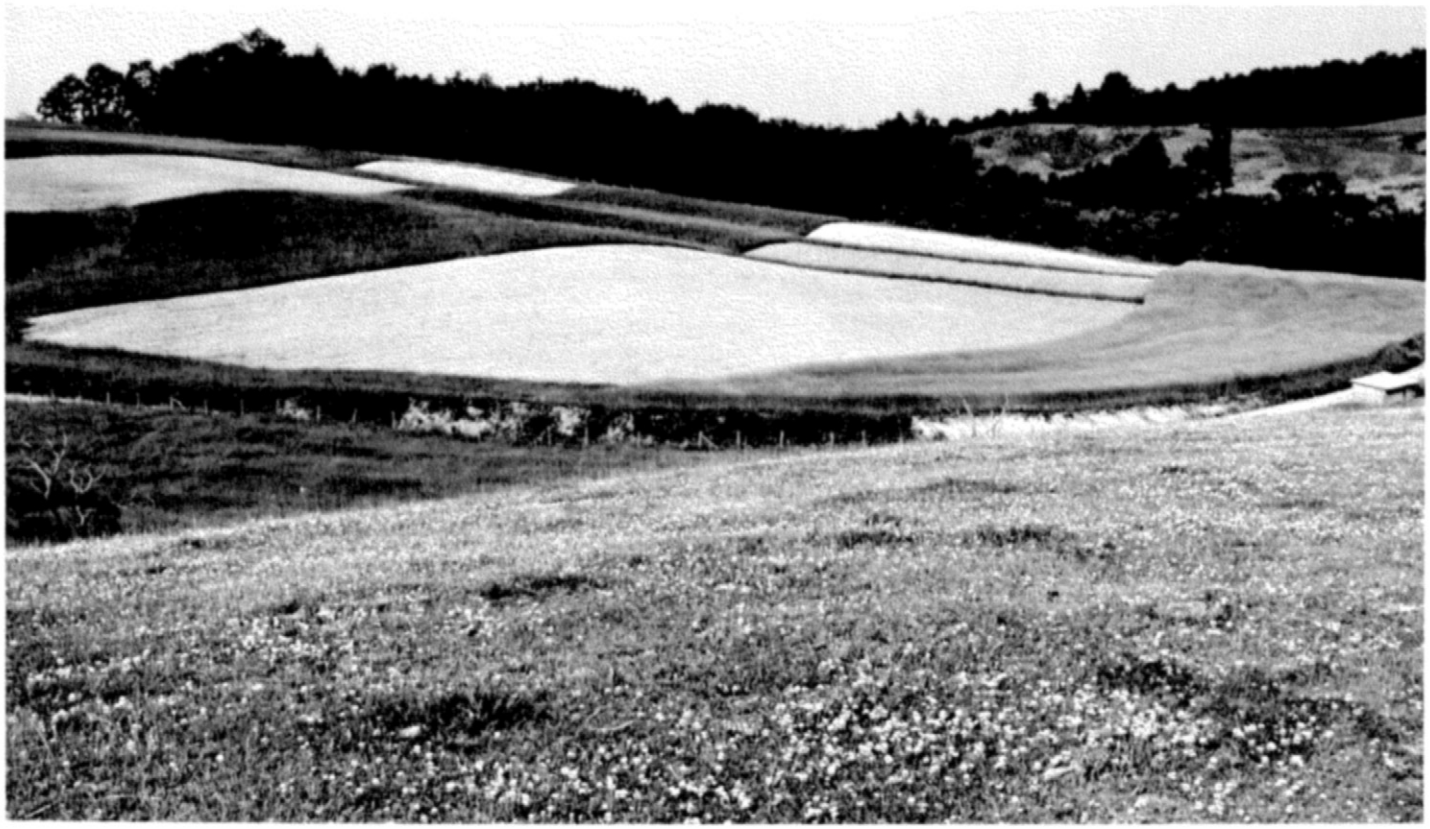
SOIL SURVEY OF

Alleghany County, North Carolina



United States Department of Agriculture
Soil Conservation Service
In cooperation with
North Carolina Agricultural Experiment Station

Issued February, 1973

Major fieldwork for this soil survey was done in the period 1962–66. Soil names and descriptions were approved in 1967. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1967. This survey was made cooperatively by the Soil Conservation Service and the North Carolina Agricultural Experiment Station. It is part of the technical assistance furnished to the Alleghany Soil and Water Conservation District.

Either enlarged or reduced copies of the soil map in this publication can be made by commercial photographers, or they can be purchased on individual order from the Cartographic Division, Soil Conservation Service, United States Department of Agriculture, Washington, D.C. 20250.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Alleghany County are shown on the detailed map at the back of this survey. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the county in alphabetic order by map symbol and gives the capability classification of each. It also shows the page where each soil is described and the page for the woodland suitability group and wildlife suitability group in which the soil has been placed.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitations or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the capability units and woodland suitability groups.

Foresters and others can refer to the section "Use of the Soils for Woodland," where the soils of the county are grouped according to their suitability for trees.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Use of the Soils for Wildlife."

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Alleghany County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the information about the county given in the section "General Nature of the County."

Cover: Stripcropping and sodded waterways. The soil is Chester loam, 10 to 25 percent slopes.

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SOIL SURVEY OF ALLEGHANY COUNTY, NORTH CAROLINA

BY EDWARD O. BREWER, ROBERT M. BROWN, AND JULIAN H. McINTYRE,
SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE,
IN COOPERATION WITH THE NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

ALLEGHANY COUNTY is a rural mountainous area in the northwestern part of North Carolina, bordering the Virginia State line (fig. 1). It is bounded on the east

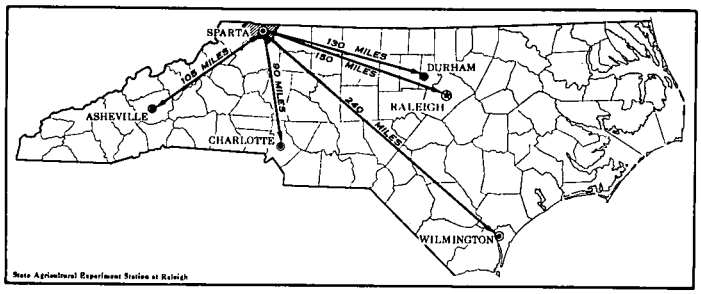

Figure 1.—**Location of Alleghany County in North Carolina.**

by Surry County, on the south by Wilkes County, on the west by Ashe County, and on the north by Grayson County, Virginia. The Blue Ridge Parkway lies along the eastern and southern boundaries. Consisting of 147,200 acres, it ranks 95th in size among the 100 counties in the State, and 94th in population. The town of Sparta is the county seat and is located in the geographical center of the county.

Most areas of the county are rolling to steep and mountainous. The steeper, more mountainous sections are in the western part and along the southern rim. These include Cheek, Fender, and Doughton Mountains to the west, and Little Grandfather, Bullhead, and Rich Mountains to the south. The more rolling areas are in the northwest and northeast sections.

Alleghany County is primarily agricultural. Livestock, mostly beef and dairy cattle, is the source of about 85 percent of the gross farm income. Hay, tobacco, corn, potatoes, and forest products make up the rest. Because of the large number of livestock, much of the land is used for pasture and hay crops. In 1962 Alleghany County was second in the State in the production of hay. Most of the farmers own the land where they live and work; however, about 53 percent of the farm operators derived more income from their off-farm occupations than from their farms. Only 3.9 percent of the farmers are tenants (*10*).[1]

[1] Italic numbers in parentheses refer to Literature Cited, p. 55.

According to the North Carolina Conservation Needs Committee (*7*), the land use in Alleghany County is approximately as follows: cropland, 18,800 acres; pasture, 45,500 acres; and woodland, 69,400 acres. About 76 percent of the county acreage is in private farms. The only significant public-owned land is the area along the Blue Ridge Parkway and the associated recreational area owned by the Federal Government.

The soils of Alleghany County are mostly strongly acid and have less than 35 percent base saturation. Most of the soils are low in natural fertility and organic-matter content. In their natural state, the major soils are low in calcium and high in exchangeable aluminum. They are very low to low in phosphorus, and medium to high in potassium. Approximately one-fourth of the soils have a surface layer that is stony enough to interfere with tillage or to limit use.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Alleghany County, where they are located, and how they can be used. The soil scientists went into the county knowing they would find many soils they had already seen, and perhaps some they had not. They observed the steepness, length, and shape of slopes, the size and speed of streams, the kinds of native plants or crops, the kinds of rock, and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The soil series (*12*) and the soil phase are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important

characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Chester and Watauga, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Chester loam, 2 to 6 percent slopes, is one of several phases within the Chester series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. One such kind of mapping unit is the soil complex, as shown on the soil map of Alleghany County.

A soil complex consists of areas of two or more soils, so intermingled or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. Codorus complex is an example.

In most areas surveyed there are places where the soil material is so rocky, so shallow, or so severely eroded that it cannot be classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names. For example, Gullied land is a land type in Alleghany County.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soil in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil. Yields under defined management are estimated for all the soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then must be organized in such a way as to be readily useful to different groups of users, among them farmers, managers of woodland, and engineers.

On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. Then they adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect an up-to-date knowledge of the soils and their behavior under current methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Alleghany County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, a wildlife area, or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field, or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The soil associations in Alleghany County are discussed in the following pages.

1. Watauga-Chandler-Fannin Association

Well-drained to somewhat excessively drained, rolling to very steep, micaceous soils on narrow ridgetops and side slopes of the uplands

This association occupies areas of irregular shape throughout most of the county. It is characterized by narrow ridges and steep side slopes. The areas are dissected by many small streams and drainageways. The flood plains are narrow and crooked. This association occupies about 39 percent of the county.

Of the major soils, Watauga soils make up about 45 percent of the association. They are well-drained soils that have a loam surface layer over a friable, strong-brown to yellowish-brown clay loam to loam subsoil. Chandler soils make up about 20 percent of the association and are primarily on the steeper slopes. They are somewhat excessively drained soils that have a silt loam surface layer over a friable, yellowish-brown to strong-brown silt loam to loam subsoil. In most places the combined thickness of the surface layer and subsoil is less than 30 inches. Fannin soils make up about 10 percent of the association. They are well-drained soils that have a silt loam or silty clay loam surface layer over a friable, yellowish-red to red silty clay loam, clay loam, or loam subsoil.

Minor soils make up about 25 percent of this association and include soils of the Ashe, Chester, Codorus, and Tate series.

About one-half of this association is in forest, and the rest chiefly is in pasture and cultivation. The farms are

generally more than 100 acres in size and are mostly owner operated. Most of the soils on the milder slopes are well suited to crops. Pasture and trees are also well suited, except where the soils are thinner and steeper. The soils are easily tilled and respond well to management practices. They are very susceptible to erosion, however, and control measures are needed.

The chief limitation in using the major soils of this association is the slope.

2. Chester-Ashe Association

Well-drained to somewhat excessively drained, gently sloping to very steep soils on fairly broad ridgetops and side slopes of the uplands

This association occupies areas mainly in the eastern half of the county. It also occupies one fairly large area in the northwestern section. It is characterized by fairly broad ridges, rolling to steep side slopes, and fairly wide flood plains (fig. 2). This association occupies about 36 percent of the county.

Of the major soils, Chester soils make up about 60 percent of the association. They are well-drained soils that have a loam or clay loam surface layer over a friable, strong-brown to yellowish-red clay loam to sandy clay loam subsoil. Ashe soils make up about 15 percent of the association. They are somewhat excessively drained soils that have a fine sandy loam surface layer over a friable, yellowish-brown to brownish-yellow fine sandy loam to loam subsoil. The combined thickness of the surface layer and the subsoil generally is less than 30 inches.

Minor soils make up about 25 percent of this association and include soils of the Clifton, Codorus, Comus, Fannin, Hayesville, Tate, and Watauga series.

Most of this association is in cultivation or pasture, and the rest is in forest. The farms average less than 100 acres in size and are mostly owner operated. A large percentage of the row crops grown in the county is grown on this association. The soils, except for the shallow soils on steep slopes, are well suited to most of the cultivated crops grown in the county. With the exception of the eroded areas that have a clay loam surface layer, these soils are easily tilled. They respond well to fairly well to good management practices. They are susceptible to erosion, and control measures are needed.

The chief limitations in using the major soils of this association are the slope and the presence of bedrock near the surface.

3. Porters Association

Well-drained, strongly sloping to very steep soils on very narrow ridges and side slopes of the rugged, high, mountain uplands

This association occupies a large, irregularly shaped area extending diagonally northwest from Ashe County in the southwest to Grayson County, Virginia, and a smaller area in the southeastern section of the county. Most of the association is above 3,000 feet in elevation. It is characterized by very narrow ridges and long(steep side slopes (fig. 3). This association occupies about 12 percent of the county.

Figure 2.—Typical area of the Chester-Ashe association.

