-D are not entirely similar in color, texture, and structure but there is a sufficiently close resemblance to justify placing them together. Except Stony colluvium (Ramsey soil material) with slopes of 2 to 15 percent, all occupy slopes of 15 to 30 percent. All have porous subsoils retentive of moisture, a moderately high fertility level and organic-matter content, and considerable quantity of stone or slate on the surface and throughout the profile. Less than 5 percent of the land in this group has been cleared for agricultural purposes, and most cleared areas are in pasture. Because of their strong relief or other unfavorable features, the soils are not suited to tilled crops. They can be used for pasture and, with good management, will furnish good grazing. In establishing pasture, or in reseeding an old pasture, soil tests should be obtained and used as a guide in adding adequate quantities of lime and fertilizer. If it is necessary to cultivate soils of this group, follow the suggestions given under group 4–A.

MANAGEMENT GROUP 4–E

Included in management group 4–E are Fannin clay loam, severely eroded rolling phase, Habersham clay loam, severely eroded hilly phase, and Habersham stony clay loam, severely eroded hilly phase. These severely eroded soils are unsuited to tilled crops and only poorly suited to pasture. They should be planted to trees. Though all areas have been cleared and cultivated, it is estimated that only about 5 percent is in crops; idle cropland, 37 percent; and the rest, open pasture. If these soils are kept in cultivation, careful management is necessary to reclaim them, because they are almost totally unproductive. Liberal applications of lime and fertilizer and the turning under of green-manure crops will be necessary. After the soil has been sufficiently stabilized, management as suggested for group 4–A will be satisfactory.

MANAGEMENT GROUP 4–F

The only member of management group 4–F, Wehadkee silt loam, has developed in the lower areas of the first bottoms and is subject to periodic overflow. Unless it is adequately drained, the soil is not suited to crops, because surface and internal drainage are slow. When adequately drained, it is moderately productive for corn, small grain, truck crops, and hay. Its fertility is high and its response to treatment is very good.

Most of the soil is used for hay and pasture, but water-loving plants and shrubs are allowed to grow in a few of the wetter areas. Very little fertilizer is applied, except for the corn and truck crops. No special practices are required for handling or cultivating areas of this soil, once they are well drained. Drainage is difficult, however.

Suggested rotations for suitably drained areas are: (1) Corn, small grain, and hay 3 to 5 years; (2) cabbage, corn, hay 2 years, and pasture; and (3) continuous hay or continuous pasture. Though the organic-matter content of this soil is not low, corn, cabbage, and like crops respond to additions of nitrogen. The use of lime is very beneficial, especially for the hay crop. Mineral fertilizer should be distributed throughout each rotation.

FIFTH-CLASS SOILS

Fifth-class soils are poorly suited to cultivated crops or to pasture under almost any condition because of their steepness, stoniness, shallow profile, poor moisture relations, and low fertility. On farms that possess very little other land the use of some Fifth-class soils for pasture or cultivation may be necessary, but conservation and workability are very difficult, and yields are generally low. Hand implements must be used in most places for preparing the seedbed and for later cultivation. This materially increases the cost of production.

Tree growth is somewhat slower on soils of this group than on others; nonetheless, these lands are better suited to forest than they are to crops or pasture. Approximately 0.3 percent is used for crops, 2.4 percent is in idle cropland, 2.9 percent in pasture, and 94.4 percent in forest.

Fifth-class soils have not been divided into management groups, but the agricultural capability of some are discussed since it may be necessary to use them for cropland. The estimated percentage of each soil in crops, idle cropland, open pasture, and forest in 1940 is given in table 8.

TABLE 8.—*Estimated percentage of Fifth-class soils in crops, idle cropland, open pasture, and forest, in Cherokee County, N. C., 1940*

Management group and soil	Crops	Idle cropland	Open pasture	Forest
GROUP 5:	*Percent*	*Percent*	*Percent*	*Percent*
Fannin clay loam, severely eroded hilly phase	5	40	40	15
Habersham fine sandy loam, steep phase	0	0	2	98
Habersham stony fine sandy loam:				
Steep phase	0	0	0	100
Very steep phase	0	0	0	100
Habersham stony loam, eroded steep phase	5	35	60	0
Porters stony loam:				
Steep phase	0	0	0	100
Very steep phase	0	0	0	100
Ramsey stony loam:				
Eroded steep phase	0	25	70	5
Steep phase	0	0	0	100
Very steep phase	0	0	0	100
Ramsey-Talladega stony clay loams, eroded steep phases	5	45	50	0
Ramsey-Talladega stony loams:				
Steep phases	0	0	0	100
Very steep phases	0	0	0	100
Ranger slaty silt loam:				
Steep phase	0	0	0	100
Very steep phase	0	0	0	100
Rough gullied land (Talladega soil material)	0	100	0	0
Rough stony land (Ramsey soil material)	0	0	5	95
Talladega-Habersham stony clay loams:				
Severely eroded hilly phases	5	40	55	0
Severely eroded steep phases	10	30	60	0
Talladega-Habersham stony loams:				
Eroded steep phases	10	30	60	0
Steep phases	0	0	0	100
Very steep phases	0	0	0	100
Talladega shaly clay loam:				
Eroded steep phase	5	35	50	10
Severely eroded hilly phase	5	45	50	0
Talladega silt loam:				
Steep phase	0	0	0	100
Very steep phase	0	0	0	100
Talladega stony loam:				
Hilly shallow phase	0	0	0	100
Steep shallow phase	0	0	0	100
Very steep shallow phase	0	0	0	100

MANAGEMENT GROUP 5

Fifth-class soils are used mainly for forest. They are not suited to crops requiring tillage and are poorly suited to pasture. It is therefore assumed that most of their acreage will remain in forest for a long time. Selective cutting should be practiced and the growth of more desirable types of trees encouraged. When forest products are harvested, care should be exercised to prevent erosion. Overcutting the timber or seriously damaging the undergrowth and failure to protect skidways will encourage erosion.

Nearly all areas of eroded and severely eroded phases have been cleared and used for pasture and cropland. All of the Rough gullied land (Talladega soil material) is idle, and over 40 percent of the cleared acreage of the eroded and severely eroded phases is idle cropland. A very small part is cropped. Corn, small grain, truck crops, and hay are produced on this small part and yields are low. These soils should be allowed to go back to woodland, but where it is necessary to pasture or cultivate them, special management practices should be followed. Soil tests are essential; applications of lime and fertilizer are necessary to maintain fertility at a level favorable to the production of a good grass cover. A clean-cultivated crop should not be planted more than 1 year out of 5 or 6.

The suggestions given under management group 4–A should be followed when it is necessary to cultivate these soils, but the length of the rotations should be increased so as to have a sod-forming crop for a longer period. Most of the nitrogen fertilizer should be applied to the grain or truck crop, but the mineral fertilizer should be distributed uniformly throughout each rotation period.

It is essential that severely eroded areas be planted to trees at once. To prevent further damage by erosion, a good cover should be maintained at all times. Some areas of Stony colluvium (Ramsey soil material) have been cleared and used successfully for pasture, but the other miscellaneous land classes, as Rough stony land (Ramsey soil material), should remain in forest.

CROP ADAPTATIONS, ROTATIONS, AND FERTILIZER REQUIREMENTS

Suggested crop rotations and special crop adaptations for the soils of the county are given by management groups in table 9, and in table 10 are listed fertilizer requirements by crop rotations, showing the date of planting crops and the date of fertilizer applications.[10]

TABLE 9.—*Crop adaptation and suggested rotations by management groups for soils of Cherokee County, N. C.*

Management group and soil	Special crop adaptation [1]	Suggested rotation [2]
Group 1–A: Congaree fine sandy loam Congaree silt loam Transylvania silt loam	Corn, small grain, truck crops, red clover, lespedeza, soybeans.	2. Cabbage or potatoes, small grain, red clover.[3] 3. Corn, crimson clover. 5. Corn, crimson clover, potatoes or cabbage. 6. Corn, small grain, lespedeza, lespedeza.[3]
Group 1–B: Altavista silt loam, level dark-colored phase Hiwassee clay loam, eroded undulating phase Hiwassee loam: Rolling phase Undulating phase Masada loam, undulating phase State silt loam Tate silt loam: Rolling phase Undulating phase Tusquitee loam, rolling phase	Corn, small grain, truck crops, alfalfa, lespedeza, peas, soybeans, tobacco, potatoes.	2. Cabbage or potatoes, small grain, red clover.[3] 3. Corn, crimson clover. 4. Corn, lespedeza or soybeans. 6. Corn, small grain, lespedeza, lespedeza. 8. Corn, small grain, alfalfa, alfalfa, alfalfa, alfalfa. 11. Tobacco, orchard grass, orchard grass, orchard grass.

See footnotes at end of table, p. 75.

[10] Recommendations are based on experimental work conducted by the Agronomy Department of the North Carolina Agricultural Experiment Station and are current to the time of survey. As more information becomes available, as better grades of fertilizer are produced, and as new methods of applying fertilizer are developed, recommendations will require changes. The fertilizer recommendations are made on the basis of the nitrogen, phosphoric acid, and potash requirements of a given rotation on soils of a particular management group.

TABLE 9.—*Crop adaptation and suggested rotations by management groups for soils of Cherokee County, N. C.*—Continued

Management group and soil	Special crop adaptation [1]	Suggested rotation [2]
Group 2-A: Altavista silt loam, undulating phase Chewacla gravelly loam Chewacla silt loam Chewacla-Tate silt loams	Corn, small grain, truck crops, lespedeza, red clover, soybeans, potatoes.	4. Corn, lespedeza or soybeans. 5. Corn, crimson clover, potatoes or cabbage. 6. Corn, small grain, lespedeza, lespedeza.[3] 12. Continuous hay. 13. Continuous pasture.
Group 2-B Habersham stony fine sandy loam, rolling phase Masada gravelly loam, rolling phase State cobbly loam Tusquitee stony loam: Rolling phase Undulating phase	Corn, small grain, mixed hay, pasture, lespedeza.	2. Cabbage or potatoes, small grain, red clover.[3] 6. Corn, small grain, lespedeza, lespedeza. 12. Continuous hay. 13. Continuous pasture.
Group 2-C: Hiwassee gravelly clay loam, eroded rolling phase. Masada gravelly clay loam eroded rolling phase.	Corn, small grain, mixed hay.	6. Corn, small grain, lespedeza, lespedeza.[3] 9. Beans or corn, mixed hay, mixed hay, pasture, pasture. 12. Continuous hay.
Group 2-D: Altavista silt loam, rolling phase Habersham fine sandy loam, rolling phase	Corn, small grain, truck crops, lespedeza, alfalfa, clover, soybeans, potatoes, sweetpotatoes, tobacco.	2. Cabbage or potatoes, small grain, red clover.[3] 4. Corn, lespedeza or soybeans. 6. Corn, small grain, lespedeza, lespedeza.[3] 7. Corn, tobacco, mixed hay, mixed hay.
Group 3-A: Buncombe loamy fine sand Warne silt loam Worsham loam	Corn, truck crops, small-grain hay, pasture.	3. Corn, crimson clover. 4. Corn, lespedeza or soybeans. 5. Corn, crimson clover, potatoes or cabbage. 6. Corn, small grain, lespedeza, lespedeza. 13. Continuous pasture.
Group 3-B. Fannin clay loam, eroded rolling phase Habersham loam, eroded rolling phase Talladega shaly clay loam, eroded rolling phase.	Corn, small grain, alfalfa, lespedeza, tobacco, mixed hay, pasture.	8. Corn, small grain, alfalfa, alfalfa, alfalfa, alfalfa. 10. Peas or beans, corn, small grain, lespedeza, lespedeza. 11. Tobacco, orchard grass, orchard grass, orchard grass. 12. Continuous hay.
Group 3-C. Habersham fine sandy loam, hilly phase Hiwassee loam, hilly phase Masada gravelly loam, hilly phase	Small grain, lespedeza, tobacco, mixed hay, pasture, potatoes.	1. Cabbage or potatoes, mixed hay, mixed hay, pasture, pasture. 10. Peas or beans, corn, small grain, lespedeza, lespedeza. 11. Tobacco, orchard grass, orchard grass, orchard grass. 12. Continuous hay. 13. Continuous pasture.
Group 4-A: Fannin loam, hilly phase Porters loam, steep phase Talladega silt loam, hilly phase	Small grain, mixed hay, lespedeza, pasture.	1. Cabbage or potatoes, mixed hay, mixed hay, pasture, pasture. 9. Beans or corn, mixed hay, mixed hay, pasture, pasture. 12. Continuous hay. 13. Continuous pasture. 14. Small grain, lespedeza, lespedeza, lespedeza.
Group 4-B: Fannin clay loam, eroded hilly phase Habersham loam, eroded hilly phase	do.	When it is necessary to cultivate these soils, follow suggestions given under 4-A.