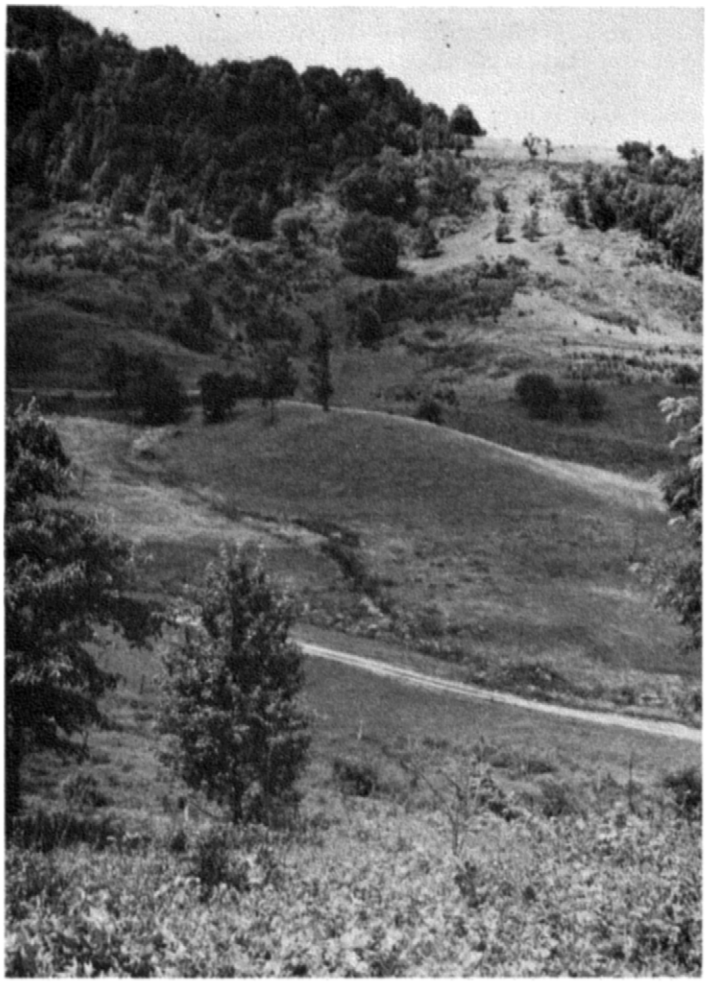

Figure 3.—Typical area of the Porters association.

The major soil is Porters, which makes up about 50 percent of the association. In most areas, stones make up from 5 to 15 percent of the surface layer. The Porters soil is well drained and has a loam surface layer over a friable, dark yellowish-brown, brown, or dark-brown loam to clay loam subsoil. In most places, the combined thickness of the surface layer and the subsoil is less than 40 inches.

Minor soils make up about 50 percent of the association and include soils of the Chester, Clifton, Codorus, Tusquitee, and Watauga series.

Most of the association is in forest, and the rest is primarily in pasture. Farms are generally more than 200 acres in size and are mostly owner operated. These soils are susceptible to erosion, and conservation practices are needed.

The chief limitations in using the major soils of this association are the slope and the presence of bedrock near the surface.

4. Clifton Association

Well-drained, rolling to steep soils on fairly broad ridgetops and side slopes of the uplands

This association occupies two narrow, elongated areas and one irregularly shaped area in the northern half of the county. It is characterized by fairly broad ridges and rolling to steep side slopes. This association occupies about 6 percent of the county.

The major soil is Clifton, which makes up about 65 percent of the association. The area is about equally divided between the stony and nonstony soils. The stony phases are primarily on the steeper slopes. These soils have a loam surface layer over a friable, reddish-brown, yellowish-red, and red clay loam to clay subsoil.

Minor soils make up about 35 percent of this association and include soils of the Chester, Codorus, Fannin, Hayesville, Tusquitee, and Watauga series.

About one-half of this association is in cultivation or pasture, and the rest is chiefly in forest. Farms average about 80 acres in size, and are mostly owner operated. Nearly all the soils, except the steeper ones, have been cultivated during some period. The soils of this association are well suited to most locally grown crops, particularly alfalfa and yellow-poplar trees.

The chief limitations in using the major soils of this association are the slope and presence of bedrock near the surface.

5. Stony Steep Land Association

Stony land on very narrow ridgetops and side slopes of the uplands

This association occupies areas mostly along the southern rim of the county, adjacent to Wilkes County, and to a lesser extent, along the eastern rim, adjacent to Surry County. It is characterized by very narrow ridges, very steep side slopes, and very narrow drainageways. This association occupies about 7 percent of the county.

Stony steep land makes up about 25 percent of this association. It consists of areas where bedrock or loose stones cover 15 to 90 percent of the surface. Rock outcrop and stony phases of the Ashe, Chandler, Chester, and Porters series make up most of the rest.

About 90 percent of this association is in woods, primarily hardwoods and mixed hardwoods and pines. Most of the rest is in pasture or homesites.

Areas of this association, although sparsely populated, have great natural beauty. Summer homes have been built in the more scenic spots, and there are camping sites, picnic areas, nature trails, and hunting areas in several places.

The chief limitations in using the major soils of this association are the slope, stoniness, and the presence of bedrock near the surface.

Descriptions of the Soils

In this section, the soil series and mapping units of Alleghany County are described in detail. To get full information on any one mapping unit, it is necessary to read both the description of that unit and the description of the soil series to which the unit belongs.

Each series contains a short narrative description of a soil profile considered representative of the series, and a much more detailed description of the same profile that can be used in making highly technical interpretations. The colors described are for a moist soil, unless otherwise

noted. Many of the terms used in describing the soil series and mapping units are defined in the Glossary, and others are defined in the section "How This Survey Was Made."

The approximate acreage and proportionate extent of the soils are shown in table 1. The "Guide to Mapping Units" lists the mapping units of the county, and shows the capability unit, woodland suitability group, and wildlife suitability group that each mapping unit is in and the page where each of these is described.

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Mapping unit	Acres	Percent
Alluvial land, wet	6, 363	4. 3
Ashe fine sandy loam, 10 to 25 percent slopes	522	. 4
Ashe fine sandy loam, 25 to 45 percent slopes	2, 370	1. 6
Ashe stony fine sandy loam, 25 to 45 percent slopes	1, 572	1. 0
Ashe stony fine sandy loam, 45 to 65 percent slopes	5, 122	3. 5
Chandler silt loam, 10 to 25 percent slopes	905	. 6
Chandler silt loam, 25 to 45 percent slopes	6, 993	4. 8
Chandler stony silt loam, 25 to 45 percent slopes	909	. 6
Chandler stony silt loam, 45 to 65 percent slopes	3, 516	2. 4
Chester loam, 2 to 6 percent slopes	1, 358	. 9
Chester loam, 6 to 10 percent slopes	9, 572	6. 5
Chester loam, 10 to 25 percent slopes	20, 870	14. 1
Chester loam, 25 to 45 percent slopes	3, 159	2. 2
Chester clay loam, 15 to 45 percent slopes, eroded	454	. 3
Chester stony loam, 10 to 15 percent slopes	378	. 3
Chester stony loam, 15 to 45 percent slopes	6, 679	4. 5
Clifton loam, 6 to 10 percent slopes	725	. 5
Clifton loam, 10 to 25 percent slopes	2, 029	1. 4
Clifton loam, 25 to 45 percent slopes	690	. 5
Clifton stony loam, 15 to 45 percent slopes	3, 065	2. 0
Codorus complex	2, 171	1. 5
Comus fine sandy loam	572	. 4
Fannin silt loam, 6 to 10 percent slopes, eroded	1, 715	1. 2
Fannin silt loam, 10 to 25 percent slopes, eroded	4, 582	3. 1
Fannin silt loam, 25 to 45 percent slopes	999	. 7
Fannin silty clay loam, 15 to 45 percent slopes, eroded	484	. 4
Gullied land	1, 739	1. 2
Hayesville loam, 6 to 10 percent slopes	594	. 4
Hayesville loam, 10 to 25 percent slopes	634	. 5
Porters loam, 10 to 25 percent slopes	1, 090	. 7
Porters loam, 25 to 45 percent slopes	1, 119	. 8
Porters stony loam, 10 to 25 percent slopes	892	. 6
Porters stony loam, 25 to 45 percent slopes	3, 568	2. 4
Porters stony loam, 45 to 65 percent slopes	2, 432	1. 7
Rock outcrop	215	. 2
Stony steep land	2, 471	1. 7
Suncook loamy sand	271	. 2
Tate loam, 2 to 6 percent slopes	708	. 5
Tate loam, 6 to 10 percent slopes	3, 125	2. 1
Tate loam, 10 to 15 percent slopes	1, 372	. 9
Tusquitee loam, 6 to 10 percent slopes	1, 738	1. 2
Tusquitee loam, 10 to 15 percent slopes	1, 946	1. 3
Tusquitee loam, 15 to 25 percent slopes	601	. 4
Tusquitee stony loam, 10 to 15 percent slopes	766	. 5
Tusquitee stony loam, 15 to 25 percent slopes	1, 372	. 9
Watauga loam, 6 to 10 percent slopes	3, 072	2. 0
Watauga loam, 10 to 25 percent slopes	17, 451	11. 8
Watauga loam, 25 to 45 percent slopes	9, 147	6. 2
Watauga stony loam, 15 to 45 percent slopes	3, 104	2. 1
Total	147, 200	100. 0

Alluvial Land, Wet

Alluvial land, wet (Ad) consists of poorly drained, nearly level soils that are variable in texture and subject to very frequent flooding. These soils are on flood plains and in upland draws and depressions. The soil material is unconsolidated alluvium, fairly recently deposited. Bedrock is at a depth of more than 5 feet, and a seasonally high water table is at or near the surface. The surface layer, 6 to 10 inches in thickness, is dominantly very dark grayish brown, but ranges from grayish brown to black. It ranges from silt loam to fine sandy loam in texture. The underlying layer ranges from dark-gray to black loamy sand to silty clay loam, 30 to 48 inches in thickness, underlain by stratified sandy material, gravel, or stones.

Alluvial land, wet is generally low in natural fertility and organic-matter content.

The acreage is about equally divided between forest and pasture or meadow. Only a small acreage is cultivated. The soils are fairly well suited to pasture and hay, particularly fescue.

Very frequent flooding of very brief duration and wetness are major hazards, and adequate drainage is needed if these soils are cultivated or used for pasture or hay (fig. 4). (Capability unit IVw–1; woodland suitability group 2; wildlife suitability group 4)

Ashe Series

The Ashe series consists of somewhat excessively drained, strongly sloping to very steep soils on narrow ridges and side slopes of the more mountainous section, at elevations mostly above 3,000 feet. These soils (fig. 5) formed under forest vegetation in residuum from gneiss.

In a typical profile the surface layer is very dark grayish-brown and yellowish-brown fine sandy loam about 7 inches thick. The subsoil, about 15 inches thick, is yellowish-brown, friable fine sandy loam. Below the subsoil, to a depth of about 32 inches, is yellowish-brown sandy loam.

The Ashe soils are low in natural fertility, organic-matter content, and available water capacity. They have moderately rapid permeability, a moderately deep effective root zone, and low shrink-swell potential. The seasonally high water table remains at a depth below 5 feet.

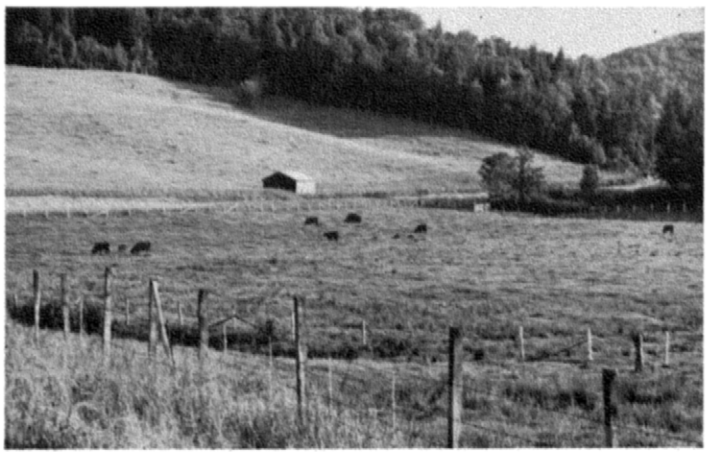

Figure 4.—**Pasture on Alluvial land, wet.**

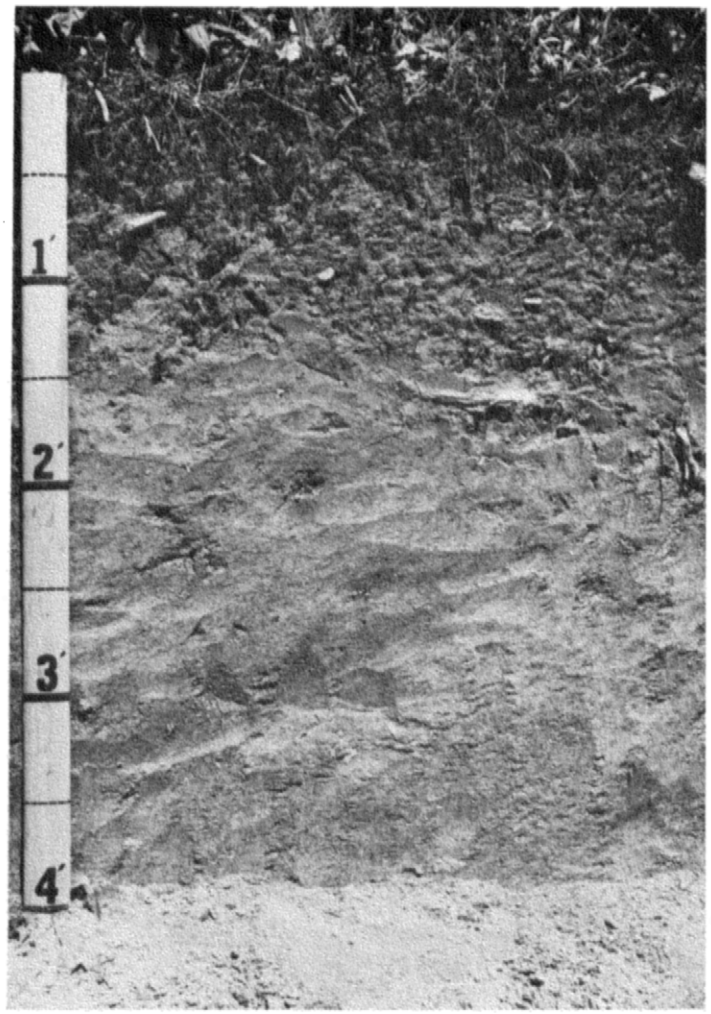

Figure 5.—**Profile of Ashe fine sandy loam.**

Most areas of the Ashe soils are in forest, and the rest are chiefly in pasture. Runoff causes a very severe erosion hazard if these soils are used for cultivation.

Representative profile of Ashe fine sandy loam, 25 to 45 percent slopes, 2 miles north of Piney Creek, 0.3 mile south of the Virginia State line, in woods, 5 feet east of County Road 1318:

O1—2 inches to 1 inch, fresh hardwood litter.
O2—1 inch to 0, very dark brown (10YR 2/2), partly decomposed hardwood litter and moss.
A1—0 to 1 inch, very dark grayish-brown (10YR 3/2) fine sandy loam; weak, fine, granular structure; very friable; many small roots; high in organic-matter content; strongly acid; abrupt, smooth boundary.
A2—1 to 7 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, fine, granular structure; very friable; many small roots and common medium roots; few fine fragments of gneiss; strongly acid; clear, smooth boundary.
B—7 to 22 inches, yellowish-brown (10YR 5/6) fine sandy loam; weak, medium, granular and subangular blocky structure; friable; few small, medium, and large roots; few mica flakes; few flat fragments of granite gneiss; strongly acid; gradual, wavy boundary.
C—22 to 32 inches, yellowish-brown (10YR 5/6) sandy loam streaked with gray and strong brown; massive; friable; few large roots; common fine and medium fragments of quartz and granite gneiss; strongly acid; gradual, wavy boundary.
R—32 to 33 inches, weathered granite gneiss.

The solum ranges from 14 to 30 inches in thickness. The depth to bedrock ranges from 2½ to 5 feet. The A horizon is 6 to 10 inches thick. The B horizon ranges from fine sandy loam to loam in texture, from 8 to 20 inches in thickness, and from weak, medium, granular to weak subangular blocky in structure. The B horizon ranges from yellowish brown to brownish yellow. The C horizon is chiefly weathered gneiss, ranging from sandy loam to loamy sand.

Ashe fine sandy loam, 10 to 25 percent slopes (AhE).—This soil is somewhat excessively drained and is on the narrow ridges and upper side slopes of the more mountainous sections.

The surface layer is very dark grayish-brown to yellowish-brown fine sandy loam 6 to 10 inches thick. The subsoil is yellowish-brown to brownish-yellow, friable fine sandy loam 8 to 20 inches thick.

Included with this soil in mapping were some areas of Chester soils. Also included were minor areas where bedrock is at depths of less than 20 inches. Gravel, stones, and rock outcrops are present in some places.

This soil is unsuited to cultivation, because of slope and low natural fertility. It is fairly well suited to pasture, hay, and trees. Most of the acreage is in pasture or low-quality hardwood trees. (Capability unit VIe-2; woodland suitability group 6; wildlife suitability group 2)

Ashe fine sandy loam, 25 to 45 percent slopes (AhF).—This soil is somewhat excessively drained and is on side slopes bordering the narrow drainageways of the more mountainous sections. It has the profile described as representative for the series. The surface layer is very dark grayish-brown to yellowish-brown fine sandy loam 6 to 8 inches thick. The subsoil is yellowish-brown to brownish-yellow, friable fine sandy loam to loam 8 to 15 inches thick.

Included with this soil in mapping were a few severely eroded areas where rills and a few gullies have formed. Gravel, stones, and rock outcrops are present in some places. Also included were minor areas of Chester soils, as well as soils where bedrock is at depths of less than 20 inches.

Most of this soil is in forest, and the rest is chiefly in pasture. Because of slopes and low natural fertility, this soil is not suited to cultivation or hay, and only fairly well suited to pasture. Intensive conservation practices are required to establish and maintain a sod. The soil is suitable for trees. (Capability unit VIIe–1; woodland suitability group 6; wildlife suitability group 2)

Ashe stony fine sandy loam, 25 to 45 percent slopes (AsF).—This soil is stony and somewhat excessively drained, and is on the very narrow ridges and side slopes of the more mountainous sections. The surface layer is very dark grayish-brown to grayish-brown fine sandy loam 6 to 8 inches thick. Stones larger than 10 inches in diameter cover up to 15 percent of the surface and occur throughout the soil. The subsoil is yellowish-brown to brownish-yellow, friable fine sandy loam to loam 8 to 15 inches thick.

Included with this soil in mapping were a few areas where bedrock is at depths of less than 20 inches. A few rock outcrops are present in some places. Also included were minor areas where the slope is 15 to 25 percent and a few areas of Chester soil.

Practically all of this land is in trees. Because of slope, low natural fertility, and stoniness, this soil is not suited to cultivation or hay. It is only poorly suited to pasture. The soil is suitable for trees. (Capability unit VIIs–1; woodland suitability group 6; wildlife suitability group 2)

Ashe stony fine sandy loam, 45 to 65 percent slopes (AsG).—This soil is stony and somewhat excessively drained. It is on side slopes bordering the narrow drainageways of the more mountainous sections.

The surface layer is very dark grayish-brown to grayish-brown fine sandy loam 6 to 8 inches thick. Stones larger than 10 inches in diameter cover up to 15 percent of the surface. The subsoil is yellowish-brown to brownish-yellow, friable fine sandy loam to loam 8 to 15 inches thick. Included with this soil in mapping were minor areas where bedrock is at depths of less than 20 inches. A few rock outcrops are present in places.

Most of this soil is in forest, primarily low-quality hardwoods. Because of slope, stoniness, and low natural fertility, this soil is not suited to cultivation or hay, and generally is not suited to pasture. It is suitable for trees. (Capability unit VIIs–1; woodland suitability group 6; wildlife suitability group 2)

Chandler Series

The Chandler series consists of somewhat excessively drained, strongly sloping to very steep, micaceous soils on the narrow ridges and side slopes of the less mountainous section, at elevations ranging from 2,800 to 3,500 feet above sea level. These soils formed under forest vegetation in residuum from mica schist or phyllite (fig. 6).

In a typical profile the surface layer is dark grayish-brown silt loam about 7 inches thick. The subsoil, about 13 inches thick, is yellowish-brown silt loam. Below the subsoil, to a depth of about 56 inches, is yellowish-brown loam.

Chandler soils are low in natural fertility, organic-matter content, and available water capacity. They have moderately rapid permeability, a moderately deep effective root zone, and a low shrink-swell potential. The seasonally high water table remains below 5 feet.

Most areas of these soils are in forest, and the rest are chiefly in pasture.

Representative profile of Chandler silt loam, 25 to 45 percent slopes, 4 miles south of Piney Creek, 0.3 mile east of Topia in north bank of County Road 1304:

A1—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; many small roots; common fine mica flakes; few quartz fragments up to 2 inches in diameter; strongly acid; clear, smooth boundary.

B—7 to 20 inches, yellowish-brown (10YR 5/4) silt loam; weak, medium, granular and subangular blocky structure; friable; few small and medium roots; many fine mica flakes; few quartz fragments up to 2 inches in diameter; strongly acid; gradual, wavy boundary.

C1—20 to 34 inches, yellowish-brown (10YR 5/6) loam; massive (has rock structure); friable; many fine mica flakes; strongly acid; gradual, wavy boundary.

C2—34 to 56 inches, brown (10YR 5/3) loam from weathered mica schist; massive (has rock structure); friable many medium and coarse mica flakes; strongly acid; gradual, wavy boundary.

R—56 to 57 inches, weathered mica schist.

The solum ranges from 14 to 30 inches in thickness. Depth to bedrock ranges from 4 to 7 feet. The A horizon is 4 to 10 inches thick and is dark grayish brown to yellowish brown. The B horizon ranges from silt loam to loam in texture, from 3 to 20 inches in thickness, and from weak, medium, granular to subangular blocky in structure. The B horizon ranges from yellowish brown to strong brown. The content of mica flakes ranges from common to many in the B horizon to many in the C horizon.

Chandler silt loam, 10 to 25 percent slopes (CaE).—This micaceous soil is somewhat excessively drained and is on the narrow ridgetops and upper side slopes. It occurs in long, narrow bands of 5 to 10 acres in size.

The surface layer is dark grayish-brown to yellowish-brown silt loam 4 to 10 inches thick. The subsoil is yellowish-brown to strong-brown, friable silt loam to loam 8 to 20 inches thick.

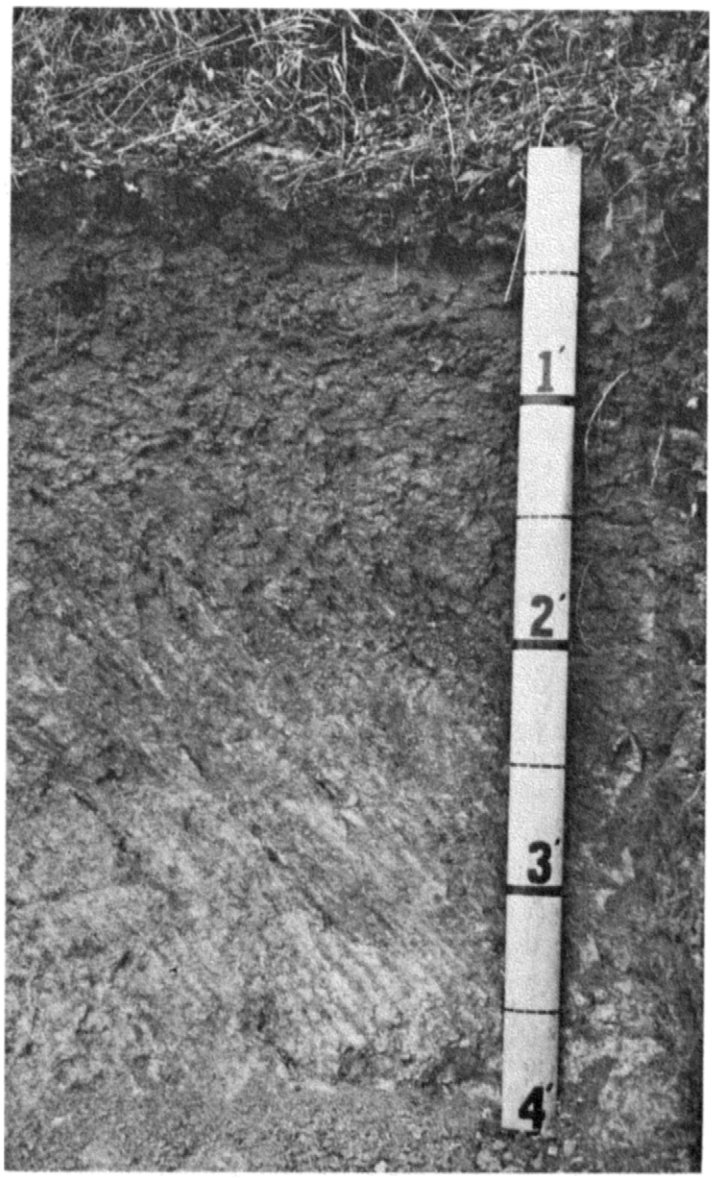

Figure 6.—Profile of Chandler silt loam. The structure of the parent rock shows in the residuum, at a depth below 2 feet.

Included with this soil in mapping were a few areas of similar but redder soils. Also included were minor areas of severely eroded soils. In a few places, schist fragments are present.

Most of this soil is in forest, and the rest is chiefly in pasture. Because of slope, low fertility, and droughtiness, this soil is unsuited to cultivation and only fairly well suited to pasture. It is suitable for trees. (Capability unit VIIe–1; woodland suitability group 6; wildlife suitability group 2)

Chandler silt loam, 25 to 45 percent slopes (CaF).—This micaceous soil is somewhat excessively drained. It is in bands 10 to 50 acres in size on side slopes bordering drainageways. This soil has the profile described as representative for the series.

The surface layer is dark grayish-brown to yellowish-brown silt loam 4 to 8 inches thick. The subsoil is yellowish-brown to strong-brown, friable silt loam to loam 8 to 16 inches thick.

Included with this soil in mapping were areas of Ashe, Porters, and Watauga soils. Also included were a few areas of soils that have been severely eroded. In a few places, schist fragments and stones are on the surface.

Most of this soil is in forest, but a small acreage is in pasture. Because of the slope, low fertility, and droughtiness, this soil is unsuited to cultivation and generally unsuited to pasture and hay. It is suitable for trees. (Capability unit VIIe–1; woodland suitability group 6; wildlife suitability group 2)

Chandler stony silt loam, 25 to 45 percent slopes (CdF).—This is a stony, micaceous, somewhat excessively drained soil on side slopes bordering drainageways. The areas are long, wide bands 10 to 60 acres in size.

The surface layer is dark grayish-brown to yellowish-brown silt loam 4 to 8 inches thick. The subsoil is yellowish-brown to strong-brown, friable silt loam to loam 8 to 16 inches thick.

Included with this soil in mapping were areas of stony Porters and stony Watauga soils. Also included in this unit were small areas that have milder slopes and minor areas that are eroded. In a few places, rock outcrops are present.

Most of this soil is in forest. Because of stoniness and slope, this soil is unsuited to cultivation and to hay and generally unsuited to pasture. It is suitable for trees. (Capability unit VIIs–1; woodland suitability group 6; wildlife suitability group 2)

Chandler stony silt loam, 45 to 65 percent slopes (CdG).—This soil is stony, and somewhat excessively drained. It is in long, narrow bands 8 to 20 acres in size on side slopes bordering drainageways.

The surface layer is dark grayish-brown to yellowish-brown silt loam 4 to 8 inches thick. The subsoil is yellowish-brown to strong-brown, friable silt loam to loam 8 to 16 inches thick.

Included with this soil in mapping were minor areas of stony Porters and stony Watauga soils. In a few places, rock outcrops are present.

Most of this soil is in forest. Because of stoniness and slope, this soil is unsuited to cultivation and hay and generally unsuited to pasture. It is suitable for trees. (Capability unit VIIs–1; woodland suitability group 6; wildlife suitability group 2)

Chester Series

The Chester series consists of well-drained, gently sloping to steep soils on the broader ridges and smoother topography of the intermountain areas. These soils formed under forest vegetation in residuum from gneiss and schist.

In a typical profile the surface layer is dark grayish-brown and dark yellowish-brown loam about 8 inches thick. The subsoil, about 30 inches thick, is strong-brown and yellowish-red, friable clay loam. Below the subsoil, to a depth of about 60 inches, is strong-brown fine sandy loam.