See footnotes at end of table, p. 75.

TABLE 9.—*Crop adaptation and suggested rotations by management groups for soils of Cherokee County, N. C.*—Continued

Management group and soil	Special crop adaptation [1]	Suggested rotation [2]
Group 4-C:		
Fannin stony clay loam, eroded hilly phase	do	Do.
Habersham stony loam, eroded hilly phase	do	Do.
Hiwassee gravelly clay loam, eroded hilly phase.	do	Do.
Masada gravelly clay loam, eroded hilly phase	do	Do.
Talladega-Habersham stony loams, eroded hilly phases.	do	Do.
Talladega shaly clay loam, eroded hilly phase	do	Do.
Group 4-D:		
Fannin stony loam, hilly phase	do	Do.
Habersham stony fine sandy loam, hilly phase	do	Do.
Ramsey stony loam, hilly phase	do	Do.
Stony colluvium (Ramsey soil material)	do	Do.
Talladega-Habersham stony loams, hilly phases.	do	Do.
Tusquitee stony loam, hilly phase	do	Do.
Group 4-E:		
Fannin clay loam, severely eroded rolling phase.	do	Do.
Habersham clay loam, severely eroded hilly phase.	do	Do.
Habersham stony clay loam, severely eroded hilly phase.	do	Do.
Group 4-F:		
Wehadkee silt loam	Pasture, hay	5. Corn, crimson clover, potatoes or cabbage. 12. Continuous hay. 13. Continuous pasture.
Group 5:		
Fannin clay loam, severely eroded hilly phase	Forest	Not suited to cultivation.
Habersham fine sandy loam, steep phase	Forest	Not suited to cultivation.
Habersham stony fine sandy loam:		
Steep phase	Forest	Not suited to cultivation.
Very steep phase	Forest	Not suited to cultivation.
Habersham stony loam, eroded steep phase	Forest	Not suited to cultivation.
Porters stony loam:		
Steep phase	Forest	Not suited to cultivation.
Very steep phase	Forest	Not suited to cultivation.
Ramsey stony loam:		
Eroded steep phase	Forest	Not suited to cultivation.
Steep phase	Forest	Not suited to cultivation.
Very steep phase	Forest	Not suited to cultivation.
Ramsey-Talladega stony clay loams, eroded steep phases.	Forest	Not suited to cultivation.
Ramsey-Talladega stony loams:		
Steep phases	Forest	Not suited to cultivation.
Very steep phases	Forest	Not suited to cultivation.
Ranger slaty silt loam:		
Steep phase	Forest	Not suited to cultivation.
Very steep phase	Forest	Not suited to cultivation.
Rough gullied land (Talladega soil material)	Forest	Not suited to cultivation.
Rough stony land (Ramsey soil material)	Forest	Not suited to cultivation.
Talladega-Habersham stony clay loams:		
Severely eroded hilly phases	Forest	Not suited to cultivation.
Severely eroded steep phases	Forest	Not suited to cultivation.
Talladega-Habersham stony loams:		
Eroded steep phases	Forest	Not suited to cultivation.
Steep phases	Forest	Not suited to cultivation.
Very steep phases	Forest	Not suited to cultivation.
Talladega shaly clay loam:		
Eroded steep phase	Forest	Not suited to cultivation.
Severely eroded hilly phase	Forest	Not suited to cultivation.
Talladega silt loam:		
Steep phase	Forest	Not suited to cultivation.
Very steep phase	Forest	Not suited to cultivation.
Talladega stony loam:		
Hilly shallow phase	Forest	Not suited to cultivation.
Steep shallow phase	Forest	Not suited to cultivation.
Very steep shallow phase	Forest	Not suited to cultivation.

[1] Crops best suited to the soils of the management group under prevailing agricultural conditions; other crops may be suited but usually require special cultural practices.

[2] Number preceding suggested rotation refers to rotation order in table 10 in which fertilizer requirements for crop rotations are shown together with dates for planting crops and applying fertilizer. A rotation should be chosen according to the program for the farm and the farm enterprises one wishes to carry on; many rotations other than those presented here would be satisfactory.

[3] Red clover can be used instead of lespedeza, or vice versa.

TABLE 10.—*Fertilizer requirements by crop rotations showing date of planting crops and date for applying fertilizer in Cherokee County, N. C.*[1]

Rotation [2, 3] and crop	Planting date	Date of fertilizer application	Fertilizer requirements per acre [4]: Nitrogen (N)	Phosphoric acid (P_2O_5)	Potash (K_2O)	Remarks
Rotation 1 (use with management groups 3-C and 4-A):			*Lb.*	*Lb.*	*Lb.*	
Cabbage	Mar. 15 to May 11.	At planting	60	80	100	For soils having steeper slopes or an eroded condition, as Fourth-class soils, continue hay or pasture crops for 1 to 3 years longer and add additional phosphorus and potash.
		3 weeks after planting.	40	(5)	(5)	
or potatoes	Mar 20 to Apr. 20.	At planting	60	80	100	
Mixed hay	Aug. 15 to Sept. 15.		(5)	(5)	(5)	
Mixed hay						
Pasture		Mar. 15 to Apr 15.	(5)	60	60	
Pasture			(5)	(5)	(5)	
Rotation 2 (use with management groups 1-A, 1-B, 2-B, and 2-D).						
Cabbage	Mar. 15 to May 11.	At planting	60	80	100	For soils having steeper slopes or an eroded condition, as those in groups 3-B and 3-C, continue the clover for 1 or 2 years longer and add additional fertilizer.
		3 weeks after setting.	40	(5)	(5)	
or potatoes	Mar. 20 to Apr 20.	At planting	60	80	100	
Small grain	Sept 20 to Oct. 10	Mar. 15 to Apr. 11.	(5)	(5)	(5)	
Red clover	Mar. 11 to Apr. 15.	At seeding	(5)	40	40	
Rotation 3 (use with management groups 1-A, 1-B, and 3-A):						
Corn	May 1 to June 1.	At planting	20	40	60	Experience may show that higher yields can be obtained by increasing fertilizer applications, particularly nitrogen and potash.
		6 to 8 weeks later.	40	(5)	(5)	
Crimson clover	Last corn cultivation.		(5)	(5)	(5)	
Rotation 4 (use with management groups 1-B, 2-A, 2-D, and 3-A)						
Corn	May 1 to June 1.	At planting	20	40	60	Heavier applications of potash may be necessary, especially on the darker-colored soils.
		6 to 8 weeks later.	40	(5)	(5)	
Lespedeza	Apr. 15 to May 15.	At planting	(5)	20	20	
or soybeans	Apr. 1 to June 1.	do	(5)	20	20	
Rotation 5 (use with management groups 1-A, 2-A, 3-A, and 4-F).						
Corn	May 1 to June 1	At planting	20	40	80	Potato scab is often increased by applications of lime, but corn and cabbage respond well. For darker-colored soils less nitrogen and more potash is usually required than is normal for the rotation.
		6 to 8 weeks later.	60	(5)	(5)	
Crimson clover	Last corn cultivation		(5)	(5)	(5)	
Potatoes	Mar. 20 to Apr. 20.	At planting	60	80	100	
or cabbage	Mar 15 to May 1.	do	60	80	100	
		3 weeks after setting.	30	(5)	(5)	
Rotation 6 (use with management groups 1-A, 1-B, 2-A, 2-B, 2-C, 2-D, and 3-A).						
Corn	May 1 to June 1.	At planting	20	80	40	Increased quantities of mineral fertilizer may prove necessary, especially if hay yields are high or on the darker-colored soils.
		6 to 8 weeks later.	40	(5)	(5)	
Small grain	Sept. 20 to Oct. 10.	Mar. 15 to Apr. 1	30	(5)	(5)	
Lespedeza	Apr. 15 to May 15.	At planting	(5)	(5)	(5)	
Lespedeza			(5)	(5)	(5)	

See footnotes at end of table, p. 78.

TABLE 10.—*Fertilizer requirements by crop rotations showing date of planting crops and date for applying fertilizer in Cherokee County, N. C.*[1]—Continued

Rotation [2] [3] and crop	Planting date	Date of fertilizer application	Fertilizer requirements per acre [4]			Remarks
			Nitrogen (N)	Phosphoric acid (P_2O_5)	Potash (K_2O)	
Rotation 7 (use with management group 2–D).			*Lb.*	*Lb.*	*Lb.*	
Corn	May 1 to June 1.	At planting	20	40	60	If hay yields are high, increase quantities of phosphorus and potash in the rotation.
		6 to 8 weeks later.	60	(5)	(5)	
Tobacco	May 15 to 30.	May 1 to 15	30	80	80	
Mixed hay	Mar. 15 to Apr. 15.		(5)	(5)	(5)	
Mixed hay		Mar. 15 to Apr. 15.	(5)	20	20	
Rotation 8 (use with management groups 1–B and 3–B).						
Corn	May 1 to June 1.	At planting	20	40	80	Cut small grain early for hay and prepare ground for alfalfa seeding. Add additional fertilizer (P_2O_5 and K_2O) if yields are somewhat low. Agricultural borax should be applied to alfalfa at seeding (20 to 30 lb. per acre) and if needed to maintain stand.
		2 to 8 weeks later.	40	(5)	(5)	
Small grain	Sept. 20 to Oct. 10.	Mar. 15 to Apr. 1.	30	(5)	(5)	
Alfalfa	Aug. 1 to Sept. 1.	At seeding	20	120	120	
Alfalfa		Apr. 1 to 15	(5)	(5)	75	
Alfalfa		do	(5)	60	60	
Alfalfa		do	(5)	(5)	75	
Rotation 9 (use with management groups 2–C and 4–A):						
Beans	Apr. 1 to June 15	At planting	20	60	60	For soils having steeper slopes or an eroded condition, as Fourth-class soils, the hay and pasture should be continued for 1 to 2 years longer each rotation.
		At flowering time.	30	(5)	(5)	
or corn	May 1 to June 1	At planting	20	(5)	40	
		6 to 8 weeks later.	60	(5)	(5)	
Mixed hay	Aug. 15 to Sept. 15.		(5)	(5)	(5)	
Mixed hay		Mar. 15 to Apr. 15.	(5)	50	50	
Pasture			(5)	(5)	(5)	
Pasture		Mar. 15 to Apr. 15.	(5)	50	50	
Rotation 10 (use with management groups 3–B and 3–C):						
Peas	Apr. 15 to June 15.	At planting	40	50	40	This rotation could be used on soils of groups 2–C and 2–D. If hay yields are high, it may be necessary to increase fertilizer applications.
or beans	Apr. 1 to June 15.	do	20	60	60	
		At flowering time.	30	(5)	(5)	
Corn	May 1 to June 1.	At planting	20	40	40	
		6 to 8 weeks later.	40	(5)	(5)	
Small grain	Sept. 20 to Oct. 10.	Mar. 15 to Apr. 1.	30	(5)	(5)	
Lespedeza	Apr. 15 to May 15.	At seeding	(5)	50	50	
Lespedeza			(5)	(5)	(5)	
Rotation 11 (use with management groups 1–B, 3–B, and 3–C):						
Tobacco	May 15 to May 30.	May 1 to 15	40	80	80	Tobacco crop usually best in yield and quality if it follows at least 3 years of blue grass or orchard grass.
Orchard grass	Aug. 15 to Sept. 15.		(5)	(5)	(5)	
Orchard grass		Mar. 15 to Apr. 15.	(5)	50	50	
Orchard grass			(5)	(5)	(5)	

See footnotes at end of table, p. 78.