Chester soils are low in natural fertility and organic-matter content. They have high available water capacity and a moderately deep to deep effective root zone. Permeability and the shrink-swell potential are moderate. The seasonally high water table remains below 5 feet.

Most areas of these soils are in pasture or in cultivation. The rest is in forest. If these soils are used for cultivation, runoff causes a moderate to very severe erosion hazard.

Representative profile of Chester loam, 6 to 10 percent slopes, 5 miles north of Roaring Gap, 0.4 mile southwest of Mountain View Church in a pasture, 50 feet east of County Road 1463:

Ap—0 to 5 inches, dark grayish-brown (10YR 4/2) loam; weak, fine and medium, granular structure; very friable; many small and medium roots; few medium quartz fragments; medium acid; clear, smooth boundary.

A2—5 to 8 inches, dark yellowish-brown (10YR 4/4) loam; weak, medium, granular structure; very friable; common small and medium roots; few medium quartz fragments; medium acid; clear, smooth boundary.

B1—8 to 14 inches, strong-brown (7.5YR 5/6) clay loam; weak, fine, subangular blocky structure; friable; few small and medium roots; few coarse fragments; strongly acid; clear, smooth boundary.

B21t—14 to 26 inches, strong-brown (7.5YR 5/6) clay loam; weak and moderate, medium, subangular blocky structure; friable; few small roots; few finely divided mica flakes; patchy clay films on ped surfaces and in pores; few coarse fragments; strongly acid; gradual, smooth boundary.

B22t—26 to 31 inches, strong-brown (7.5YR 5/8) clay loam; moderate, medium, subangular blocky structure; friable; few finely divided mica flakes; thin, patchy clay films on ped surfaces and in pores; strongly acid; gradual, wavy boundary.

B3—31 to 38 inches, yellowish-red (5YR 5/8) clay loam; few faint mottles or streaks of strong brown (7.5YR 5/8); weak, medium, subangular blocky structure; friable; few weathered gneiss fragments; few, thin, clay films on vertical faces; strongly acid; gradual, wavy boundary.

C—38 to 60 inches, strong-brown (7.5YR 5/6) fine sandy loam with pockets of yellowish-red (5YR 5/8) loam; massive; friable; strongly acid.

The solum ranges from 24 to 45 inches in thickness, and depth to bedrock is more than 5 feet. The A horizon ranges from 3 to 10 inches in thickness; it is dark grayish-brown, dark-brown, or brown to dark yellowish-brown loam or clay loam. The B horizon ranges from strong-brown to yellowish-red, friable clay loam to sandy clay loam 20 to 35 inches thick. It has weak to moderate, fine and medium, subangular blocky structure. The C horizon ranges from sandy loam that contains pockets of loam to weathered gneiss or schist.

Chester loam, 2 to 6 percent slopes (CeB).—This is a well-drained soil on the broader ridges of the less mountainous areas. The areas are 2 to 20 acres in size.

The surface layer is dark grayish-brown to dark-brown loam 6 to 10 inches thick. The subsoil is strong-brown to yellowish-red, friable clay loam to sandy clay loam 20 to 35 inches thick.

Included with this soil in mapping were small areas of Chester soils that are eroded and have a thinner surface layer. Also included in mapping were some areas of Fannin, Hayesville, and Watauga soils.

Infiltration is moderate, and surface runoff is medium. The soil is easy to keep in good tilth, and except for the eroded areas, can be worked over a wide range of moisture content.

Most of this soil is in row crops or in pasture; the rest is in forest or other uses. This soil is well suited to pasture, hay, row crops, or trees.

If this soil is used for cultivation, surface runoff causes a moderate erosion hazard and conservation practices are needed to control runoff and to reduce erosion. (Capability unit IIe–2; woodland suitability group 5A; wildlife suitability group 1A)

Chester loam, 6 to 10 percent slopes (CeC).—This is a well-drained soil on the broader ridges and upper side slopes of the less mountainous areas. The areas are 5 to 20 acres in size. This soil has the profile described as representative for the series.

The surface layer is dark grayish-brown to dark-brown loam 6 to 10 inches thick. The subsoil is strong-brown to yellowish-red, friable clay loam to sandy clay loam 20 to 35 inches thick.

Included with this soil in mapping were some eroded areas where the plow layer is a mixture of the original surface layer and the subsoil. Also included were areas that have been graded, cut or filled, and used for school and industrial sites. Minor areas of Fannin, Hayesville, and Watauga soils were also included.

Infiltration is moderate, and surface runoff is medium. This soil is easy to keep in good tilth, and except for the eroded spots, can be worked over a wide range of moisture content. If worked when too wet, clodding occurs in the eroded areas.

Most of this soil is cleared and is in pasture or cultivation; the rest is in forest or other uses. This soil is well suited to most pasture, hay, row crops, or trees grown in the county.

If this soil is used for cultivation, surface runoff causes a severe erosion hazard and conservation practices are needed to reduce erosion. (Capability unit IIIe–1; woodland suitability group 5A; wildlife suitability group 1A)

Chester loam, 10 to 25 percent slopes (CeE).—This is a well-drained soil on side slopes bordering drainageways or between steeper side slopes and ridgetops. The areas are fairly long, narrow bands 8 to 15 acres in size.

This soil has a dark grayish-brown to dark-brown loam surface layer 6 to 10 inches thick. The subsoil is strong-brown to yellowish-red, friable clay loam to sandy clay loam 20 to 35 inches thick.

Included with this soil in mapping were some eroded areas where the plow layer is a mixture of the original surface layer and the subsoil, and a few areas in which the plow layer consists mostly of the subsoil. Also included were minor areas of Fannin, Hayesville, and Watauga soils.

Infiltration is moderate, and surface runoff is rapid. This soil is easy to keep in good tilth, and except for the eroded areas, can be worked over a wide range of moisture content. If worked when too wet, clodding occurs in the eroded areas.

Most of this soil is cleared and is in pasture or is cultivated; the rest is chiefly in forest. This soil is well suited to all pasture and hay crops or trees grown in the county. Because of the slope, it is only fairly well suited to cultivation.

If this soil is used for cultivation, surface runoff causes a very severe erosion hazard and intensive conservation practices are needed to reduce erosion. (Capability unit IVe–1; woodland suitability group 5A; wildlife suitability group 1A)

Chester loam, 25 to 45 percent slopes (CeF).—This is a well-drained soil on the lower side slopes bordering drainageways.

This soil has a dark grayish-brown to dark-brown surface layer 5 to 8 inches thick. The subsoil is strong-brown to yellowish-red, friable clay loam to sandy clay loam 20 to 30 inches thick.

Included with this soil in mapping were minor areas of Ashe and Watauga soils. In a few places rock outcrops, gravel, and stones are present in quantities sufficient to interfere with tillage.

Most of this soil is in pasture or trees. Because of slope, this soil is not suited to cultivation. It is fairly well suited to pasture, and is well suited to trees. If this soil is used for pasture, good conservation practices should be used to establish and maintain a sod. (Capability unit VIe–1; woodland suitability group 5A; wildlife suitability group 1A)

Chester clay loam, 15 to 45 percent slopes, eroded (ChF2).—This soil is well drained, eroded, and on side slopes in narrow bands 5 to 8 acres in size.

The surface layer is brown to dark yellowish-brown clay loam 3 to 5 inches thick. It consists of material formerly in the upper part of the subsoil that has been mixed with the remaining original surface layer by plowing. The subsoil is strong-brown to yellowish-red, friable clay loam to sandy clay loam 20 to 30 inches thick.

Included with this soil in mapping were a few areas of a soil that has a clay loam surface layer. In places rills and a few gullies have formed.

Infiltration is slow, and surface runoff is rapid. This soil is difficult to keep in good tilth. Much of the acreage is in trees, chiefly white pine. Because of erosion and slope, this soil is not suited to cultivation and only fairly well suited to pasture. If this soil is used for pasture, good conservation practices should be followed to establish and maintain the sod. (Capability unit VIIe–1; woodland suitability group 5B; wildlife suitability group 1B)

Chester stony loam, 10 to 15 percent slopes (ClD).—This is a stony, well-drained soil on fairly narrow ridges and upper side slopes. The areas are 8 to 12 acres in size.

The surface layer is dark grayish-brown to dark-brown loam 5 to 8 inches thick. Stones larger than 10 inches in diameter make up 5 to 15 percent of the surface layer. The subsoil is strong-brown to yellowish-red, friable clay loam to sandy clay loam 20 to 30 inches thick.

Included with this soil in mapping were a few areas of stony Ashe soils and a stony Watauga soil. In some places rock outcrops are present.

The infiltration rate is moderate; surface runoff is rapid.

Most of this soil is in trees or in pasture, and the rest is in cultivation. If in cultivation or hay, this soil has severe limitations because of stoniness and slope. It is fairly well suited to locally grown crops and to pasture. (Capability unit IVe–2; woodland suitability group 5A; wildlife suitability group 1A)

Chester stony loam, 15 to 45 percent slopes (ChF).—This soil is stony and well drained. It is on side slopes bordering drainageways.

The surface layer is dark grayish-brown to dark-brown loam 5 to 8 inches thick. Stones larger than 10 inches in diameter make up 5 to 15 percent of the surface layer. The subsoil is strong-brown to yellowish-red, friable clay loam to sandy clay loam 20 to 25 inches thick.

Included with this soil in mapping were a few areas of steeper Chester soils. Also included were minor areas of stony Ashe soils and stony Hayesville soils. In places a few rock outcrops are present.

Most of this soil is in trees. Because of stoniness and slope, this soil is not suited to cultivation and is only poorly suited to pasture. It is suitable for trees. (Capability unit VIIe–1; woodland suitability group 5A; wildlife suitability group 1A)

Clifton Series

The Clifton series consists of well-drained, sloping to steep soils on fairly broad ridges and side slopes of the intermountain areas at elevations around 3,000 feet. These soils formed in residuum from hornblende gneiss.

In a typical profile the surface layer is dark reddish-brown loam about 7 inches thick. The subsoil, about 31 inches thick, is reddish-brown to yellowish-red, friable clay loam. Below the subsoil, to a depth of 56 inches, is yellowish-red loam.

Clifton soils are medium in natural fertility and organic-matter content. They have high available water capacity and a moderately deep to deep effective root zone. Permeability and the shrink-swell potential are moderate. The seasonally high water table remains below 5 feet.

Most of the nonstony soils are in pasture or cultivation. These areas are well suited to most locally grown crops. The stony soils are mostly in forest. If these soils are in cultivation, runoff causes a moderate to very severe erosion hazard.

Representative profile of Clifton loam, 10 to 25 percent slopes, 2 miles east of Edwards Crossroads, ½ mile north of State Route 18, in a cultivated field 50 feet east of County Road 1414:

Ap—0 to 7 inches, dark reddish-brown (5YR 3/4) loam; moderate, fine and medium, granular structure; very friable; many small roots; few quartz and gneiss fragments up to 2 inches in diameter; slightly acid; abrupt, smooth boundary.

B21t—7 to 12 inches, reddish-brown (5YR 4/4) clay loam; weak, fine, subangular blocky structure; friable; few small roots; few thin clay films on ped faces; few fine pores and worm channels; few quartz fragments; medium acid; clear, smooth boundary.

B22t—12 to 28 inches, yellowish-red (5YR 4/6) clay loam; moderate, medium, subangular blocky structure; friable; patchy clay films on ped surfaces; few dark mineral streaks; medium acid; clear, smooth boundary.

B3t—28 to 38 inches, yellowish-red (5YR 5/6) clay loam; weak, medium, subangular blocky structure; friable; patchy clay films on vertical faces; common dark mineral streaks; few weathered hornblende gneiss fragments; medium acid; gradual, wavy boundary.

C—38 to 56 inches, yellowish-red (5YR 5/6) loam; massive; friable; contains a few weathered fragments of hornblende gneiss; medium acid; gradual, wavy boundary,

R—56 to 57 inches, partially weathered hornblende gneiss.

The solum ranges from 20 to 40 inches in thickness, and depth to bedrock ranges from 3 to 5 feet. The A horizon is 4 to 10 inches thick and is dark reddish brown to dark brown. The B horizon is clay loam to clay, 15 to 35 inches thick, and is reddish-brown to red but dominantly yellowish red. The C horizon is strong brown to yellowish red and contains few to many weathered rock fragments.

Clifton loam, 6 to 10 percent slopes (CmC).—This soil is well drained and is on fairly broad ridgetops of the less mountainous section.

The surface layer is dark reddish-brown to dark-brown loam 4 to 10 inches thick. In some places it is a mixture of the original surface layer and the subsoil. The subsoil is reddish-brown or yellowish-red to red, friable clay loam to clay 15 to 35 inches thick.

Included with this soil in mapping were some areas where the slope is less than 6 percent. Also included were a few minor areas of Chester and Hayesville soils.

Infiltration is moderately slow. If this soil is used for crops, surface runoff is medium, and there is a moderate to severe erosion hazard. The plow layer is fairly easy to keep in good tilth, and it can be worked over a fairly wide range of moisture content.

Most of this soil is in pasture or in cultivation, and the rest is in forest. It is well suited to all locally grown crops, but because of slope, good conservation practices are needed to effectively control runoff and erosion. (Capability unit IIIe–1; woodland suitability group 5A; wildlife suitability group 1A)

Clifton loam, 10 to 25 percent slopes (CmE).—This is a well-drained soil on the side slopes between the milder ridgetops and the steeper slopes to the drainageways. It occurs in long, narrow bands 2 to 18 acres in size. This soil has the profile described as representative for the series.

The surface layer is dark reddish-brown to dark-brown loam 4 to 10 inches thick. In many places the surface layer is a mixture of the original surface layer and the subsoil. The subsoil is reddish-brown or yellowish-red to red, friable clay loam to clay 15 to 35 inches thick.

Included with this soil in mapping were a few areas that are severely eroded. Also included were minor areas of Chester and Hayesville soils.

Infiltration is moderately slow. If this soil is used for cultivation, surface runoff is rapid. The plow layer is fairly easy to keep in good tilth, except on the minor areas that are severely eroded. Where the subsoil is exposed, the plow layer is more difficult to keep in good tilth and cannot be worked throughout so wide a range of moisture content. In these more eroded areas, stands of crops are uneven, and yields are lower than on the uneroded soils of the same slope.

Most of this soil is in pasture or cultivation, and the rest is in forest. It is well suited to all pasture and hay crops. Because of slope, it is only fairly well suited to cultivation. If this soil is cultivated, intensive conservation practices are needed to effectively control runoff and erosion. (Capability unit IVe–1; woodland suitability group 5A; wildlife suitability group 1A)

Clifton loam, 25 to 45 percent slopes (CmF).—This is a well-drained soil on side slopes in long, narrow bands bordering drainageways.

The surface layer is a dark reddish-brown to dark-brown loam 6 to 10 inches thick. The subsoil is reddish-brown or yellowish-red to red, friable clay loam to clay 15 to 30 inches thick.

Included with this soil in mapping were small eroded areas and a few areas that are severely eroded. Also included were minor areas of Chester and Hayesville soils. In some places gravel or rock fragments are on the surface.

Most of this soil is in pasture, and the rest is chiefly in forest. Because of slope, this soil is not suited to cultivation. It is suited to pasture or trees. Most locally grown pasture plants do well on this soil. (Capability unit VIe–1; woodland suitability group 5A; wildlife suitability group 1A)

Clifton stony loam, 15 to 45 percent slopes (CsF).—This is a well-drained, stony soil on side slopes bordering drainageways. The areas are fairly long, wide bands up to 40 acres in size.

The surface layer is dark reddish-brown to dark-brown loam 6 to 10 inches thick. Stones larger than 10 inches in diameter make up 5 to 15 percent of the surface layer. The subsoil is reddish-brown or yellowish-red to red, friable clay loam to clay 15 to 24 inches thick.

Included with this soil in mapping were a few areas of stony Chester soils and stony Porters soils. Also included were minor areas on steeper slopes.

Because of the stoniness and slope, this soil is unsuited to cultivation or hay and is only poorly suited to pasture. Most of it is in trees. It is suited to trees. (Capability unit VIIe–1; woodland suitability group 5A; wildlife suitability group 1A)

Codorus Series

The Codorus series consists of somewhat poorly drained, nearly level soils on flood plains. These soils are subject to very frequent flooding.

In a typical profile (fig. 7) the surface layer is dark-brown silt loam about 9 inches thick. The subsoil is loam and silt loam to a depth of about 40 inches. It is dark brown to brown in the upper part and is mottled grayish brown, dark grayish brown, and strong brown in the lower part. Below the subsoil, to a depth of about 64 inches, is stratified sand and gravel.

The Codorus soils are low in natural fertility and organic-matter content and are high in available water capacity. These soils have a moderately deep to deep effective root zone. Permeability is moderate, and the shrink-swell potential is low. The seasonally high water table is at a depth of about 1 to 1½ feet.

Most of the areas are cleared and are in pasture, hay, or row crops. Unless drained, these soils have a rather narrow range of suitability for row crops. Drained areas are suited to corn, hay, and pasture grasses. The major limitations to the use of these soils are wetness and very frequent brief flooding.

Representative profile of Codorus silt loam, in an area of Codorus complex, 1½ miles east of Piney Creek, in pasture, 100 feet south of State Route 93, 30 feet north of creek:

Ap—0 to 9 inches, dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; many small roots; few medium pores and root channels; common fine mica flakes; medium acid; abrupt, smooth boundary.

B1—9 to 15 inches, dark-brown (10YR 4/3) loam; weak, medium, granular and subangular blocky structure; friable; common small roots; few fine mica flakes; few lenses of coarser material; strongly acid; clear, smooth boundary.

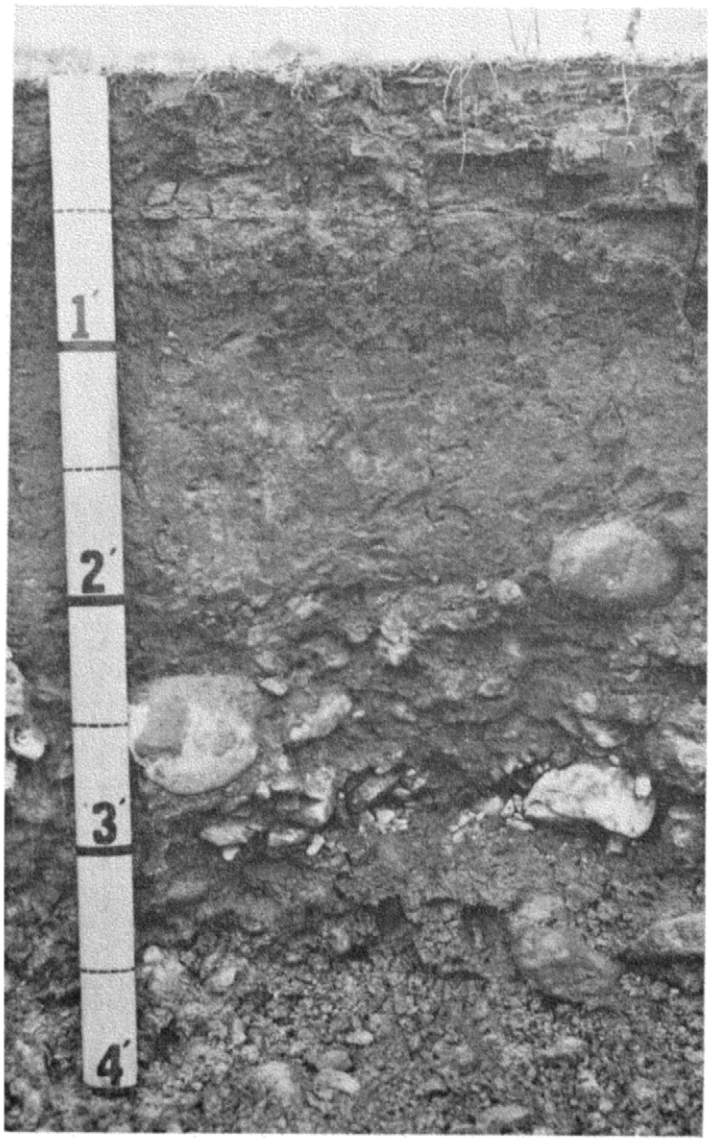

Figure 7.—**Profile of Codorus silt loam.**

B2—15 to 32 inches, brown (10YR 5/3) silt loam; common to many, medium, faint mottles of grayish brown (10YR 5/2) and few, fine, distinct mottles of strong brown; weak, medium, subangular blocky and granular structure; friable; few fine mica flakes; few medium lenses of coarser material; strongly acid; abrupt, smooth boundary.

B3—32 to 40 inches, mottled grayish-brown (10YR 5/2), dark grayish-brown (10 YR 4/2), and strong-brown (7.5 YR 5/6) loam; massive; friable; few fine mica flakes; strongly acid; abrupt, smooth boundary.

IIC—40 to 64 inches, stratified sand and gravel; single grain; strongly acid.

The solum ranges from 38 to 60 inches in thickness, and depth to bedrock is more than 5 feet. The A horizon ranges from 8 to 15 inches in thickness and is dark grayish brown to dark brown in color. The B horizon is silt loam, loam, or silty clay loam, 30 to 45 inches thick, and dark brown or brown to yellowish brown. Gley colors or mottles of low chroma occur within 20 inches of the surface. The C horizon is stratified sand, loamy sand, silt, gravel, or stones.

Codorus complex (Cx).—This complex consists of somewhat poorly drained to poorly drained, nearly level soils on flood plains. These soils are subject to very frequent flooding.

The Codorus soil has a dark grayish-brown to dark-brown silt loam surface layer 8 to 15 inches thick. The subsoil is dark-brown or brown to yellowish-brown, friable silt loam, loam, or silty clay loam 30 to 45 inches thick. Grayish mottles appear within 20 inches of the surface.

The somewhat poorly drained Codorus soil makes up about 50 percent of the complex, and a soil that is wetter and grayer than the Codorus soil makes up about 30 percent. Included in mapping were areas of Alluvial land, wet, which make up about 20 percent of the acreage.

Infiltration is moderate, and surface runoff is slow. The soil is fairly easy to keep in good tilth and can be worked throughout a fairly wide range of moisture content.

Most of this complex is in pasture or cultivation. If drained, the soils are well suited to corn, hay, and pasture. Flooding is very frequent, but generally of extremely brief duration; crop damage can be expected about one year in three. (Capability unit IIw–1; woodland suitability group 1; wildlife suitability group 4)

Comus Series

The Comus series consists of well-drained, nearly level soils on stream flood plains. These soils are subject to very frequent flooding.

In a typical profile the surface layer is dark grayish-brown fine sandy loam about 12 inches thick. The subsoil is dark-brown to dark grayish-brown loam and fine sandy loam about 32 inches thick. Below this is stratified sand and gravel.

Comus soils are low in natural fertility and organic-matter content. They have high available water capacity. Permeability is moderate, and the shrink-swell potential is low. Comus soils have a deep effective root zone. The seasonally high water table is at a depth of about 2½ feet.

Most areas of Comus soils are cleared and used for pasture or cultivation. These soils are well suited to most crops and to all pasture and hay plants grown in the county. Very frequent flooding, two to three times a year, is the major limitation to the use of these soils.

Representative profile of Comus fine sandy loam, 5 miles north of Glade Valley, 500 yards south of junction of Brush and Little Pine Creeks, in a cultivated field 200 feet west of Brush Creek:

Ap—0 to 12 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, medium, granular structure; very friable; many small roots; few fine mica flakes; medium acid; abrupt, smooth boundary.

B1—12 to 21 inches, dark-brown (10YR 4/3) loam; weak, medium, granular structure; very friable; common small roots; few fine pores and root channels; few fine mica flakes; medium acid; abrupt, smooth boundary.

B2—21 to 30 inches, dark grayish-brown (10YR 4/2) loam; weak, medium, granular and subangular blocky structure; very friable; few small roots; few pores and mica flakes; strongly acid; clear, smooth boundary.

B3—30 to 44 inches, dark-brown (10YR 4/3) fine sandy loam; weak, medium, subangular blocky structure; very friable; few fine streaks of very dark grayish brown; few medium sand lenses, increasing with depth; few fine mica flakes; strongly acid; abrupt, smooth boundary.

IIC—44 to 50 inches, yellowish-brown (10YR 5/4) stratified sand and gravel; single grain; loose; strongly acid.

The solum ranges from 38 to 60 inches in thickness, and depth to bedrock is more than 5 feet. The A horizon ranges from 10 to 15 inches in thickness and is dark grayish brown to brown. The B horizon ranges from loam to fine sandy loam in texture and from 28 to 45 inches in thickness. It ranges from dark grayish brown or dark brown to yellowish brown. The structure of the B horizon ranges from weak granular to weak subangular blocky. The C horizon is stratified sands, loamy sands, and silts, and gravel or stones.

Comus fine sandy loam (Cy).—This is a well-drained, nearly level soil on flood plains. It occurs in long narrow bands between the stream and adjoining uplands or the stream and a more poorly drained soil.

The surface layer is dark grayish-brown to brown fine sandy loam 10 to 15 inches thick. The subsoil is dark grayish-brown or dark-brown to yellowish-brown loam and fine sandy loam 28 to 45 inches thick.

Included with this soil in mapping were areas of similar soils that lack evident structure and are medium acid. Also included in mapping were soils that have a very dark grayish-brown surface layer more than 10 inches thick.

Infiltration is moderate, and surface runoff is slow. This soil is easy to keep in good tilth and can be worked throughout a wide range of moisture content.

Most of this soil is in pasture or cultivation, but a small amount is in forest. This soil is well suited to most locally grown crops. The major limitation is flooding, which occurs two or three times a year. The flooding is of extremely brief duration but can cause damage to crops. (Capability unit IIw–1; woodland suitability group 1; wildlife suitability group 3)

Fannin Series

The Fannin series consists of well-drained, sloping to steep, micaceous soils on the broader ridges and smoother topography of the intermountain area. These soils formed under forest vegetation in residuum from mica schist.

In a typical profile the surface layer is dark-brown silt loam about 6 inches thick. The subsoil is yellowish-red, friable clay loam to loam about 26 inches thick. Below the subsoil, to a depth of about 108 inches, is yellowish-red loam.

Fannin soils are low in natural fertility and organic-matter content. They have medium available water capacity, moderate permeability, moderate shrink-swell potential, and a moderately deep effective root zone. The seasonally high water table remains below 5 feet.

Most of these soils are in pasture or cultivation. If these soils are cultivated, runoff causes a moderate to very severe erosion hazard.

Representative profile of Fannin silt loam, 10 to 25 percent slopes, eroded, 5½ miles northeast of Sparta, 0.8 mile west of Edwards Crossroads, 0.2 mile south of Zion Church, in cutover woods 15 yards east of County Road 1428:

Ap—0 to 6 inches, dark-brown (7.5YR 4/4) silt loam; weak, fine, granular structure; very friable; many small roots and few medium roots; few quartz fragments up to ¾ inch in diameter; common finely divided mica flakes; strongly acid; abrupt, smooth boundary.

B21t—6 to 12 inches, yellowish-red (5YR 4/6) clay loam; weak, fine, subangular blocky structure; friable; few medium and small roots; common finely divided mica flakes, giving a greasy feel; thin patchy clay films on ped surfaces; few quartz fragments up to ¾ inch in diameter; strongly acid; clear, smooth boundary.

B22t—12 to 20 inches, yellowish-red (5YR 4/8) clay loam; weak and moderate, medium, subangular blocky structure; friable; sticky; thin patchy clay films on ped surfaces; common to many, finely divided mica flakes, giving a slick, greasy feel; strongly acid; gradual, wavy boundary.

B31—20 to 24 inches, yellowish-red (5YR 5/8) clay loam; weak, medium, subangular blocky structure; friable; many finely divided mica flakes, giving a slick, greasy feel; few quartz fragments up to 1½ inches; few small mica schist fragments; strongly acid; gradual, wavy boundary.