TABLE 10.—*Fertilizer requirements by crop rotations showing date of planting crops and date for applying fertilizer in Cherokee County, N. C.*[1]—Continued

Rotation [2] [3] and crop	Planting date	Date of fertilizer application	Fertilizer requirements per acre [4]: Nitrogen (N)	Phosphoric acid (P_2O_5)	Potash (K_2O)	Remarks
Rotation 12 (use with management groups 2-A, 2-B, 2-C, 3-B, 3-C, 4-A, and 4-F):			*Lb.*	*Lb.*	*Lb.*	
Continuous hay	Aug. 1 to Sept. 1.	At seeding	(5)	40	20	When seeding or reseeding, sow hay in small grain, corn, or other than cultivated crop. Clover stands can be best maintained by the proper use of lime.
		Mar. 15 to Apr. 15 alternate years, to maintain productivity.	(5)	60	40	
Rotation 13 (use with management groups 2-A, 2-B, 3-A, 3-C, 4-A, 4-F):						
Continuous pasture	do	At seeding	(5)	60	30	In a grass-clover mixture the clover stand can be best maintained by the proper use of lime.
		Mar. 15 to Apr. 15 alternate years, to maintain productivity.	(5)	60	20	
Rotation 14 (use with management group 4-A):						
Small grain	Sept. 15 to Oct. 15.	At seeding	15	30	30	Corn can be substituted for small grain when it is necessary to have a feed crop. When corn is used it is advisable to keep the land in hay for a longer period.
		Mar. 15 to Apr. 1.	30	(5)	(5)	
Lespedeza	Apr. 15 to May 15.	At seeding	(5)	60	60	
Lespedeza			(5)	(5)	(5)	
Lespedeza		Mar. 15 to Apr. 15.	(5)	40	20	

[1] Information is based on experimental results obtained and recommendations made by the Agronomy Department, North Carolina Agricultural Experiment Station and are subject to change as more information becomes available.
[2] Rotation numbers correspond with those given in table 9.
[3] Management groups are comprised of soils having similar management requirements.
[4] Each soil should be tested for lime requirements; applications should be made according to the needs of the crops to be grown and the type of rotation followed. Manure should be applied to thin or galled spots, especially on upland soils; when it is applied uniformly to a field, the most profitable returns are usually obtained from tobacco, corn, and alfalfa crops; for each ton applied, fertilizer requirements per acre can be reduced as follows: Nitrogen (N), 6 pounds; phosphoric acid (P_2O_5), 6 pounds; and potash (K_2O), 12 pounds.
[5] No fertilizer applied.

In planning applications of fertilizer, the farmer should keep in mind the yield level that he expects to maintain and the treatment of the preceding crop. When he is in doubt concerning the requirements necessary to accomplish his purpose, soil tests should be made to determine the fertilizer and, especially, the lime needs of his land. The general principles to be remembered in applying plant food in rotations are outlined in the following paragraphs; suggestions based on these principles are presented in table 10.

Lime, properly used, is essential if fertilizers are to be efficient. Lime is not a substitute for mineral fertilizer, but it is a necessary element in plant growth and a neutralizer of soil acidity as well. Legume crops are the most responsive to lime, and therefore it should he applied just prior to seeding a legume or to the crop just preceding it in the rotation. Alfalfa needs a heavy application of lime and a deep soil—one with a profile of 3 feet or more. For potatoes, however, heavy applications of lime may be harmful because some soil-borne diseases are favored by a less acid medium. Potatoes should not therefore follow legumes in rotation.

Nitrogen gives the best results when it is applied directly to corn, small grains, and truck crops. Smaller applications can be used when a good growth from a sod crop has been turned under. Legume crops are often retarded or crowded out when nitrogen is applied to a mixed sod or hay crop, and cabbage should not follow a pasture crop because of the wireworm hazard. The quality of some crops can be injured by the addition of an excess quantity of some nutrients. For example, the quality of tobacco may be lowered by the application of an excess quantity of nitrogen.

Phosphoric acid is essential in the production of seed, and it plays an important part in the establishment of young seedlings. It is extremely important that phosphate be applied to legumes, truck crops, and grains. Straight phosphate can be applied where available, but if this is done, the application should be taken into consideration in applying complete fertilizer to the rest of the rotation.

Potash is an element to which most crops respond, but its part in plant nutrition is not exactly known. It should be well distributed throughout rotation periods. Low-lying or poorly drained soils high in organic-matter content generally do not need potash. As is true for phosphate, potash can be applied alone whenever available. The quantity applied should be taken into consideration when complete fertilizer is applied to the rotation.

AGRICULTURAL PRACTICES

Under the usual agricultural practices, most cropland is broken in spring, ordinarily during March and April. Some of the more level areas, especially in the bottoms, are plowed in November and December. Steep land is generally plowed on the contour, but practically none of it has been terraced. Much of the land with poor natural drainage has been artificially drained by open or by covered box-type ditches made of poles and slabs of rock. An estimated 7,500 acres of the land needs drainage. Most of this area is partly drained, but a more adequate system would bring about much improvement.

Rotation of crops is practiced on some farms. The following rotations are used on soils of the bottom lands, stream terraces, and colluvial slopes: (1) Corn each year with a winter crop of crimson clover or small grain; (2) corn, small grain, and lespedeza 2 years; (3) corn, lespedeza 1 year, crimson clover, and then corn; and (4) corn, red clover, and grass 2 years. On the upland soils, the most common rotations are (1) corn, lespedeza 2 years; and (2) corn, then idle 3 to 4 years. Truck crops are often substituted for corn in these rotations.

There is a tendency to produce certain crops in particular areas in the county. For example, most of the hay is produced in Murphy Township, and most of the soybeans are grown in Shoal Creek Township. Larger acreages of lespedeza are in Hot House and Notla Townships, and most of the potatoes are produced in Murphy and Valley Town Townships. Although Murphy Township contains a larger acreage of cultivated land, the production of crops other than hay is fairly well distributed.

Commercial fertilizer is used throughout the agricultural districts for crops, but except on the first bottoms, there is usually no distinction between the soils as to analysis or quantity used. Corn and wheat usually receive about 200 pounds of 2–9–3, 4–8–4, or 4–10–4 fertilizer. Potatoes, sweetpotatoes, tobacco, and truck crops receive fairly heavy applications ranging from 500 to 800 pounds an acre of a 4–8–4, 4–10–4, or 5–7–5 mixture. Rye and lespedeza are rarely fertilized. Hay (timothy, orchard grass, red clover, and alsike clover) and pastures usually receive moderate to light applications of lime, and many farmers use phosphate. Commercial fertilizer is seldom used on the bottom lands, except for potatoes or vegetables, but lime is generally applied. It has been estimated by the North Carolina State Department of Agriculture that 43 percent of the fertilizer sold in Cherokee County (1944) was used in Murphy Township, with Shoal Creek, Valley Town, and Beaver Dam Townships receiving most of the remaining 57 percent.

Practically all the manure is applied in spring to eroded or gullied areas or to the corn, tobacco, or truck crops. Because nearly half of the livestock is produced in Murphy Township, a large part of the manure available for field crops is in that area. In other townships, most of the manure is used on the farm garden or on the thin or eroded areas in the fields.

The use of lime has generally increased. Most of it is applied to meadow and truck crops, especially on the bottom lands. Some is put on the more accessible areas of pasture, but little is being applied to the steeper slopes. There is a general increase in the acreage of legumes planted for hay and for soil improvement.

Practices designed to control water on the land are not generally followed, though more close-growing crops are planted on hilly and steep land than on smoother soils. Cultivation, mostly from necessity, is approximately on the contour of the stronger slopes. Little is done to control insect pests and diseases, except to spray fruit trees, and only the commercial orchard growers follow a careful spraying program. The quality of seedbed preparation and the promptness of accomplishing various farming operations vary considerably from farm to farm.

In general, there are probably more well-managed farms on the soils of the first bottoms and terraces than on those of the hilly and steep uplands, but it must be borne in mind that the cropping systems, distribution of crops, and management practices mentioned are general rather than specific. There is considerable variation from farm to farm.

WATER CONTROL ON THE LAND

Water control on the land consists of practices having to do with the regulation of runoff and with the maintenance of soil-moisture conditions favorable for the growth of a particular crop or group of crops. These practices include (1) protection from floods, (2) artificial drainage, (3) irrigation, and (4) control of runoff.

Control of runoff and providing artificial drainage are the only significant water-control problems in the present agriculture of the county. Of the two, the control of runoff is far more important and is necessary in some degree on most of the cleared uplands and terraces. Soils requiring runoff control are distributed throughout the southwestern, northwestern, and central-intermountain parts of the county and occupy about one-seventh of its total area.

Agriculture is dependent not only on the soil but also on the water supply, and though the rainfall may be ample and well-distributed throughout the year, the quantity will not be sufficient unless the water can be held in a form available to plants. More than 90 percent of the land surface in the county lies on slopes sufficiently steep to discharge rain water at an erosive rate, and unless precautions are taken, runoff may be rapid. Under such conditions, little water will enter the soil and in some areas a great quantity of soil material may be removed by erosion. Runoff control is therefore necessary not only for crops but also for the reduction of floods that may damage fertile river bottoms, dams, and industrial installations.

Keeping forest cover undisturbed is the best way to control water that falls on the land. This cannot be duplicated feasibly in cleared and cultivated areas, but effective tillage practices, crop adaptations, and engineering methods can be used to advantage.

Control of runoff requires changes in land use [11] that involve the following: (1) Improvement of soil fertility; (2) modification of cropping systems to provide a maximum protective cover throughout the year; (3) reduction in the acreage planted to row crops; (4) use of less sloping land for row crops; (5) increase in acreage of hay and forage; (6) improvement of pasture sod; and (7) improvement in woodland management.

Contour tillage, terracing, establishing of hillside or diversion channels, and similar mechanical means of control should be used where necessary with the corrective changes in vegetal cover. Contour strip cropping, the use of permanent strips of sod crops, and the sodding or vegetating of all waterways and the field outlets from terraces and channels should be included as measures of control. Whether accomplished by mechanical or vegetative means or by both, control of surface runoff goes hand in hand with control of soil losses.

The small areas in the county that present problems in drainage are restricted to the flood plains or first bottoms, and the greater portion occur along the smaller streams. Included in the group are the Chewacla and Wehadkee soils (pl. 4, *C*) and the Chewacla-Tate complex. The area covered is not extensive, but the present drainage system could be much improved and additional areas could be drained. Open or covered ditches drain most areas in the low-lying bottoms and terraces and some of the slightly depressed ones at the base of slopes. In places the deepening and straightening of stream channels would help reduce the flood hazard and improve soil drainage as well.

Irrigation might be a practicable means of water control, especially for high-value truck crops, because despite the relatively high average rainfall, there are some seasons when the precipitation is not sufficient for growing crops. Ample water is usually available for irrigation by gravity systems.

[11] Land use refers to the major uses of the soils. These are: (1) Tilled crops (small grain, annual hay, and row crops); (2) permanent sod (either pasture or hay); and (3) trees.

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SOIL PRODUCTIVITY

In considering soil productivity, the soils of the county are rated according to their ability to produce the crops most generally grown and according to their relative physical suitability for agricultural use.

Expected average yields are given in table 11 for the soils suitable for crops; for those not suited physically to crop production, yields are listed only for pasture or forest. According to probable production under two different levels of management two yield levels are given for each crop on each soil. Yields obtained under soil-management practices prevailing in the county—those practiced by the greatest number of farmers—are listed in columns B of the table. Columns C give average yields obtained by some of the more progressive farmers—yields that actually can be obtained under good soil management, as has been shown in experiments conducted by the North Carolina Agricultural Experiment Station.