B32—24 to 32 inches, yellowish-red (5YR 5/8) loam; massive and weak, medium, subangular blocky structure; friable; many fine and medium mica flakes; strongly acid; gradual, wavy boundary.

C—32 to 108 inches, yellowish-red (5YR 5/8) loam from weathered mica schist; massive (has rock structure); many fine and medium mica flakes; strongly acid.

The solum ranges from 20 to 40 inches in thickness, and depth to bedrock is more than 5 feet. The A horizon is silt loam or silty clay loam 3 to 8 inches thick. It ranges from dark brown to reddish brown. The B horizon is silty clay loam, clay loam, or loam in texture, 17 to 32 inches in thickness, and yellowish red to red in color. Mica flakes are common to many in the upper part of the B horizon. They are many in the lower part of the B horizon and in the C horizon, giving a slick, greasy feel.

Fannin silt loam, 6 to 10 percent slopes, eroded (FnC2).—This micaceous soil is well drained; it is on the broader ridges or milder side slopes of the less mountainous section.

The surface layer is dark-brown to reddish-brown silt loam 3 to 8 inches thick. In most places it is a mixture of the original surface layer and the subsoil. The subsoil is yellowish-red to red, friable silty clay loam or clay loam to loam 17 to 32 inches thick.

Included with this soil in mapping were some areas that are severely eroded and areas where the slope is 2 to 6 percent. Also included were minor areas of Hayesville soil.

Infiltration is moderate. Where this soil is used for cultivation, surface runoff is medium and there is a severe erosion hazard. This soil can be worked over a fairly wide range of moisture content, except in severely eroded areas. In the eroded areas, the soil can be worked only within a narrow range of moisture content. On the more eroded areas, stands of crops are uneven and yields are lower.

Most of this soil is in cultivation and is well suited to most locally grown crops. If this soil is cultivated, good conservation practices are needed to control runoff and erosion. (Capability unit IIIe–1; woodland suitability group 5A; wildlife suitability group 1A)

Fannin silt loam, 10 to 25 percent slopes, eroded (FnE2).—This micaceous soil is well drained; it occurs in narrow bands between the milder ridges and steeper side slopes breaking to the drainageways. This soil has the profile described as representative for the series.

The surface layer is dark-brown to reddish-brown silt loam 3 to 8 inches thick. In most places it is a mixture of the original surface layer and the subsoil. The subsoil is yellowish-red to red, friable clay loam, silty clay loam, or loam 17 to 30 inches thick.

Included with this soil in mapping were a few areas that are severely eroded. Also included were minor areas of Hayesville and Watauga soils.

Infiltration is moderate. Where soil is used for cultivation, surface runoff is rapid and there is a very severe erosion hazard. This soil can be worked throughout a fairly wide range of moisture content, but the severely eroded areas will clod if worked when too wet. Stands of crops are uneven on the severely eroded areas.

Most of this soil is in pasture or cultivation, and the rest is in forest. It is well suited to most pasture and hay crops but is only fairly well suited to row crops. If this soil is cultivated, slope causes a very severe erosion hazard, and intensive conservation practices are needed to effectively control runoff and erosion. (Capability unit IVe–1; woodland suitability group 5A; wildlife suitability group 1A)

Fannin silt loam, 25 to 45 percent slopes (FnF).—This micaceous soil is well drained. The areas are on side slopes bordering drainageways; they range from 8 to 12 acres in size.

This soil has a dark-brown to reddish-brown silt loam surface layer 3 to 6 inches thick. The subsoil is yellowish-red to red, friable clay loam, silty clay loam, or loam 17 to 24 inches thick.

Included with this soil in mapping were small areas that are eroded or severely eroded. Also included were minor areas of Chandler soils.

Most of this soil is in pasture, and the rest is chiefly in forest. Because of slope and the very severe erosion hazard, it is not suited to cultivation. It is suited to pasture or trees. (Capability unit VIe–1; woodland suitability group 5A; wildlife suitability group 1A)

Fannin silty clay loam, 15 to 45 percent slopes, eroded (FoF2).—This micaceous soil is well drained; it occurs in long, narrow bands between the milder ridges and the drainageways.

This soil has a reddish-brown silty clay loam surface layer 3 to 5 inches thick. The subsoil is yellowish-red to red, friable clay loam, silty clay loam, or loam 17 to 24 inches thick. The plow layer consists primarily of the subsoil. In some places shallow rills and a few gullies have formed.

Included with this soil in mapping were areas of Fannin soils where the surface layer is silt loam.

Most of this soil is in forest, and the rest is chiefly in pasture. Because of slope and the very severe erosion hazard, this soil is not suited to cultivation and is only fairly well suited to pasture. It is suited to trees. (Capability unit VIIe–1; woodland suitability group 5B; wildlife suitability group 1B)

Gullied Land

Gullied land (Gu) consists of areas that are eroded and gullied. It occurs in very small areas scattered throughout the county, particularly in the northwest and southwest sections. It is primarily in the steeper areas of the upland soils. Gullies have cut through the solum and into the parent material and are so numerous that for the most part only remnants of soil profiles remain (fig. 8). In places there are narrow ridges of normal soil between the gullies.

Included in mapping were a few areas of shallow soils that are severely eroded.

In most places the surface layer is clay loam. Infiltration is slow, and surface runoff is very rapid. Because of continued erosion and deposition, there is a hazard of silting in streams below.

This land type is suited to trees or wildlife; however, trees or other plants grow slowly unless erosion is checked and the soil is adequately fertilized and limed. Gullied land may also be used as a source of borrow material, depending upon extent and type of soil material. (Capability unit VIIe–1; woodland suitability group 7; wildlife suitability group 5)

Hayesville Series

The Hayesville series consists of well-drained, sloping to moderately steep soils on the broader ridges and smoother topography of the intermountain area. These soils formed under forest vegetation in residuum from gneiss and schist.

In a typical profile the surface layer is brown loam about 6 inches thick, and the subsoil is red, friable clay loam about 38 inches thick. Below the subsoil, to a depth of about 78 inches, is yellowish-red loam.

Hayesville soils are low in natural fertility and organic-matter content. They have high available water capacity. They have a moderately deep to deep effective root zone. Permeability and shrink-swell potential are moderate. The seasonally high water table is at a depth below 5 feet.

Most areas of these soils are in pasture or cultivation. If these soils are cultivated, runoff causes a moderate to very severe erosion hazard.

Representative profile of Hayesville loam, 6 to 10 percent slopes, 1 mile north of Pleasant Home Church, 500 yards south of the North Carolina-Virginia State line, in pasture 15 yards west of County Road 1412:

Ap—0 to 6 inches, brown (10YR 4/3) loam; weak, fine, granular structure; very friable; many small roots; few, fine and medium quartz fragments; medium acid; abrupt, smooth boundary.

B1—6 to 11 inches, yellowish-red (5YR 4/6) clay loam; weak, medium, subangular blocky structure; friable; few small roots; few pores and root channels; few quartz fragments; strongly acid; clear, smooth boundary.

B2t—11 to 34 inches, red (2.5 YR 4/8) clay loam; moderate, medium, subangular blocky structure; friable; thin, continuous clay films on ped surfaces; few fine mica flakes; few, fine quartz fragments; strongly acid; clear, smooth boundary.

B3—34 to 44 inches, red (2.5YR 4/6) clay loam; weak, medium, subangular blocky structure; friable; few fine mica flakes; few fine quartz fragments; strongly acid; gradual, smooth boundary.

C—44 to 78 inches, yellowish-red (5YR 5/8) loam from weathered mica gneiss; common gneiss fragments; strongly acid.

The solum ranges from 24 to 48 inches in thickness, and depth to bedrock is more than 5 feet. The A horizon ranges from 4 to 8 inches in thickness and is brown to reddish brown. The B horizon is red to yellowish-red clay loam to clay 20 to 40 inches thick. It has weak to moderate subangular blocky structure. The C horizon ranges from loam to sandy clay loam. It contains few to many rock fragments and unweathered primary minerals.

Hayesville loam, 6 to 10 percent slopes (HaC).—This is a well-drained soil on the broader ridges of the less mountainous areas. It occurs as small, irregularly shaped areas 2 to 8 acres in size. It has the profile described as representative for the series.

The surface layer is dark-brown to reddish-brown loam 4 to 8 inches thick. The subsoil is red, friable clay loam to clay 20 to 40 inches thick.

Included with this soil in mapping were a few eroded areas where the surface layer is a mixture of the original surface layer and the subsoil. Also included were a few areas where the slope is less than 6 percent and small areas of Clifton and Fannin soils.

Infiltration is moderate, and surface runoff is medium. This soil is fairly easy to keep in good tilth and can be worked over a wide range of moisture content.

Most of this soil is cleared and is in pasture or cultivation. It is well suited to most locally grown crops. If this soil is cultivated, slope causes a severe erosion hazard and conservation practices are needed to effectively control runoff and reduce erosion. (Capability unit IIIe–1; woodland suitability group 5A; wildlife suitability group 1A)

Hayesville loam, 10 to 25 percent slopes (HaE).—This is a well-drained soil on upper side slopes. The areas are narrow bands 5 to 8 acres in size.

The surface layer is brown to reddish-brown loam 4 to 8 inches thick. The subsoil is red, friable clay loam to clay 20 to 40 inches thick.

Included with this soil in mapping were eroded areas where the plow layer is a mixture of the original surface layer and the subsoil. Also included in mapping were minor areas of Clifton and Fannin soils.

Infiltration is moderate, and surface runoff is rapid. This soil is fairly easy to keep in good tilth and can be worked over a wide range of moisture content.

Most of this soil is cleared and used for pasture or cultivated crops. It is well suited to pasture and hay crops, but because of slope, is only fairly well suited to row crops. If this soil is cultivated, there is a very severe erosion hazard, and intensive conservation practices are needed to effectively control runoff and reduce erosion. (Capability unit IVe–1; woodland suitability group 5A; wildlife suitability group 1A)

Figure 8.—Area of Gullied land.

Porters Series

The Porters series consists of well-drained, strongly sloping to very steep soils on the very narrow ridges and side slopes of the higher mountains, at elevations above 3,000 feet. These soils formed under forest vegetation in residuum from gneiss.

In a typical profile the surface layer is dark grayish-brown loam about 7 inches thick. The subsoil is brown, friable loam to clay loam about 21 inches thick. Below the subsoil, to a depth of about 42 inches, is mottled brown and grayish-brown fine sandy loam.

Porters soils are medium in natural fertility and high in organic-matter content. They have high available water capacity. They have a moderately deep effective root zone. Permeability is moderately rapid, and the shrink-swell potential is low. The seasonally high water table is at a depth below 5 feet.

Most areas of these soils are in forest, and the rest are chiefly in pasture. Only a small acreage is in cultivation. If not stony or steep, these soils are well suited to most locally grown crops. If these soils are cultivated, runoff causes a moderate to very severe erosion hazard.

Representative profile of a Porters loam, 5 miles northeast of Laurel Springs, 1 mile south of Prathers Creek Church, 300 yards east of County Road 1149:

Ap—0 to 7 inches, very dark grayish-brown (10YR 3/2) loam; moderate, fine and medium, granular structure; very friable; many small roots; few fine mica flakes; few gneiss and quartz fragments; slightly acid; abrupt, smooth boundary.

B1—7 to 10 inches, brown (10YR 4/3) loam; weak, medium, granular and subangular blocky structure; very friable; common small roots; few fine mica flakes; few gneiss and quartz fragments up to 3 inches across; medium acid; clear, smooth boundary.

B2t—10 to 22 inches, brown (7.5YR 4/4) clay loam; weak, medium, subangular blocky structure; friable; common small roots; few, thin, discontinuous clay films and clay bridging; few fine mica flakes; common quartz fragments up to 2 inches across; few stones; slightly acid; gradual, wavy boundary.

B3—22 to 28 inches, brown (7.5YR 4/4) loam; weak, medium, subangular blocky structure; very friable; common fine mica flakes; common quartz and gneiss fragments up to 3 inches across; common quartz and flat gneiss stones; slightly acid; gradual, smooth boundary.

C—28 to 42 inches, mottled brown (10YR 4/3) and grayish-brown (10YR 5/2) fine sandy loam; massive, friable; many quartz and flat gneiss stones; slightly acid; gradual, wavy boundary.

R—42 to 43 inches, dark-colored gneiss.

The solum ranges from 20 to 40 inches in thickness, and depth to bedrock ranges from 3 to 5 feet. The A horizon ranges from 6 to 10 inches in thickness and is very dark grayish brown to dark brown. The B horizon is loam to clay loam 14 to 30 inches thick. It is dark yellowish brown, brown, or dark brown. The C horizon is fine sandy loam to loam that contains few to many gneiss fragments. In some areas the C horizon is lacking.

Porters loam, 10 to 25 percent slopes (PoE.)—This is a well-drained soil on the ridgetops of the higher mountains. It occurs as irregularly shaped areas 8 to 15 acres in size.

The surface layer is very dark grayish-brown to dark-brown loam 6 to 10 inches thick. The subsoil is dark yellowish-brown, brown, or dark-brown loam to clay loam 14 to 30 inches thick. Gravel and stones are in quantities sufficient to interfere with cultivation in some places.

Included with this soil in mapping were a few areas where the slope is less than 10 percent. Also included were areas of Ashe, Clifton, and Watauga soils.

Infiltration is moderate, and surface runoff is rapid. This soil is easy to keep in good tilth and can be worked over a wide range of moisture content.

Most of this soil is cleared and is in pasture. A small acreage is in trees or in cultivation. This soil is well suited to most pasture and hay crops. Because of slope, it is only fairly well suited to row crops. If this soil is cultivated, there is a very severe erosion hazard and intensive conservation practices are needed to effectively control runoff and reduce erosion. (Capability unit IVe–1; woodland suitability group 5A; wildlife suitability group 1A)

Porters loam, 25 to 45 percent slopes (PoF).—This soil is well drained; it is on side slopes bordering drainageways. It occurs in fairly long, wide bands up to 40 acres in size. This soil has the profile described as representative for the series.

The surface layer is very dark grayish-brown to dark-brown loam 6 to 8 inches thick, and the subsoil is dark yellowish-brown, brown, or dark-brown loam to clay loam 14 to 25 inches thick. In a few places, gravel and stones are in sufficient quantities to interfere with tillage.

Included with this soil in mapping were some areas where the slope is greater than 45 percent. Also included in mapping were areas of Ashe, Clifton, and Watauga soils. Minor areas where bedrock is at a depth of less than 20 inches were also included.

Most of this soil is in forest of mixed hardwoods and white pine, or white pine that has been set out over the past few years. It is well suited to most locally grown pasture plants, particularly bluegrass. This soil is not suited to cultivation or hay, because of slope and the very severe erosion hazard. It is suited to pasture or to trees. (Capability unit VIe–1; woodland suitability group 5A; wildlife suitability group 1A)

Porters stony loam, 10 to 25 percent slopes (PsE).—This soil is a well-drained stony soil on narrow ridgetops and upper side slopes of the higher mountains.

The surface layer is very dark grayish-brown to dark-brown loam 6 to 10 inches thick. Stones larger than 10 inches in diameter make up 5 to 15 percent of the surface

layer. The subsoil is dark yellowish-brown, brown, or dark-brown loam to clay loam 14 to 25 inches thick.

Included with this soil in mapping were areas of stony soils of the Ashe and Clifton series. Minor areas where bedrock is at a depth of less than 20 inches were also included.

Most of this soil is in forest, and the rest is chiefly in pasture. Because of slope and stoniness, this soil is not suited to cultivation or hay and only fairly well suited to pasture. It is suited to trees. (Capability unit VIe–2; woodland suitability group 5A; wildlife suitability group 1A)

Porters stony loam, 25 to 45 percent slopes (PsF).—This soil is a well-drained stony soil on side slopes bordering the drainageways of the higher mountains.

The surface layer is very dark grayish-brown to dark-brown loam 6 to 8 inches thick. Stones larger than 10 inches in diameter make up 5 to 15 percent of the surface layer. The subsoil is dark yellowish-brown, brown, or dark-brown loam to clay loam 14 to 20 inches thick. Present in places are a few rock outcrops.

Included with this soil in mapping were areas of Ashe, Clifton, and stony Watauga soils. In a few places, the depth to bedrock is less than 20 inches.

Most of this soil is in forest, primarily low-quality hardwoods or mixed hardwoods and white pine. Because of stoniness and slope, this soil is not suited to cultivation or hay and only fairly well suited to pasture. It is suited to trees. (Capability unit VIIe–1; woodland suitability group 5A; wildlife suitability group 1A)

Porters stony loam, 45 to 65 percent slopes (PsG).—This is a stony, well-drained soil in long, wide bands on lower side slopes bordering drainageways.

The surface layer is very dark grayish-brown to dark-brown loam 6 to 8 inches thick. Stones larger than 10 inches in diameter make up 5 to 15 percent of the surface layer. The subsoil is dark yellowish-brown, brown, or dark-brown loam to clay loam 14 to 20 inches thick. Present in places are a few outcrops of bedrock.

Included with this soil in mapping were areas of Ashe, Clifton, and stony Watauga soils. Also included were some areas where the depth to bedrock is less than 20 inches.

Most of this soil is in forest of low-quality hardwoods or mixed hardwoods and pine. Because of stoniness and slope, this soil is not suited to cultivation, hay, or pasture. It is suited to trees. (Capability unit VIIe–1; woodland suitability group 5A; wildlife suitability group 1A)

Rock Outcrop

Rock outcrop (Ro) consists of small areas where bedrock or loose stones cover more than 90 percent of the surface. It occurs in very small areas on steeper slopes of the more mountainous sections of the county, and its total acreage is small.

This land type is composed of both acidic and basic rock. The largest acreage is on Stone Mountain in the southeastern part of the county.

Because of the rock and stones, this land type is suited only to recreation and wildlife. (Capability unit VIIIs–1; woodland suitability group 7; wildlife suitability group 5)

Stony Steep Land

Stony steep land (StF) consists of upland areas where bedrock or loose stones cover 15 to 90 percent of the surface (fig. 9). This land type occurs as small areas in the steeper parts of the more mountainous section, particularly along the southern rim of the county.

This miscellaneous land type has stones and rock outcrops in quantities sufficient to prohibit any cultivation. The soil between the stones is variable, but thin, in most places.

The total acreage of this unit is small, and most of it is in trees, primarily low-quality hardwoods. Because of stoniness and the slope, this miscellaneous land type is unsuited to cultivation, hay, or pasture. It is suited to trees or to wildlife. (Capability unit VIIs–1; woodland suitability group 7; wildlife suitability group 5)

Suncook Series

The Suncook series consists of excessively drained, nearly level sandy soils of the flood plains. These soils are subject to very frequent flooding.

In a typical profile the surface layer is dark-brown and brown loamy sand about 14 inches thick. The lower layers are commonly brown loamy sand and sand to a depth of 84 inches.

Suncook soils are very low in natural fertility and organic-matter content. They have low available water capacity and are low in shrink-swell potential. These soils have a moderately deep to deep effective root zone. Permeability is rapid. The seasonally high water table is at a depth of about 2½ feet.

These soils are of little importance in farming because they occupy only small areas of the larger flood plains. Most of the acreage is in pasture or cultivation, and the rest is chiefly in forest. The major limitations are very frequent flooding, very low natural fertility, and droughtiness.

Representative profile of Suncook loamy sand, 2 miles north of Twin Oaks, 200 yards southeast of County Road 1345, in pasture 100 feet north of New River.

Ap—0 to 9 inches, dark-brown (10YR 3/3) loamy sand; weak, fine, granular structure; very friable; common small

Figure 9.—Area of Stony steep land.

roots; few fine mica flakes; medium acid; clear, smooth boundary.

A1—9 to 14 inches, brown (10YR 4/3) loamy sand; weak, fine, granular structure; very friable; few small roots; few fine mica flakes; common uncoated sand grains; strongly acid; clear, smooth boundary.

C1—14 to 58 inches, brown (10YR 4/3) loamy sand; common coarse lenses of light yellowish brown (2.5Y 6/4); single grain; loose; few finely divided mica flakes; strongly acid; clear, smooth boundary.

C2—58 to 84 inches, mottled grayish-brown (2.5Y 5/2) and light yellowish-brown (2.5 Y 6/4) sand; single grain; loose; strongly acid.

The Suncook soils have sandy horizons that range from 36 to 90 inches in thickness. The depth to bedrock is more than 5 feet. The A horizon is 8 to 15 inches thick and is dark brown to dark grayish brown. The C horizon is loamy sand and sand, 28 to 75 inches or more thick, and dark brown, brown, grayish brown, or light yellowish brown. In some places these soils are underlain by gravel or stones at depths greater than 40 inches. Throughout the profile, the content of mica flakes ranges from few to common.

Suncook loamy sand (Su).—This soil is excessively drained, nearly level, and sandy. It is on stream flood plains and is subject to very frequent flooding.

The surface layer is dark-brown to dark grayish-brown loamy sand 8 to 15 inches thick. The underlying layers are dark-brown or brown to olive-brown loamy sand and sand 28 to 75 inches or more thick.

Included with this soil in mapping were some areas where the surface layer is very dark grayish-brown sand.

Infiltration is rapid, and surface runoff is slow. This soil is fairly easy to keep in good tilth and can be worked over a wide range of moisture content.

Most of this soil is in pasture or hay, and the rest is in row crops and trees. This soil is only fairly well suited to locally grown crops. Low fertility, very frequent flooding of extremely brief duration, and droughtiness are major limitations to the use of this soil. (Capability unit IIIs–1; woodland suitability group 3; wildlife suitability group 3)

Tate Series

The Tate series consists of well-drained, gently sloping to strongly sloping soils of the upland draws and foot slopes. These soils formed under forest vegetation in local alluvium from materials of the surrounding uplands.

In a typical profile the surface layer is dark grayish-brown loam about 7 inches thick. The subsoil is yellowish-brown to brownish-yellow clay loam to sandy clay loam about 31 inches thick. Below the subsoil, to a depth of about 72 inches, is fine sandy loam that contains medium-size gravel in the upper part.

Tate soils are low in natural fertility, medium in organic-matter content, and high in available water capacity. They have a deep effective root zone. Permeability is moderate, and the shrink-swell potential is low. The seasonally high water table is at a depth of about 2½ feet.

Most areas of these soils are used for row crops, pasture, or hay. These soils are well suited to all locally grown crops and are particularly well suited to tobacco and truck crops. Surface runoff causes a moderate to a very severe erosion hazard if the soils are used for cultivation.

Representative profile of Tate loam, 6 to 10 percent slopes, 2½ miles west of Roaring Gap, 400 yards south of County Road 1103, in pasture 50 yards west of field road:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) loam; moderate, fine, granular structure; very friable; many small roots; few fine pores and root channels; some mixing of material from B1 horizon; medium acid; abrupt, smooth boundary.

B1—7 to 12 inches, brown (10YR 4/3) clay loam; weak, medium, subangular blocky structure; friable; common small roots; common fine pores and root channels; medium acid; clear, smooth boundary.

B2t—12 to 32 inches, yellowish-brown (10YR 5/6) clay loam; weak, medium, subangular blocky structure; friable; few small roots; few fine pores; few patchy clay films on ped surfaces and in pores; strongly acid; clear, smooth boundary.

B3t—32 to 38 inches, brownish-yellow (10YR 6/6) sandy clay loam; weak, medium, subangular blocky structure; friable; few, thin, discontinuous clay films on ped surfaces; many small, medium, and large pebbles; strongly acid; gradual, wavy boundary.

C—38 to 72 inches, brownish-yellow (10YR 6/8) and light yellowish-brown (10YR 6/4) fine sandy loam; massive; friable; common fine and medium quartz pebbles in upper part of layer; strongly acid.

The solum ranges from 30 to 48 inches in thickness. The depth to bedrock is more than 5 feet. The A horizon ranges from 6 to 12 inches in thickness and is dominantly dark grayish brown. In some wooded areas, however, there is a thin, very dark grayish-brown A1 horizon. The B horizon ranges from clay loam to sandy clay loam in texture and from 24 to 36 inches in thickness. It is yellowish brown or brownish yellow to brown. The B horizon ranges from weak to moderate subangular blocky in structure. The lower part of the B horizon is mottled with gray in places. The C horizon commonly has few to many subrounded quartz pebbles or stones.

Tate loam, 2 to 6 percent slopes (TaB).—This is a well-drained soil in upland draws and on foot slopes in small areas.

The surface layer is dominantly dark grayish-brown loam 6 to 12 inches thick. In wooded areas it is very dark grayish brown. The subsoil is yellowish-brown to brownish-yellow clay loam to sandy clay loam 24 to 36 inches thick.

Included with this soil in mapping were some areas of moderately well drained and well drained soils on low stream terraces. Also included were a few small areas of somewhat poorly drained soils along drainageways.

Infiltration is moderate, and surface runoff is medium. This soil is easy to keep in good tilth and can be worked throughout a wide range of moisture content.

Most of this soil has been cleared, and a large percentage is used for row crops. The rest is primarily in pasture or hay. This soil is well suited to locally grown crops. It is particularly well suited to tobacco (fig. 10) and truck crops. If this soil is cultivated, the erosion hazard is moderate and conservation practices are needed to control runoff and reduce erosion. (Capability unit IIe–1; woodland suitability group 4; wildlife suitability group 1A)

Tate loam, 6 to 10 percent slopes (TaC).—This is a well-drained soil in upland draws and on foot slopes. It is in small areas 2 to 5 acres in size. This soil has the profile described as representative for the series.

The surface layer is dominantly dark grayish-brown loam 6 to 12 inches thick. In wooded areas it is very dark grayish brown. The subsoil is yellowish-brown to brownish-yellow clay loam to sandy clay loam 24 to 36 inches thick.

Figure 10.—Burley tobacco on Tate loam, 2 to 6 percent slopes.

Included with this soil in mapping were some areas of moderately well drained to well drained soils on low stream terraces. Also included were a few small areas of somewhat poorly drained soils along drainageways.

Infiltration is moderate, and surface runoff is medium. This soil is easy to keep in good tilth, and it can be worked over a wide range of moisture content.

Most of this soil has been cleared, and a large percentage is used for row crops. The rest is primarily in pasture or hay. This soil is well suited to the locally grown crops. It is a choice tobacco or truck crop soil. Because of slope, the erosion hazard is severe if this soil is cultivated, and conservation practices are needed to effectively control runoff and reduce erosion. (Capability unit IIIe–1; woodland suitability group 4; wildlife suitability group 1A)

Tate loam, 10 to 15 percent slopes (TaD).—This is a well-drained soil in upland draws and on foot slopes. The areas are 2 to 5 acres in size.

The surface layer is dominantly dark grayish-brown loam 6 to 12 inches thick. In wooded areas it is very dark grayish brown. The subsoil is yellowish-brown to brownish-yellow clay loam to sandy clay loam 24 to 36 inches thick.

Included with this soil in mapping were a few small areas of somewhat poorly drained soils along drainageways.

Infiltration is moderate, and surface runoff is medium. This soil is easy to keep in good tilth, and it can be worked throughout a wide range of moisture content.

Most of this soil has been cleared and is used for pasture or row crops. This soil is well suited to the locally grown pasture and hay plants. Because of slope, it is only fairly well suited to row crops. If this soil is cultivated, surface runoff causes a very severe erosion hazard and intensive conservation practices are needed to reduce runoff and control erosion. (Capability unit IVe–1; woodland suitability group 4; wildlife suitability group 1A)

Tusquitee Series

The Tusquitee series consists of well-drained, sloping to moderately steep soils in upland draws and on foot slopes. These soils formed under forest vegetation in local alluvium from materials of the surrounding upland soils.