The yield data in columns B are based on information obtained from individual farmers throughout the county, the county agricultural agent, and other agricultural leaders. Specific crop yields on soil types were obtained for periods of several years whenever possible. The data on carrying capacity of pastures are based on information given by farmers for the soils they use commonly for grazing. Because yields in columns B are those obtained under management practices employed by the greatest number of the farmers, it is pertinent that there are few, if any, who do not make some effort to improve their land by adding manure or small quantities of commercial fertilizer, or by occasionally rotating crops. This is evidenced by the steady increase in the use of commercial fertilizer and by the increasing acreage of legume crops. In interpreting yields given in columns B, it is to be borne in mind that prevailing management practices are not the same on all soils or in all parts of the county.

The yields in columns C are those to be expected under good management. Knowledge of what good management should be on specific soils planted to certain crops may be rather limited, but some deficiencies are known and others are considered probable. From this some of the required management practices are determined. These are discussed in the section Soil Use, Management, and Productivity which can be referred to for definitions of the levels of management required to obtain yields stated in columns C. Good soil management involves the use within practical limits of all the following methods of maintaining or increasing soil productivity: The selection of suitable crops and rotations; the correct use of commercial fertilizer, lime, and manure; the return of organic matter to the soil; proper tillage, and, where necessary, engineering measures for the control of water on the land.

The yields shown in columns C, when compared with those shown in columns B, give some idea of the response crops can be expected to make under good soil management. Even greater yields can be expected with additions of larger quantities of well-balanced fertilizer. These yields can be considered as production goals that can be reached under feasible management practices. One or several different combinations of soil management practices can be used to reach the same goals. The proper choice will depend on the farm business as a whole.

TABLE 11.—*Estimated average acre yields of principal crops on the soils of Cherokee County, N. C., under two levels of soil management, with the conservability, workability, and land class of each soil*

[Yields in columns B are those to be expected under the farm-management practices followed by the majority of farmers in the county; those in columns C are those to be expected under soil-management practices considered the best that the majority of farmers in the county could feasibly follow]

Soil	Corn		Rye		Wheat		Mixed hay		Lespedeza hay		Potatoes		Sweetpotatoes		Pasture		Conservability [1]	Workability [2]	Land class [3]
	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B	C			
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Cow-acre-days* [4]	*Cow-acre-days* [4]			
Altavista silt loam:																			
Level dark-colored phase [5]	35	55	12	20	10	20	1.3	1.8	1.1	1.6	120	180	90	120	70	110	Very good	Excellent	First.
Rolling phase	25	45	11	18	9	18	1.2	1.6	1.0	1.5	110	170	75	100	60	100	Good	Good	Second.
Undulating phase	30	50	12	20	10	20	1.3	1.8	1.1	1.6	120	180	90	120	70	140	Very good	Excellent	Do.
Buncombe loamy fine sand [5]	10	20	8	12	6	10	.4	.7	.5	.9	70	120	60	90	20	45	Fair	Very good	Third.
Chewacla gravelly loam [5]	25	40	5	10	4	12	1.5	2.0	.9	1.1	60	100	(6)	(6)	60	90	Good	Good	Second.
Chewacla silt loam [5]	30	60	6	12	5	15	1.8	2.3	1.0	1.4	100	150	(6)	(6)	60	100	Excellent	do	Do.
Chewacla-Tate silt loams [5]	30	60	4	12	5	15	1.8	2.3	1.0	1.2	60	100	(6)	(6)	60	100	do	do	Do.
Congaree fine sandy loam [5]	40	60	12	14	12	14	1.0	1.8	.9	1.6	100	180	80	110	60	100	Very good	Excellent	First.
Congaree silt loam [5]	40	80	14	18	14	18	1.5	2.3	1.2	1.6	125	175	90	120	75	125	Excellent	do	Do.
Fannin clay loam:																			
Eroded hilly phase	12	28	7	13	7	13	.3	1.0	.3	.6	(6)	(6)	(6)	(6)	30	50	Poor	Poor	Fourth.
Eroded rolling phase	15	30	7	13	6	12	.6	.8	.5	.8	80	125	(7)	(7)	50	90	Fair	Good	Third.
Severely eroded hilly phase	5	10	5	8	5	8	.2	.8	.2	.5	(6)	(6)	(6)	(6)	20	40	Very poor	do	Fifth.
Severely eroded rolling phase	10	25	6	10	5	10	.4	.6	.4	.7	(6)	(6)	(6)	(6)	30	60	Poor	Poor	Fourth.
Fannin loam, hilly phase [5]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	do	do	Do.
Fannin stony clay loam, eroded hilly phase	10	30	3	10	3	10	.4	.8	.3	.6	(6)	(6)	(6)	(6)	15	50	do	do	Do.
Fannin stony loam, hilly phase [5]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(7)	(7)	do	do	Do.
Habersham clay loam, severely eroded hilly phase	10	25	6	9	5	11	.6	.9	.4	.8	50	80	30	60	20	45	do	Fair	Do.
Habersham fine sandy loam:																			
Hilly phase [5]	(6)	(6)	(6)	(6)	(6)	(6)	.7	1.0	.5	1.0	(6)	(6)	(6)	(6)	60	90	Fair	do	Third.
Rolling phase [5]	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	Good	Good	Second.
Steep phase [5]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	Fair	do	Third.
Habersham loam:																			
Eroded hilly phase	15	30	7	10	6	12	.7	1.0	.6	1.0	70	120	60	90	40	75	Poor	Fair	Fourth.
Eroded rolling phase	20	40	9	12	7	14	.8	1.2	.7	1.1	80	125	70	100	55	95	Fair	do	Third.
Habersham stony clay loam, severely eroded hilly phase.	10	20	(6)	(6)	(6)	(6)	.3	.5	(6)	(6)	(6)	(6)	(6)	(6)	10	30	Poor	Poor	Fourth.
Habersham stony fine sandy loam:																			
Hilly phase [5]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(7)	(7)	do	do	Do.
Rolling phase [5]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(7)	(7)	Good	Good	Second.
Steep phase [5]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	Very poor	Very poor	Fifth.
Very steep phase [5]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	do	do	Do.
Habersham stony loam:																			
Eroded hilly phase	20	30	3	10	3	10	.4	.8	.3	.6	(6)	(6)	(6)	(6)	20	50	Poor	Poor	Fourth.
Eroded steep phase	12	28	6	9	5	11	.6	.9	.5	.9	60	100	50	80	35	70	do	do	Fifth.
Hiwassee clay loam, eroded undulating phase	30	55	8	20	10	28	1.0	1.5	.6	1.1	100	150	100	120	80	120	Very good	Good	First.
Hiwassee gravelly clay loam:																			
Eroded hilly phase	15	40	5	15	6	20	.7	1.0	.4	.9	70	100	40	80	60	100	Poor	Fair	Fourth.
Eroded rolling phase	20	45	6	18	8	25	.8	1.2	.5	1.0	90	130	60	100	70	110	Good	Good	Second.

See footnotes at end of table, p. 85.

TABLE 11.—*Estimated average acre yields of principal crops on the soils of Cherokee County, N. C., under two levels of soil management, with the conservability, workability, and land class of each soil*—Continued

Soil	Corn		Rye		Wheat		Mixed hay		Lespedeza hay		Potatoes		Sweetpotatoes		Pasture		Conservability [1]	Workability [2]	Land class [3]
	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B	C			
	Bu.	*Bu*	*Bu.*	*Bu*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Cow-acre-days* [4]	*Cow-acre-days* [4]			
Hiwassee loam:																			
Hilly phase [8]	20	45	6	16	7	21	0.8	1 2	0 5	1.1	90	130	60	100	65	110	Poor	Fair	Third.
Rolling phase	35	50	15	22	15	22	1 0	1 8	1 0	1 6	110	165	90	120	85	120	Very good	Excellent	First.
Undulating phase	40	60	15	24	15	24	1.1	2 0	1 1	1 6	120	175	100	125	90	135	do	do	Do.
Masada gravelly clay loam:																			
Eroded hilly phase	12	25	8	14	8	14	6	1 0	5	1.0	60	100	(6)	(6)	45	75	Fair	Fair	Fourth.
Eroded rolling phase	20	45	10	16	12	18	.8	1 2	.6	1.0	80	140	(6)	(6)	55	90	Good	Good	Second.
Masada gravelly loam:																			
Hilly phase [8]	15	35	9	15	9	15	.7	1 1	6	.9	65	110	60	90	50	80	Poor	Fair	Third.
Rolling phase	30	55	10	20	12	22	.8	1 2	7	1 1	100	150	75	100	60	95	Good	Good	Second.
Masada loam, undulating phase	40	60	12	25	15	25	.9	1.4	.8	1 2	125	175	80	105	65	105	Very good	Very good	First.
Porters loam, steep phase [8]	14	30	10	14	(6)	(6)	.6	.9	.5	.8	60	120	(6)	(6)	55	90	Poor	Fair	Fourth.
Porters stony loam:																			
Steep phase [8]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	Very poor	Very poor	Fifth.
Very steep phase [8]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	do	do	Do.
Ramsey stony loam:																			
Eroded steep phase	5	15	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	[9] 15	20	do	do	Do.
Hilly phase [8]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	do	do	Fourth.
Steep phase [9]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	do	do	Do.
Very steep phase [8]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	do	do	Do.
Ramsey-Talladega stony clay loams, eroded steep phases.	8	16	(6)	(6)	(6)	(6)	.3	.5	.3	.6	(6)	(6)	(6)	(6)	30	50	do	do	Do.
Ramsey-Talladega stony loams:																			
Steep phases [8]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	do	do	Do.
Very steep phases [8]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	do	do	Do.
Ranger slaty silt loam:																			
Steep phase [8]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	do	do	Do.
Very steep phase [8]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	do	do	Do.
Rough gullied land (Talladega soil material)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	[9] 10	25	do	do	Do.
Rough stony land (Ramsey soil material)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	[9] 30	45	do	do	Do.
State cobbly loam	40	60	8	18	12	22	1 1	1 8	.7	1.0	125	200	70	100	100	115	Very good	Good	Second.
State silt loam	50	70	10	20	15	25	1 9	2 0	.8	1 2	140	220	80	110	110	125	Excellent	Excellent	First.
Stony colluvium (Ramsey soil material)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	[9] 30	45	Very good	Very poor	Fourth.
Talladega-Habersham stony clay loams:																			
Severely eroded hilly phases	8	15	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	[9] 25	50	Very poor	do	Fifth.
Severely eroded steep phases	5	12	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	[9] 20	30	do	do	Do.
Talladega-Habersham stony loams:																			
Eroded hilly phases	10	20	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	[9] 30	55	Poor	Poor	Fourth.
Eroded steep phases	5	15	(6)	(6)	(6)	(6)	.2	.4	.2	.4	(6)	(6)	(6)	(6)	[9] 20	40	Very poor	Very poor	Fifth.
Hilly phases [8]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(7)	(7)	Fair	Fair	Fourth.
Steep phases [8]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	do	do	Do.
Very steep phases [8]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	do	do	Do.

Talladega shaly clay loam.																		
Eroded hilly phase	12	20	8	14	8	15	5	.8	.4	.7	(6)	(6)	(6)	(6)	40	80	Fair	do	Fourth.
Eroded rolling phase	20	35	9	16	9	16	.7	1.2	.6	1.0	(7)	(7)	(7)	(7)	60	90	Good	Good	Third.
Eroded steep phase [8]	5	15	(6)	(6)	(6)	(6)	.2	4	2	.4	(6)	(6)	(6)	(6)	20	40	Very poor	Poor	Fifth.
Severely eroded hilly phase	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	[9] 10	40	do	do	Do.
Talladega silt loam:																		
Hilly phase [8]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(7)	(7)	Fair	Good	Fourth.
Steep phase [8]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	Very poor	Very poor	Fifth.
Very steep phase [8]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	do	do	Do.
Talladega stony loam:																		
Hilly shallow phase [8]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	do	do	Do.
Steep shallow phase [8]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	do	do	Do.
Very steep shallow phase [8]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	do	do	Do.
Tate silt loam:																		
Rolling phase	30	50	10	20	15	25	1.2	1.8	9	1.2	90	150	80	110	80	100	Very good	Very good	First.
Undulating phase	40	60	15	25	(7)	(7)	1.3	2.0	1.0	1.4	100	175	90	110	90	110	do	do	Do.
Transylvania silt loam	45	60	10	17	10	15	1.5	2.0	1.5	1.7	150	200	(7)	(7)	80	120	do	do	Do.
Tusquitee loam, rolling phase	40	60	12	22	15	25	1.3	2.0	.8	1.2	140	220	60	85	100	120	do	do	Do.
Tusquitee stony loam.																		
Hilly phase	20	40	8	16	6	18	.8	1.2	.5	1.0	60	100	(6)	(6)	60	90	Poor	Fair	Fourth
Rolling phase	30	45	8	16	10	20	1.0	1.5	6	1.0	100	180	40	75	80	110	Good	Good	Second.
Undulating phase	40	55	10	20	14	22	1.3	2.0	.8	1.2	120	200	50	80	90	110	do	Very good	Do
Warne silt loam	20	30	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	40	80	Fair	Fair	Third.
Wehadkee silt loam [5]	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	40	80	Very good	Poor	Fourth.
Worsham loam	10	25	10	20	10	20	.6	1.0	.8	1.0	(6)	(6)	(6)	(6)	50	80	Good	Good	Third.

[1] Conservability refers to the ease with which the productivity and workability of the soil can be maintained and includes as major considerations the ease with which soil material and plant nutrients can be conserved and the ease of maintaining good tilth. The descriptive terms used are applicable to all soils listed, as they refer to the conservability of a soil when it is used for crops requiring tillage, even though the soil may be one that is not ordinarily cultivated.

[2] Workability refers to the ease of tillage, harvesting, and other field operations. The relative descriptive terms express workability of the soils from the highest degree (very good) to the lowest (very poor).

[3] Land classes group soils according to their relative suitability for use. First-class soils are those especially well suited to the crops generally grown; Fifth-class soils are those most poorly suited.

[4] Cow-acre-days, used to express the carrying capacity of pasture land, is the product of the number of animal units carried per acre multiplied by the number of days that animals can be grazed without injury to pasture, for example, a soil that supports 1 animal unit per acre for 360 days rates 360; a soil supporting 1 animal unit on 2 acres for 180 days rates 90; and a soil supporting 1 animal unit on 4 acres for 100 days rates 25.

[5] Soil damaged by high water every third to fifth year

[6] Crop is not generally grown, and the soil is considered unsuited to its production; yield experience is insufficient to estimate yields.

[7] Crop or pasture is usually not grown, but the soil is considered suitable.

[8] Uneroded areas are practically all under a cover of trees.

[9] At the time of survey (1941) there was practically no treatment of pasture.

On one farm it may be practical to manage the soil so that yields exceed the goal; on another it may not be practical to reach the goal. The best feasible management for a farm unit may result in yields above the goal for one crop, and on the same soil yields below the goal for another crop.

Under extremely favorable conditions it is possible to obtain moderately high crop yields on the poorer soils, as Talladega silt loam, steep phase, which is listed as a Fifth-class soil. Though the good yields on these poorer soils may nearly equal those obtained on the better soils, their productivity cannot be maintained if the land is farmed to a clean-cultivated crop more than 1 year out of every 4 to 6 years. Because of this and the fact that normal yields are poor, the productivity of some soils must be considered low, even though yields may sometimes indicate otherwise.

Soil tests are essential in planning a soil-management program because the requirements of any one of the various crops planted on a given soil will be modified according to the kind of treatment the soil has previously received. They are also useful to the farmer in determining the point where the additional cost of intensified management will no longer be offset by the further increased yields. Practically, this limit is determined by the investment that the farmer wishes to make in the soil as well as by the other soils, crops, and enterprises on the farm. Practical limits to production are not fully defined in this report because they are uncertain and knowledge concerning them is insufficient.

The yield data given in table 11 characterize the productivity of individual soil units but do not show the extent or area of the different soils used for the various crops and, therefore, do not indicate the relative roles that the different soils play in the agriculture of the county. Nor do these yield estimates indicate directly the relative values of land. Distance to market, relative prices of farm products, association with other soils of different capabilities, and many other factors influence the land values. The yield data can be used to compare the productivity of different soils for specified crops; to show crop responses that can be expected under different levels of management; and together with information given on acreage, can be used to estimate the potential productiveness of the soils.

AGRICULTURE

The Cherokee Indians planted small patches of maize along the valleys of the Hiwassee and the Nottely Rivers and burned over the woodlands to improve grazing, but the actual agriculture of the county dates from the arrival of the first white settlers in 1837. They settled along the Valley River between Andrews and Murphy, and began growing corn, rye, potatoes, and cabbage, and raising livestock. As the population increased and more settlers moved in, lands along other valleys were cleared for crops. The pioneers cleared and farmed small tracts until the natural fertility was practically exhausted, when they cleared other areas and let the old abandoned fields grow up to trees.

There were 964 farms in the county in 1879, averaging 31.8 acres of improved land each. The important crops were corn, wheat, oats, rye, hay, potatoes, sweetpotatoes, and sorgo. The early settlers obtained much of their meat by hunting and fishing, and most of their clothing, tools, and equipment were home-made. Potatoes and corn and other grain were fed to stock; the hogs obtained much of their own feed from the abundance of chestnuts and acorns in the woods. Honey, maple syrup, and maple sugar were the only sweetenings before sorgo (sorghum molasses) came into general use.

Agriculture has always been the principal industry of the county, but no one crop predominates. Corn, oats, wheat, rye, soybeans, potatoes, and lespedeza are the important general farm crops. Small acreages of sweetpotatoes, snap beans, cabbage, and tobacco are grown as cash crops. There are few commercial apple orchards, but nearly every farm has fruit enough for home use and a vegetable garden as well. Certain cash crops are grown within small areas or neighborhoods, the kinds depending on individual preference rather than on soil conditions.

Most farms have a few head of cattle, a small flock of chickens, one to three hogs, and one or two work animals. Sheep are raised on a few farms, but the number has decreased steadily since 1910. Cattle raising, which was early establised, has become an important part of the agriculture, and along with livestock population, the production of hay and other feed crops has gradually increased.

The majority of the farms are of the subsistence type; that is, producing mainly for home consumption. Of the 2,007 farms reported in 1945, 1,972 were classified by chief source of income as follows: Farms producing primarily for own household use, 1,820; general farms, 32; forest products, 28; livestock, 23; poultry, 17; dairy, 18; all-other-crop farms, 33; and fruit farm, 1.

Most of the land suitable for agriculture and some of doubtful suitability has been cleared and is in use. Though most of the crops grown in the area can be produced on any of the soils, a considerable part of the cleared land should not be used for tilled crops because of steepness, susceptibility to erosion, difficulty of management, or other adverse conditions.

The agriculture of the county depends largely on the few soils that have developed on the less sloping areas. These include members of the Tusquitee, Tate, Warne, Wehadkee, State, Transylvania, Altavista, Chewacla, Congaree, Fannin, Hiwassee, and Masada series. Steeper lands are used mostly for pasture and for timber production. Farmers having a small area of relatively smooth land and considerable steep land cultivate on the smoother slopes and use the remaining open areas for pasture and an occasional crop. In this system, water control and erosion problems are less serious. Many farms, however, have only hilly or steep land, and on these the erosion loss is rather high because runoff is difficult to control.

The farmers recognize the suitability of certain soils for particular crops. Congaree and Transylvania silt loams, Congaree fine sandy loam, and some of Altavista silt loam, especially the level dark-colored phase, are best for corn, soybeans, and hay, and are suited to rye. Phases of Hiwassee and Masada loams are good soils for wheat, alfalfa, lespedeza, corn, and clover. Some of the Fannin and Habersham soils are used for small grains and, under good management, produce fair yields of corn, clover, and lespedeza as well. Tusquitee loam, rolling phase, and Tate silt loam, undulating phase, are excellent soils for any of the crops grown in the county, especially potatoes, vegetables, and corn.

On the smoother areas of the larger farms, two-horse turning plows and a few tractor plows are used for breaking the land. Most plowing is done late in fall or in winter, except in the areas sown to winter cover crops, which are turned just before seeding time in spring. Hillside-turning plows are used for breaking on the more sloping, hilly, or steep lands. Row crops are generally cultivated with one- or two-horse implements, though on a few of the larger farms tractors are used, especially for corn and soybeans. After the land is prepared in spring, two-row planters for sowing corn and soybeans are used on the larger farms. The single-row planters are in general use on the smaller farms.

CROPS [13]

Corn, the most important crop, is grown on practically every farm, regardless of soil adaptability, and is fed to livestock or ground to meal for domestic use. Though not enough corn is produced to meet the local demand, a small quantity is shipped to markets nearby. The acreage fluctuates somewhat, but there has been a steady decline from a peak of 20,827 acres in 1899 to 12,963 in 1944. Average yields were 22.9 bushels an acre in 1944 and 16.2 bushels in 1939. The yields are generally low because part of the acreage is on steep and poor soils. The best and most consistent yields—as high as 75 bushels an acre—are usually obtained on bottom lands, terraces, and colluvial slopes. On the larger farms most corn is harvested by machine; on smaller ones farmers cut the tops, strip the leaves (pull the fodder), and leave the corn in the field until thoroughly dried; it is then pulled and taken to barns or piled out for husking.

The acreage of rye has fluctuated considerably but on the average has increased since 1899. A total of 639 acres was reported threshed in 1944 with an average acre yield of 7.6 bushels; of the 1,854 acres threshed in 1939 the average yield was 5.6 bushels. Some rye is sown for spring pasture or as a cover crop.

The wheat acreage—414 acres threshed in 1939 and 301 in 1944—has made a rather steady and rapid decline since 1879. Yields are rather low.

Of the total of 174 acres of oats reported in 1944, only 11 acres were threshed and the rest was cut for feeding unthreshed.

Alfalfa, lespedeza, sweetclover, red clover, timothy, wild hay, and other grasses are on most of the agricultural soils. In total acreage, hay ranks next to corn. There has been a rather steady increase in acreage of hay and forage crops. The hay is used locally to feed cattle in winter and to serve also as a cover crop. Most of the farms produce enough for the work animals and cattle, but there is seldom any to sell. The hay is usually cut with mowers, but on steep land, by hand. A large part of the crop is stacked in the field and fed on the land. The average yield of all hay crops was 1.4 tons an acre in 1944. Larger yields can be expected on the better soils, especially on those limed and fertilized.

Potatoes averaged 60.3 bushels an acre on the 924 acres reported in 1939 and 55.1 bushels on the 695 acres in 1944. Part of the potato crop is marketed at Atlanta and Chattanooga and part locally. The acreage

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[13] Average yields for crops in 1939 and 1944 are for the total acreage planted to each on unspecified soils of the county. For estimates on crop yields on specific soils, see table 11.

of sweetpotatoes has fluctuated somewhat, the average being about 240. Sorgo, tobacco, cabbage, snap beans, and other vegetables are minor crops grown on limited acreages, mostly for home use or for local markets.

Income from farm produce is supplemented considerably by the sale of forest products. Were it not for the timber industry and mineral resources the number of rural inhabitants would be much less, because farm income alone is not sufficient to support the population. Large quantities of tanbark, acid wood, pulpwood, and cross ties are brought from the forest every year and sold at Andrews, Murphy, and other points along the railroads. Some acid wood and pulpwood is shipped to Sylva and Canton. Lumbering also is an important source of revenue. There is some virgin timber left, mostly in the northern part of the county along the headwaters of the Tellico River.

The acreages of the principal crops in stated years are given in table 12.

TABLE 12.—*Acreages of principal crops in Cherokee County, N. C., in stated years*

Crop	1919	1929	1939	1944
	Acres	*Acres*	*Acres*	*Acres*
Corn	18,370	16,879	14,204	12,963
Wheat	2,382	40	414	301
Oats	131	34	30	11
Rye	2,628	1,615	1,854	639
Potatoes	532	669	924	695
Sweetpotatoes	287	275	236	(1)
Tobacco	10	12	16	22
Sorgo (sirup)	325	88	87	(1)
Hay and forage	2,903	3,630	2,575	10,025
Coarse forage (corn)	(1)	441	17	(1)
Silage (corn)	(1)	4	121	(1)
Strawberries	6	6	5	6
	Number	*Number*	*Number*	*Number*
Apples, trees [2]	49,426	41,937	32,838	36,231
Peaches, do	11,827	6,854	2,790	2,226
Pears, do	326	313	367	358
Plums and prunes, do	2,674	1,741	612	826
Cherries, do	357	1,123	1,461	2,796
Grapes, vines	1,646	1,982	6,349	5,869

[1] Not available.
[2] Trees reported for 1944 are of all ages; for other years, trees are of bearing age.

ROTATIONS AND FERTILIZERS

Rotations recommended by the county agricultural agent and other State agencies and generally used are for periods of only 2 or 3 years. The 2-year rotation, used on the more productive bottom and terrace lands, consists of corn, an intercrop of peas or soybeans, and small grain with lespedeza or crimson clover. The 3-year rotation consists of corn with some cover crop, the following year soybeans, and then wheat, rye, or lespedeza. Corn is planted year after year on some of the more productive bottom lands and colluvial soils, but most farmers following this practice turn under a crop of crimson clover each spring.

Fertilizer, lime, and other amendments are in general use on practically every farm. The fertilizers commonly used are 0–16–0,[18] 2–9–3, 4–8–4, 5–7–5, 4–10–4, and 3–8–3, and some nitrogen and potash was added as top dressing material. The rate of application for all crops, except potatoes and truck, is about 200 pounds an acre.

[18] Percentages, respectively, of nitrogen, phosphoric acid, and potash.

In 1940, 42.6 percent of the farms reported the use of $25,939 worth of fertilizer, an average of $19.48 per farm. Practically all the fertilizer is factory mixed and is purchased both cooperatively and individually. Lime is used on nearly all the agricultural land, and phosphate is often applied to grass and pasture. The uplands need more phosphate than the bottoms, and all the soils respond to applications of lime. For information on rotations and application of fertilizers for specific crops and soils, see tables 9 and 10 and the section on Soil Use, Management, and Productivity.

PERMANENT PASTURE

The total acreage of permanent pasture is not known, but census reports show 8,566 acres in plowable pasture in 1939, and 6,883 in land other than cropland, plowable pasture, and woodland. From these figures it is estimated that there were approximately 12,000 acres of permanent pasture in 1939. The 1945 census figures bear out this estimate. The tendency is toward a slight increase in permanent pasture. Practically all soils are used to some extent, but the more extensive pastures are on steeper uplands and on soils of colluvial slopes, as the Tate and the stony Tusquitee soils.

The quality of permanent pasture varies from farm to farm and field to field. Treatment with fertilizer and lime, the natural fertility of soil, and the rotations used account for much of the variation. Applications of 1,000 to 2,000 pounds an acre of limestone and 200 to 400 pounds of phosphate are often used to improve pasture.

Mixtures for reseeding pastures usually include Kentucky bluegrass, redtop, orchard grass, and Korean lespedeza. The usual rate of seeding for most pastures is about 25 pounds an acre. The grazing season extends from about May 1 to October 15, depending on elevations, condition of the sod, and character of the soil. Pasture yields are generally good, especially under the better management practices.

LIVESTOCK AND LIVESTOCK PRODUCTS

Livestock is important as a part of the agricultural pattern on many farms of the county rather than as a major source of income on the few specialized farms. Cattle lead in value; hogs and poultry follow in the order named. Where pastures are good, cattle and sheep can be expected to make economic gains. Some hogs are pastured in the woods on mast. Little grain is fed to cattle, but it is used to fatten hogs, and some is fed to chickens. The number of livestock on farms for stated years is given in table 13, and specified livestock products produced and quantity sold in table 14.

TABLE 13.—*Number of livestock in Cherokee County, N. C., in stated years*

Livestock	1920	1930	1940	1945
	Number	*Number*	*Number*	*Number*
Cattle	7,527	5,093	4,721	5,840
Hogs	6,668	2,663	2,299	2,957
Sheep	1,031	581	116	115
Goats	99	20	24	16
Poultry	56,854	51,051	61,909	65,152
Bees ... hives	2,750	1,491	516	(1)

1 Not reported.

TABLE 14.—*Specified livestock products produced and sold in Cherokee County, N. C., in stated years*

Product	1929	1939	1944
Milk gallons	971, 749	1, 098, 188	1, 479, 924
Whole milk sold do	36, 111	102, 949	235, 372
Cream sold as butterfat pounds	9, 129	5, 342	5, 078
Butter do	224, 732	255, 289	(1)
Butter sold do	16, 538	18, 976	9, 835
Wool do	729	394	332
Honey do	6, 568	4, 805	(1)
Chickens number	87, 428	84, 924	110, 807
Chickens sold do	28, 087	24, 862	(1)
Chicken eggs dozens	390, 671	278, 937	399, 169

[1] Not reported.

FARM TENURE, INVESTMENT, AND EXPENDITURE

In 1945 the owners operated 87.5 percent of the farms; tenants, 12.3 percent; and managers, 0.2 percent. Most of the harvested cropland, and the greatest investment, is on farms of less than 220 acres. Expenditures for hired labor by 551 farms reporting totaled $54,718, an average of $99.30 each. Feed cost on 1,374 farms reporting totaled $250,129, or $182.04 per farm. The farms had an estimated total of 326 automobiles, 175 trucks, and 32 tractors. In 1940 a little more than half the farms used fertilizer, the average being 0.8 ton.

LAND USE

The 2,007 farms in the county in 1945 comprised 133,665 acres, or approximately 44.7 percent of the total land area. Harvested cropland totaled 19,846 acres, or nearly 15 percent of the land in farms. There were 75 fewer farms in 1945 than in 1940, and the total acreage of farm land decreased by 3,380 acres, and of harvested cropland by 1,995 acres. Nonfarm lands are largely in forest, and no extensive areas of it are suitable for clearing as cropland.

Between 1900 and 1945 the number of farms increased by approximately 85 percent, but there was a decrease of about 47 percent in their average size. The average size of all farms in the county was 66.5 acres in 1945. The number having less than 30 acres was somewhat smaller in 1945 than in 1940, but nearly 80 percent still had less than 100 acres. In 1945 by approximate percentages, 12 percent of the farms of the county were of less than 10 acres each; those of 10 to 29 acres, 21 percent; 30 to 49, 19 percent; 50 to 69, 15 percent; 70 to 99, 12 percent; and 100 to 139 acres, 11 percent. About 10 percent of the farms had more than 140 acres.

MORPHOLOGY AND GENESIS OF SOILS

Soil is the product of the forces of weathering and soil-forming processes acting on materials deposited or accumulated by geologic agencies. The characteristics of the soil at any given point depend on (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil material has accumulated and existed since accumulation; (3) the plant and animal life in and on the soil; (4) relief, or lay of the land; and (5) the length of time the forces of soil development have acted on the parent material. The climate, and its influence on soil and plants, depends not only on temperature, rainfall, and humidity but also on the physical characteristics of the soil or soil material and on the relief, which, in turn, strongly influences drainage, aeration, runoff, erosion, and exposure to sun and wind.

Climate and vegetation change the parent material from an inert heterogeneous mass to a soil having a more or less definite genetic morphology. The action on the parent material is aided or hindered in varying degrees by the relief, which determines to some extent runoff, the movement of water through the soil, natural erosion, and the natural vegetation. The character of the parent material itself, with climate and vegetation, is a factor in soil formation and an important one in determining the internal character of the soil and the kinds of natural vegetation.

Time brings about changes in soil genesis, and age is therefore a factor in the development of the soil to a point in equilibrium with the environment. The degree of development depends not only on time but also on the rate at which the forces of climate and vegetation act. Vegetation and climate are regulated, in turn, by the relief and parent material.

The parent materials from which the soils of the county are derived can be placed in two classes according to source: (1) Residual material derived from the decomposition of rocks in place; and (2) transported material—that removed from its original position and deposited on valley uplands and near streams. The first class of parent material consists of weathered products derived from underlying rock; the second is comprised of rock fragments and other rock waste moved from the uplands by gravity and water and deposited at the base of slopes, and of alluvial material derived from the uplands and deposited near streams by running water. The parent material of the first class is related directly to the underlying rock from which it came, and the material of the second class to the soils or rock from which it was removed.

The residual materials are derived from igneous, metamorphic, and sedimentary rock. These differ somewhat in chemical and mineralogical composition, and consequently the parent materials derived from them differ. Sufficient study has not been made to permit comparison of differences in the chemical and mineralogical composition of the various kinds of rock with differences in the resultant soils, but variations in most of the soils developed in place from the residuum of rock can probably be attributed to differences in the mineral composition of the rock from which derived. In many places, however, the same kind of rock underlies different kinds of soil. In such instances, differences in the soils are due to other causes.

Some of the characteristics of soils can be correlated with the kinds of parent material, but others, especially those of regional significance to soil genesis, correlate better with climatic conditions and other factors to be discussed.

Climate in the lower altitudes—that prevailing in the intermountain uplands of the county—is characterized by long moderately warm summers, short mild winters, and moderately high rainfall. Because moderately warm weather prevails during much of the year, and because the soils are moist most of the time, chemical reactions are rapid. The moderately heavy yearly rainfall has caused the leaching of soluble bases and other materials from the soil and also the downward movement of less soluble materials and colloidal matter in the soils. The soils are frozen for only short periods and to shallow depths. The freezing intensifies the action of weathering and the translocation of insoluble materials within the soils.

In the mountain uplands the climate is characterized by winter and summer temperatures somewhat lower than those of the intermountain uplands. The lower temperature in these more elevated areas probably retards chemical reactions in the soils. The rainfall is high, however, as it is at the lower elevations. Soluble materials are leached from the soils, and the less soluble materials and colloidal matter are translocated downward. The soils are frozen for longer periods and to greater depths than those of the intermountain uplands, and leaching is consequently somewhat less active.

In general, the climatic conditions in the intermountain uplands give rise to Red and Yellow Podzolic soils; in the mountain uplands to Gray-Brown Podzolic soils. A large part of the county has a climate marginal between that characteristic of the Red and Yellow Podzolic region and that of the Gray-Brown Podzolic region. Consequently, Red and Yellow Podzolic and Gray-Brown Podzolic are closely associated, and all manner of gradations between these two divisions of soil formation can be found.

The well-drained, well-developed soils within any one climatic zone have certain outstanding characteristics in common; but they differ in other characteristics that may be due to factors other than climate. The character of the parent material seems to have an outstanding part in bringing about these differences, but drainage and age also are prominent factors. Where Red Podzolic, Yellow Podzolic, and Gray-Brown Podzolic soils are closely associated, as they are in this county, the differences resulting from the influence of parent material, drainage, and age are important in determining the great soil group in which many of the soils belong.

Higher plants, micro-organisms, earthworms, and other forms of life on and within soil contribute to its morphology. The changes biological activity brings about in a soil are variable, depending, among other things, on the life and life processes peculiar to each organism. Many factors of the environment determine the kinds of plants and animals. Climate is the most apparent but not the most important factor determining the kinds of plants and animals that grow on the well-developed, well-drained soils. Through its effect on living organisms climate greatly influences the morphology of soils. Climate and living organisms together constitute the active factors of soil genesis.

The soils on north slopes in the northern part of the county have developed mostly under a growth of Appalachian hardwoods and on south slopes under pine-hardwood cover. The growth in the Tellico River watershed in the extreme northern part of the forest is mainly hardwoods on all slopes. Forests of the pine-hardwood type predominate in the central and southern parts, but in some places pure stands of pine occur. The principal Appalachian hardwood species are Northern red oak, chestnut oak, basswood, and poplar, with some white pine, hemlock, black birch, black cherry, sugar maple, buckeye, beech, scarlet oak, white oak, red maple, cucumber magnolia, sourwood, black gum (black tupelo), ash, and dogwood. In the pine-hardwood type shortleaf pine, pitch pine, and scarlet and black oaks predominate, but a few Southern red oaks, Virginia pines, and post and white oaks are present. The stands of pure pine are predominantly shortleaf. In many areas an undergrowth of rhododendron, mountain-laurel, azalea, fern, and galax is common.

Many of the trees of the present-day forest obtain their plant nutrients at a moderately deep level and shed their leaves annually. The content of plant nutrients in the leaves varies considerably, but the quantity of bases and phosphorus returned to the soil is generally high, compared with that returned by the leaves of conifers, and therefore, essential plant nutrients are restored to the upper part of the soil from the lower. The organic material that accumulates in the soil impedes soil depletion by slowing down the action of percolating water. It is probable that its retarding action is more effective on the smoother landscapes than on the steeper and that it tends to counterbalance somewhat the effects of the rapid rock weathering and soil leaching.

Plants are the source of the organic matter that accumulates in the upper part of a soil. As this material is acted on by micro-organisms, earthworms, and other life, decomposition results. In decomposition, chemical reactions occur. The organic material releases organic acids that promote the dissolving of soluble constituents and the leaching and translocation of inorganic materials. The intensity of change resulting from this action is conditioned, however, by the climate, which affects the kinds of vegetation, the kinds of micro-organisms, and the rates of reaction and leaching. Apparently the organic matter decomposes more slowly in the higher altitudes than in the lower; as a result, some soils on the higher mountains accumulate more organic matter than comparable ones in the valleys.

Relief modifies the effects of climate and vegetation. In the county it ranges from nearly level in first bottoms to very steep in the mountainous districts. On some steep slopes the runoff of water is great and geologic erosion is consequently so rapid that it keeps an almost even pace with rock weathering and soil formation. The material for soil formation is constantly being removed from the steep slopes by water, or is being mixed by local slides. A profile of genetically related horizons is not formed on these steeper areas, because a sufficient quantity of material rarely remains long enough in place.

Only small quantities of water percolate through the soil on steep slopes, and the leaching and the translocation of insoluble materials downward in the soil are correspondingly inactive. The stands of vegetation are generally thinner than on soils having better moisture relations. In many places the soil on a concave slope shows a more nearly complete profile development than that on a convex slope. On concave slopes geologic erosion is apparently slower than on the convex and the moisture relations are more favorable to the growth of dense stands of vegetation.

In age, the soils of the county range from very young to old, but over a large part they are very young or young. Age is determined by the length of time the forces of development have acted on parent material. Soil material that remains in place for a long time under favorable conditions of relief and other factors of soil genesis will develop into a soil that is in an approximate state of equilibrium with its environment, or in other words, a mature or old soil. For young soils, the material has been in place for a short time and has been little altered by climate and vegetation and a well-defined soil profile of genetically related horizons has not formed. Most of the soils on the first bottoms along streams are of the same character as those on steep relief. Soils on steep slopes are replenished through the weathering of rock as their cover is removed by geologic erosion, and there is little opportunity for the formation of a genetic profile.

CLASSIFICATION OF SOILS

Soils are classified on the basis of characteristics that aid in remembering them individually and in relation to others. Several units of classification are used in grouping similar soils. The most commonly used units are phases, types, and series, all of which are defined in the section on Soil Survey Methods and Definitions.

Soil series can be grouped into still higher categories, as Red Podzolic, Yellow Podzolic, Gray-Brown Podzolic, and other great soil groups. In the highest category are the three soil orders—zonal, intrazonal, and azonal. These soil orders are defined as follows:

Zonal soils include those great groups having well-developed soil characteristics that reflect the influence of the active factors of soil genesis—climate and living organisms (chiefly vegetation).

Intrazonal soils have more or less well-developed soil characteristics that reflect the dominating influence of some local factor of relief or parent material over the normal effect of climate and vegetation. Any one of these may be associated with two or more zonal groups, but no one with them all.

Azonal soils are without well-developed soil characteristics either because of their youth or because conditions of parent material or relief have prevented the development of definite soil characteristics. Each of them may be found associated with any of the zonal groups (*6*).

In soil classification the normal, or zonal, soil profile serves as a basis of comparison. In Cherokee County the normal profile has a fairly light-colored and rather fine-textured subsoil, or B horizon; and a lighter colored and generally coarser textured parent material, or C horizon.

Normal, or zonal, soil profiles have developed in only a small part of the county and are largely confined to places on intermountain uplands and stream terraces. In contrast, the soils on mountain uplands are predominantly immature, or azonal. The profile is relatively shallow to bedrock and does not show such sharp differentiation between layers as does the normal profile of soils on the intermountain upland and on the stream terraces.

The characteristics, arrangements, relations, and development of the soils of the county are described in the following pages according to great soil groups. The soil series are classified by soil orders and great soil groups in table 15.

ZONAL SOILS

The zonal soils of the county are members of the Red Podzolic, Yellow Podzolic, and Gray-Brown Podzolic great soil groups (*3*), and, of these, the first to be considered are the Red Podzolic.

RED PODZOLIC SOILS

The Red Podzolic soils are a group of soils having thin organic and organic-mineral layers over a yellowish-brown leached layer that rests on an illuvial red horizon; developed under a deciduous or mixed

TABLE 15.—*Classification of the soil series of Cherokee County, N. C., by higher categories*

Great soil groups	Soil series	Parent material
ZONAL SOILS		
Red Podzolic	Fannin	Mica schist and talc schist.
	Habersham	Siliceous rocks, chiefly graywacke.
	Hiwassee	Old alluvium.
	Masada	Do.
Yellow Podzolic	Altavista	Do.
	Tate	Colluvium.
Gray-Brown Podzolic	State	Old alluvium.
	Tusquitee	Colluvium.
Lithosolic Gray-Brown Podzolic	Porters	Acid sedimentary rocks and highly metamorphosed graywacke.
INTRAZONAL SOILS		
Planosols	Warne	Old alluvium.
Semi-Planosols	Worsham	Local alluvial and colluvial accumulations.
AZONAL SOILS		
Lithosols	Ramsey	Sandstone, conglomerate, shale, slate, and quartzite.
	Ranger	Slate and schist.
	Talladega	Mica schist and talc schist.
Alluvial	Congaree	Recent alluvium.
	Transylvania	Do.
	Buncombe	Do.
	Chewacla	Do.
	Wehadkee	Do.

forest in a warm-temperate moist climate. The processes by which the soils were formed are podzolization and laterization (*6*, *3*).

Soils of the Fannin, Habersham, Hiwassee, and Masada series are included in the Red Podzolic. All are in lower lying parts of the county—those where the temperature is highest. They occur on high terraces along streams, on the valley uplands, and on lower slopes of mountains. They are well drained and range in relief from very gently sloping to steep. All are derived from parent rock material that generally is higher in content of bases or that has been in place a longer time than the parent material of the Gray-Brown Podzolic soils on similar elevations. The Red Podzolic soils have better internal drainage than the Yellow Podzolic with which associated.

The most extensive of the Red Podzolic soils in Cherokee County are those belonging to the Fannin series. The parent rock is fine-grained mica schist and talc schist and the relief is sloping to hilly, as most areas are in the intermountain uplands. They have a smooth and friable brown to light-brown loam surface soil and a yellowish-red to salmon-red stiff brittle clay loam to clay subsoil. The Hiwassee and Masada soils have formed on high terraces from old alluvium, and they usually have a somewhat better developed B horizon than the Fannin.

Following is a profile of Fannin loam, hilly phase, in a wooded area north of Culberson:

A_0. 0 to ½ inch, gray loam mixed with well-decomposed leafmold.

A_2. ½ to 10 inches, brown to light-brown smooth friable loam having a moderate-crumb structure.

B. 10 to 25 inches, yellowish-red to salmon-red stiff brittle silty clay or clay loam; smooth to slick when crushed between the fingers and of moderate medium-nuciform structure.
C. 25 to 38 inches, salmon-red smooth silty clay loam; decidedly slick or greasy to touch, and massive in structure; parent rock of soft mica schist mixed with this material.

The Habersham soils have developed over siliceous rock, chiefly graywacke, both in the intermountain and in the mountain upland regions and are to a large extent associated with Ramsey and Talladega soils. Their natural forest cover consists of mixed deciduous hardwoods with some pine intermixed. Slopes range to 60 percent or more.

Following is a profile of Habersham fine sandy loam, rolling phase, in a wooded area:

A_0. 0 to ½ inch, a very thin layer of leafmold and partly decomposed roots and twigs.
A_1. ½ to 5 inches, yellowish to yellowish-brown loose friable fine sandy loam of weak fine-crumb structure.
A_2. 5 to 15 inches, yellowish-brown loose friable fine sandy loam with a reddish tinge and moderate medium-crumb structure.
B_1. 15 to 38 inches, light-red to brownish-red heavy but friable fine sandy clay having a moderate medium-nuciform structure.
C. 38 to 47 inches, a mixture of red clay and soft partly weathered parent rock resting on partly decomposed parent rock consisting of gray sandstone or graywacke.

The Hiwassee and Masada soils are on old high terraces and have a comparatively deep profile over gravelly beds or sedentary material. The surface soil, or A horizon, is dark-brown to reddish-brown friable loam, and the subsoil, or B horizon, reddish-brown to deep-red friable clay loam or silty clay, moderately compact, and of moderate-nuciform structure. The substratum, or C horizon, is light-red to red friable soil material, splotched with yellow and gray.

The A horizon of the Hiwassee soil is generally darker than that of either the Fannin or Habersham. The Masada soil, though similar to the Hiwassee in character of parent material, has a lighter brown A horizon and a lighter red B horizon.

YELLOW PODZOLIC SOILS

Yellow Podzolic soils have thin organic and organic-mineral layers over a grayish-yellow leached layer that rests on a yellow horizon. They have developed under the coniferous or mixed forest in a warm-temperate moist climate. The soil development processes are podzolization with some laterization.

The Yellow Podzolic soils include members of the Altavista and Tate series. They are developed in association with Red Podzolic soils under similar climate and vegetation. The parent material does not differ greatly from that of the Red Podzolic soils, but most of it probably has been in place for a shorter time. Drainage is restricted somewhat, and this may cause the yellow color that characterizes soils of this group. The cause of differences between the Yellow Podzolic and the Red Podzolic soils is not fully understood.

The Altavista soils occur on old stream terraces. Their site differs from that of the Hiwassee chiefly in being smoother, and they are therefore more slowly drained. In general, the older higher terraces

810518—51——7

have the more rolling surface and better drainage; the lower younger terraces have a smoother surface and slower drainage. These soils have a gray, light-gray, or light-brown friable silt loam surface soil (A layer) about 12 inches thick, the upper 1½ to 2 inches of which contains much partly decomposed organic matter. The subsoil (B layer) is friable to compact yellow silty clay or clay having a moderate medium-nuciform structure. A brittle consistence is common at a depth of 30 inches. Mica flakes ordinarily occur in all layers, and in places there are irregular gravelly beds at a depth of 3 to 8 feet.

The Tate soils have formed from colluvium and local alluvium at the base of slopes, around the head of streams, or along small streams. The thin parent material has washed from uplands that are underlain by acidic rocks containing a greatly variable quantity of mica.

GRAY-BROWN PODZOLIC SOILS

Gray-Brown Podzolic soils are a zonal group developed under deciduous forest in a humid temperate climate and having a comparatively thin organic covering and organic-mineral layers that overlie a grayish-brown leached layer, which in turn rests on an illuvial brown layer. Podzolization is the dominant soil-forming process. Differences among these soils result mainly from differences in parent material and relief.

State and Tusquitee soils correlate fairly well as Gray-Brown Podzolic soils, but the climate under which they have developed was similar to that under which the Red and the Yellow Podzolic soils have formed. The Tusquitee soils, developed from colluvial material, usually at the foot of steep slopes, are the more extensive of the two.

The State soils have formed from old alluvium on low terraces and are similar to Tusquitee in degree of development and in physical characteristics. In many places, however, they are underlain by stratified material containing water-rounded gravel.

Following is a profile description of Tusquitee loam, rolling phase, in a forested area:

A_1. 0 to 3 inches, well-decomposed leafmold containing a large quantity of partly disintegrated twigs and roots.

A_2. 3 to 12 inches, dark-brown or grayish-brown to brown very friable loam having a moderate medium-crumb structure.

B. 12 to 30 inches, yellowish-brown to brown or light reddish-brown loam to clay loam; friable and easily pervious to water and roots; weak medium-nuciform structure.

C. 30 inches +, yellowish-brown or brownish-yellow friable clay loam splotched with brown, yellow, and gray, generally containing both rounded and angular rock fragments.

The lithosolic Gray-Brown Podzolic subgroup includes soils that have a profile resembling that of the Gray-Brown Podzolic. They are intermediate in degree of development between the Gray-Brown Podzolic and the Lithosol profile. Most of the acreage is on steep and very steep slopes, and the lack of profile development is very likely related to this relief. The Porters soils belong to this subgroup.

The Porters soils are developed on material weathered from acid sedimentary rocks and highly metamorphosed graywacke. They are at noticeably higher altitudes than the Red and Yellow Podzolic soils. The entire profile is open and permeable, the subsoil, or B layer, decidedly more so than that of the Fannin, Habersham, Hiwassee, and

Masada soils. The native forest consisted of deciduous hardwoods with some white pine intermixed.

The following is a profile description of Porters loam, steep phase, under native forest:

A_1. 0 to 3 inches, dark-gray organic loam containing a fairly large quantity of decomposed leaves, twigs, and roots; granular structure.

A_2. 3 to 15 inches, grayish-brown to brown very friable loam of moderate fine-crumb structure.

B. 15 to 40 inches, yellowish-brown to dark yellowish-brown friable and permeable clay loam of weak medium-nuciform structure.

C. 40 inches +, partly decomposed acid sedimentary rock.

INTRAZONAL SOILS

The intrazonal soils of the county include one Planosol (Warne series) and one semi-Planosol (Worsham series).

PLANOSOLS

Planosols are a group of intrazonal soils with an eluviated surface horizon underlain by a B horizon more strongly illuviated, cemented, or compacted than that of associated normal soils. They have developed on a smooth or nearly level surface under grass or forest vegetation in a humid or subhumid climate. The Warne and Worsham soils are both in the Planosols group, but the Worsham is the least well developed of the two and is therefore placed in a subgroup (semi-Planosols). Both are low in organic matter and strongly acid.

The Warne soil occurs on low stream terraces and has a nearly level to gently undulating surface. It has a strongly eluviated surface layer (A horizon) and a strongly illuviated subsoil (B horizon) underlain by gray-mottled material. The 8- to 10-inch surface layer is firm gray silt loam. The subsoil is grayish-yellow or yellowish-gray slightly to moderately plastic clay loam to silty clay. Below a depth of about 30 inches there is tough plastic light-gray or steel-gray silty clay mottled with yellow and rust brown. Finely divided mica occurs throughout the soil mass.

The Worsham soil has developed on level, nearly level, or depressed parts of local alluvial and colluvial accumulations, and on stream terraces. It is less well developed than the Warne, as evidenced by the less well-defined eluviated and illuviated layers. The parent material is generally younger than that of the Warne. The 6- to 9-inch surface layer of gray to yellowish-gray loam is underlain by yellow to brownish-yellow brittle sticky sandy clay loam. The lower layer grades to a finer texture, a heavier consistence, and a somewhat mottled condition in the lower part. Below depths of 20 to 25 inches there is a heavy steel-gray clay mottled with yellow and rust brown. A thin layer or lens of white quartzite gravel may occur at varying depths in the profile.

AZONAL SOILS

In this county the azonal soil order is represented by Lithosols and Alluvial soils. Lithosols have no clearly expressed soil morphology and consist of a freshly and imperfectly weathered mass of rock fragments, largely confined to steeply sloping land. The soils designated as Lithosols are generally steep, broken or severely eroded, and very shallow over bedrock. They have little if any development of a genetic profile. Geologic erosion almost keeps pace with the weathering of rock or material, and little true soil can develop. Where zonal soils have formed in some small areas, they are not separated from the azonal soils on the map.

LITHOSOLS

Classified as Lithosols are the Ramsey, Ranger, and Talladega soils and miscellaneous land types. The Ramsey soils, the most extensive of this group, have formed over sandstone, shale, slate, and quartzite on slopes of 15 to 60 percent or more. The sparse native vegetation was mixed hardwood forest that in many places on the mountain uplands contained some pine.

Following is a profile description of Ramsey stony loam, steep phase, in a forested area:

A_0. 0 to 1 inch, dark-brown loam containing a high percentage of organic matter.

A_1. 1 to 4 inches, brownish-gray friable stony loam of weak medium-crumb structure.

A_2. 4 to 10 inches, brownish-yellow very friable stony loam of moderate coarse-crumb structure.

B. 10 to 20 inches, yellowish-brown to brownish-yellow very friable and permeable light clay loam to fine sandy clay loam, showing little or no structural development and in many places apparently consisting of material transitional between the A_2 layer and the C horizon.

C. 20 to 32 inches, disintegrated gray rock mixed with more thoroughly weathered rock material, underlain by the bedrock of sandstone, conglomerate, or slate.

Ranger soils have formed on mountain uplands from weathered products of slate and schist. They differ from the Ramsey mainly in having a somewhat darker surface soil and a finer texture throughout.

Talladega soils have formed on both the mountain and the intermountain uplands from weathered material from fine-grained mica schist and talc schist. They differ from Ramsey and Ranger soils mainly in having a brown to light-red surface soil, a light-red to red subsoil, and a high content of mica flakes.

Stony colluvium (Ramsey soil material), Rough stony land (Ramsey soil material), and Rough gullied land (Talladega soil material) are miscellaneous land types. Because of their close relation to the parent rock or parent material, they are classified as Lithosols. The stony colluvium shows little or no profile development and consists chiefly of well-rounded or flat somewhat rounded stones mixed with some soil material. The rough stony land includes stony areas of steep and rough relief and consists primarily of Ramsey soil material. In some places large boulders and outcrops of bedrock are numerous and in others the slope is very steep and bedrock is only a few inches below the surface. Areas of rough gullied land are on knolls and steep slopes of the valleys or on mountainsides. These are so severely sheet-eroded and gullied that they are considered unsuitable for agriculture and have been abandoned. In some intergully parts, the soil has been affected very little by erosion but elsewhere it has been so badly eroded that rebuilding it would hardly be possible by any means other than reforestation or similar slow processes.

ALLUVIAL SOILS

Alluvial soils consist of transported and relatively recently deposited material (alluvium) characterized by a weak modification or none of the original material by soil-forming processes. Congaree, Transylvania, Buncombe, Chewacla, and Wehadkee soils are in this great soil group.

The Congaree soils are the most extensive. They consist of more or less assorted medium- to coarse-textured acid alluvium washed mainly from uplands underlain by igneous and metamorphic rock. The soils have slow external drainage and medium internal drainage. They are subject to overflow from adjacent streams and to the deposition or removal of material. Although practically all areas have been cleared at some time, the original trees were probably mixed hardwoods, predominantly birch, beech, poplar, and maple.

Following is a description of Congaree fine sandy loam in a cultivated area:

1. 0 to 12 inches, grayish-brown to brown very friable loam of weak medium-crumb structure.
2. 12 to 40 inches, brown to light-brown friable loam to clay loam of weak medium-crumb or massive structure.
3. 40 inches +, variable-textured material ranging from gravel and sand beds to silt and clay laminations.

In some areas the profile has a relatively dark layer at a depth of 8 to 20 inches. This layer is representative of an older profile that has been covered by recent deposition.

Transylvania silt loam is the only representative of the Transylvania series in the county. It shows a greater degree of profile development than any of the other alluvial soils. The upper layer, about 12 inches thick, is dark brownish-gray to dark-brown friable silt loam. To a depth of 24 inches or more beneath this, there is brownish-yellow rather compact friable silty clay. The next layer is yellowish fine sandy loam to loose loamy sand that passes into lighter colored sand and gravel.

The Buncombe series is distinguished from the Congaree by its extremely loose sandy nature and lack of clay material. Throughout the profile its texture ranges from loamy sand to sand. The entire profile is lighter colored than the Congaree profile, and it has no structural character.

Chewacla soils differ from the Congaree in having a mottled subsoil and in being imperfectly drained. The profile is brown to light brown to a depth of about 12 inches and dark brownish-gray or bluish-gray silty clay loam to a depth of about 22 inches. Below 22 inches it gives way to gray splotched with rust-brown silty clay. Gravel and sand beds are generally at a depth of about 40 inches.

Wehadkee silt loam, the only member of the Wehadkee series in the county, is the most poorly drained soil of the alluvial group. In catenary [14] relation, the Wehadkee soil represents the poorly drained, the Chewacla the imperfectly drained, and the Congaree the well-drained soils. Wehadkee silt loam is associated with the Chewacla soils and is locally known as bulrush land. The 10- to 15-inch surface layer is dark-gray to grayish-brown silt loam, with rust-brown mottlings near the top. To a depth of about 30 inches is gray clay mottled with yellow and rust brown. The sand, gravel, and clay that follow in profile are permanently saturated. In some areas the water

[14] A catena is a group of soils within one zonal region developed from similar parent material but differing in characteristics of the solum (surface soil and subsoil) owing to differences in relief or drainage.

table is within 12 to 15 inches of the surface. During the wetter seasons the entire soil is saturated.

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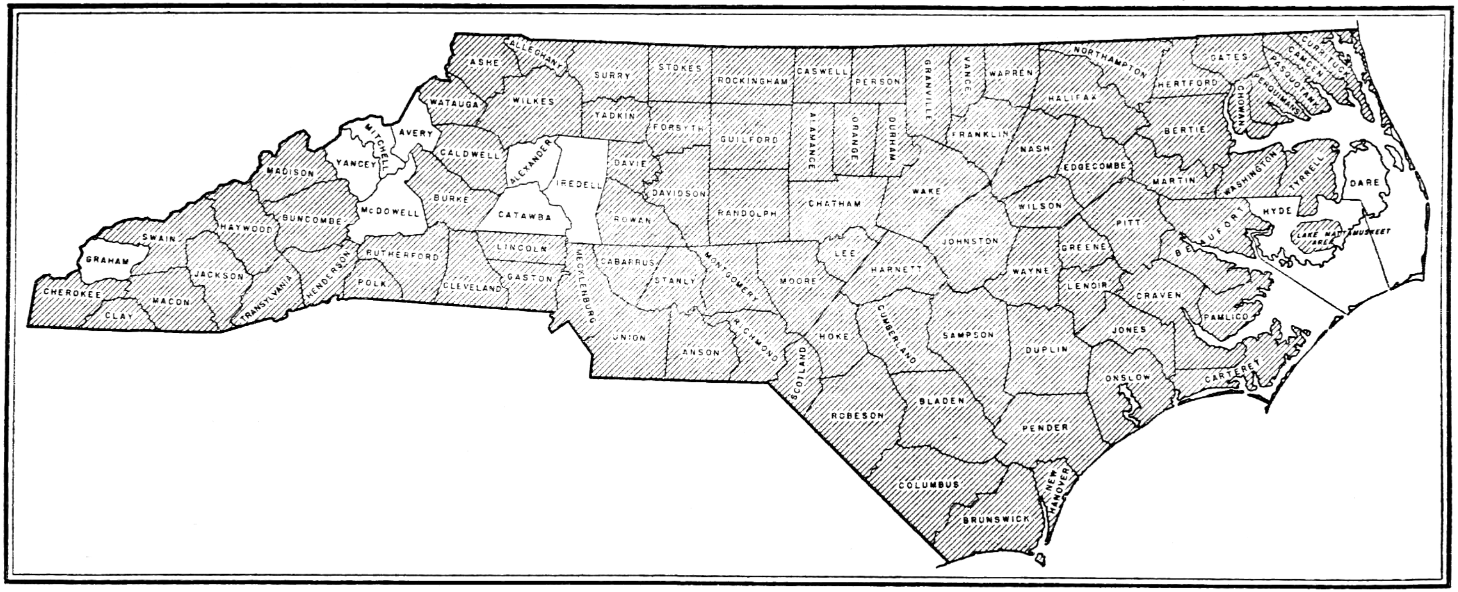

Areas surveyed in North Carolina shown by shading.

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