In a typical profile the surface layer is dark-brown and dark yellowish-brown loam about 10 inches thick. The subsoil is brown, strong-brown, and yellowish-brown, friable loam and clay loam about 38 inches thick. Below the subsoil, to a depth of about 60 inches, is fine sandy loam that contains many partially weathered rock fragments.

Tusquitee soils are medium in natural fertility, high in organic-matter content, and very high in available water capacity. They have a deep effective root zone. Permeability is moderately rapid, and the shrink-swell potential is low. The seasonally high water table is at a depth of 5 feet.

Most areas of these soils are in cultivation, in pasture, or in hay. These soils are well suited to all locally grown crops. They are chiefly used for tobacco or truck crops. If these soils are cultivated, surface runoff causes a moderate to very severe erosion hazard.

Representative profile of Tusquitee loam 6 to 10 percent slopes, 3 miles north of Whitehead, 1 mile northeast of Fender Mountain, in woods 5 yards east of County Road 1135:

O1—1 inch to 0, very dark brown, partially decomposed hardwood leaves and twigs mixed with a small amount of mineral soil.

A1—0 to 7 inches, dark-brown (7.5YR 3/2) loam; weak, fine, granular structure; very friable; many small and medium roots; few quartz pebbles up to 1 inch in diameter; few fine mica flakes; strongly acid; clear, smooth boundary.

A3—7 to 10 inches, dark yellowish-brown (10YR 3/4) loam; weak, medium, granular structure; very friable; common medium and large roots; few mica flakes; few quartz pebbles up to 1 inch in diameter; medium acid; clear, smooth boundary.

B1—10 to 15 inches, brown (7.5YR 4/4) loam; weak, fine, subangular blocky structure; friable; common medium and large roots; few quartz and gneiss fragments up to 2 inches in diameter; medium acid; clear, wavy boundary.

B21t—15 to 32 inches, brown (7.5YR 4/4) clay loam; moderate, medium, subangular blocky structure; friable; common medium and large roots; thin discontinuous clay films and clay bridging on ped surfaces and in root channels; few quartz and gneiss fragments less than 2 inches in diameter; medium acid; clear, wavy boundary.

B22t—32 to 43 inches, strong-brown (7.5YR 5/6) clay loam; moderate, medium, subangular blocky structure; friable; few medium and large roots; few mica flakes; thin discontinuous clay films on ped surfaces and in root channels; few gneiss fragments and quartz pebbles up to 3 inches in diameter; medium acid; gradual, wavy boundary.

B3—43 to 48 inches, yellowish-brown (10YR 5/4) loam; weak, medium, subangular blocky structure; friable; few medium and large roots; few mica flakes; few to common gneiss fragments and quartz pebbles, up to 3 inches in diameter, make up approximately 3 percent by volume; medium acid; clear, smooth boundary.

C—48 to 60 inches, yellowish-brown (10YR 5/4) and grayish-brown (10YR 5/2) fine sandy loam; massive; friable; many partially weathered rock fragments; medium acid.

The solum ranges from 40 to 60 inches in thickness. The depth to bedrock is more than 5 feet. The A horizon ranges from 8 to 20 inches in thickness and dark brown or very dark brown to very dark grayish brown in color. The B horizon ranges from loam to clay loam in texture and from 32 to 40 inches in thickness. It is dark brown, brown, strong brown

and yellowish brown in color. The B horizon has weak to moderate, fine and medium, subangular blocky structure. The C horizon is sandy loam to loam that contains few to many pebbles and rock fragments.

Tusquitee loam, 6 to 10 percent slopes (TlC).—This is a well-drained soil in upland draws and on foot slopes. It has the profile described as representative for the series.

The surface layer is dark-brown to very dark grayish-brown loam 8 to 20 inches thick. The subsoil is dark-brown, brown, strong-brown, or yellowish-brown, friable loam to clay loam 32 to 40 inches thick.

Included with this soil in mapping were similar but redder soils. Some areas where the slope is less than 6 percent were also included in mapping. In a few places gravel and stones are in sufficient quantities to interfere with tillage.

Infiltration is moderate, and surface runoff is medium. This soil is easy to keep in good tilth and can be worked throughout a wide range of moisture content.

Most of this soil has been cleared and is used for row crops, pasture, or hay. This soil is well suited to all row crops, pasture, or hay grown in the county. It is a choice soil for burley tobacco and truck crops. It is one of the most productive soils in the county. If this soil is cultivated, there is a moderate hazard of erosion and conservation practices are needed to effectively reduce runoff and to control erosion. (Capability unit IIe–1; woodland suitability group 4; wildlife suitability group 1A)

Tusquitee loam, 10 to 15 percent slopes (TlD).—This is a well-drained soil in upland draws and on foot slopes.

The surface layer is dark-brown to very dark grayish-brown loam 8 to 20 inches thick. The subsoil is dark-brown, brown, strong-brown, or yellowish-brown, friable loam to clay loam 32 to 40 inches thick.

Included with this soil in mapping were similar but redder soils. In a few places gravel and stones are in sufficient quantities to interfere with tillage.

Infiltration is moderate, and surface runoff is rapid. The plow layer is easy to keep in good tilth and can be worked throughout a wide range of moisture content.

Most of this soil has been cleared and is in row crops, pasture, or hay. This soil is well suited to all row crops, pasture, or hay grown in the county. It is a choice soil for tobacco and truck crops. It is one of the most productive soils in the county. If this soil is cultivated, there is a severe hazard of erosion and conservation practices are needed to effectively control runoff and to reduce erosion. (Capability unit IIIe–1; woodland suitability group 4; wildlife suitability group 1A)

Tusquitee loam, 15 to 25 percent slopes (TlE).—This is a well-drained soil in upland draws and on foot slopes.

The surface layer is dark-brown to very dark grayish-brown loam 8 to 20 inches thick. The subsoil is dark-brown, brown, strong-brown, or yellowish-brown, friable loam to clay loam 32 to 40 inches thick.

Included with this soil in mapping were a few areas of steeper soils. In a few places gravel and stones are in sufficient quantities to interfere with tillage.

Infiltration is moderate, and surface runoff is rapid. The ploy layer is easy to keep in good tilth and can be worked throughout a wide range of moisture content.

Most of this soil has been cleared and is in pasture, hay, or row crops. This soil is well suited to all pasture and hay crops grown in the county. Because of slope, it is only fairly well suited to row crops. If this soil is cultivated, there is a very severe hazard of erosion and intensive conservation practices are needed to effectively reduce runoff and control erosion. (Capability unit IVe–1; woodland suitability group 4; wildlife suitability group 1A)

Tusquitee stony loam, 10 to 15 percent slopes (TsD).—This is a stony, well-drained soil in upland draws and on foot slopes.

The surface layer is dark-brown to very dark grayish-brown loam 8 to 15 inches thick. Stones larger than 10 inches in diameter make up 5 to 15 percent of the surface layer. The subsoil is dark-brown, brown, strong-brown, or yellowish-brown, friable loam to clay loam 32 to 40 inches thick.

Included with this soil in mapping were a few areas where the slope is less than 10 percent. Also included were minor areas of stony Tate soils and small areas of Tusquitee soils where stones make up more than 15 percent of the surface layer.

Infiltration is moderate, and surface runoff is rapid. The plow layer is easy to keep in good tilth and can be worked throughout a wide range of moisture content. Stones on the surface make cultivation difficult.

About half of this soil is cleared and used for pasture and cultivated crops. The rest is in forest. Because of stoniness, this soil is only fairly well suited to cultivation. It is well suited to pasture or trees. If this soil is cultivated, there is a severe hazard of erosion and conservation practices are needed to effectively control runoff and to reduce erosion. (Capability unit IVe–2; woodland suitability group 4; wildlife suitability group 1A)

Tusquitee stony loam, 15 to 25 percent slopes (TsE).—This is a stony, well-drained soil in upland draws and on foot slopes.

The surface layer is dark-brown to very dark grayish-brown loam 8 to 15 inches thick. Stones larger than 10 inches in diameter make up 5 to 15 percent of the surface layer. The subsoil is dark-brown, brown, strong-brown, or yellowish-brown, friable loam to clay loam 32 to 40 inches thick.

Included with this soil in mapping were a few very stony areas on first bottoms and in draws. Also included were minor areas of stony Tate soils. In a few places the slope is greater than 25 percent.

Most of this soil is in pasture, and the rest is chiefly in forest. Because of slope and stoniness, this soil is not suited to cultivation or hay. It is fairly well suited to pasture and well suited to trees. (Capability unit VIe–2; woodland suitability group 4; wildlife suitability group 1A)

Watauga Series

The Watauga series consists of well-drained, micaceous, sloping to steep soils on the more narrow ridges and side slopes of the less mountainous area. These soils formed under forest vegetation in residuum from mica schist and phyllite.

In a typical profile the surface layer is brown loam about 7 inches thick. The subsoil is strong-brown, friable clay loam to loam about 21 inches thick (fig. 11). Below the subsoil, to a depth of about 72 inches, is yellowish-brown and gray loam.

Watauga soils are low in natural fertility and organic-matter content. They are medium in available water capacity. They have a moderately deep effective root zone. Permeability is moderate, and the shrink-swell potential is low. The seasonally high water table is at a depth of more than 5 feet.

Most areas of these soils are cleared and are in pasture, hay, or cultivation. They are well suited to most locally grown crops. If these soils are cultivated, there is a moderate to very severe hazard of erosion.

Representative profile of Watauga loam, 10 to 25 percent slopes, 1.5 miles south of Laurel Springs, 100 yards east of State Route 18, in a pasture, 100 feet southwest of a small cemetery:

Ap—0 to 7 inches, brown (10YR 4/3) loam; weak, fine, granular structure; very friable; many small roots; common finely divided mica flakes; common quartz fragments (1/2 to 2 inches in diameter); medium acid; abrupt, smooth boundary.

B2t—7 to 21 inches, strong-brown (7.5YR 5/6) clay loam; weak, medium, subangular blocky structure; friable; few small roots; thin discontinuous clay films on ped surfaces; few quartz and schist fragments less than 1 inch in diameter; many finely divided mica flakes; strongly acid; clear, wavy boundary.

B3—21 to 28 inches, strong-brown (7.5YR 5/6) loam that has few, medium, faint, yellowish-brown (10YR 5/6) streaks; weak, medium, subangular blocky structure; friable; many finely divided mica flakes; strongly acid; gradual, wavy boundary.

C1—28 to 52 inches, yellowish-brown (10YR 5/6) loam; massive; very friable; many fine and medium mica flakes; strongly acid; gradual, wavy boundary.

C2—52 to 72 inches, gray (10YR 5/1) loam; massive; common quartz and mica schist fragments; strongly acid.

The solum ranges from 20 to 40 inches in thickness, and depth to bedrock is more than 5 feet. The A horizon is brown to dark grayish brown and is 5 to 10 inches thick. The B horizon is strong-brown to yellowish-brown clay loam to loam 15 to 30 inches thick. The B2t horizon ranges from 10 to 18 inches in thickness. Mica flakes are common to many in the upper part of the B horizon and are many in the lower part of the B horizon and in the C horizon.

Watauga loam, 6 to 10 percent slopes (WaC).—This micaceous soil is well drained, and is on the more narrow ridgetops and upper side slopes of the intermountain areas.

The surface layer is brown to dark grayish-brown loam 5 to 10 inches thick. The subsoil is strong-brown to yellowish-brown, friable clay loam to loam and is 15 to 30 inches thick.

Included with this soil in mapping were eroded areas in which the plow layer is a mixture of the original surface soil and the subsoil. Also included were areas of Chandler, Chester, and Porters soils. Also included were a few areas where the slope is less than 6 percent.

Infiltration is moderate, and surface runoff is medium. This soil, except the eroded areas, is easy to keep in good tilth and can be worked over a wide range of moisture content. In the eroded areas, tilth is difficult to maintain and stands of crops are uneven.

Most of the soil is in cultivation or in pasture, and the rest is chiefly in forest. It is well suited to the locally grown crops. If this soil is cultivated, runoff causes a severe hazard of erosion and conservation practices are needed to reduce runoff and control erosion. (Capability unit IIIe–1; woodland suitability group 5A; wildlife suitability group 1A)

Figure 11.—**Profile of a Watauga loam.**

Watauga loam, 10 to 25 percent slopes (WaE).—This micaceous soil is well drained. It is in long narrow bands, 4 to 25 acres in size, between the milder ridges and steeper slopes to drainageways. This soil has the profile described as representative for the series.

The surface layer is brown to dark grayish-brown loam 5 to 10 inches thick. The subsoil is strong-brown to yellowish-brown, friable clay loam to loam 15 to 30 inches thick.

Included with this soil in mapping were areas of Chandler, Chester, and Porters soils. Also included were some eroded areas where the plow layer is a mixture of the original surface soil and the subsoil. A few areas are severely eroded, and the plow layer consists mostly of the subsoil.

Infiltration is moderate, and surface runoff is rapid. This soil, except in eroded areas, is easy to keep in good tilth and can be worked throughout a wide range of moisture content. In the more eroded areas, tilth is difficult to maintain and stands of crops are uneven.

Most of this soil is cleared and is in pasture, hay, or cultivation. The rest is chiefly in forest. This is one of the most extensive soils in the county. It is well suited to all pasture (fig. 12) and hay crops grown in the county. Because of slope, it is only fairly well suited to cultivation. If this soil is cultivated, there is a very severe hazard of erosion and intensive conservation practices are needed to reduce runoff and to control erosion. (Capability unit IVe–1; woodland suitability group 5A; wildlife suitability group 1A)

Watauga loam, 25 to 45 percent slopes (WaF).—This is a well-drained micaceous soil on uplands. It is in long narrow bands, 10 to 20 acres in size, on side slopes bordering the drainageways.

The surface layer is brown to dark grayish-brown loam 5 to 8 inches thick. The subsoil is strong-brown to yellowish-brown, friable clay loam to loam 15 to 24 inches thick.

Included with this soil in mapping were small areas of Chandler soil. Also included were minor areas of Fannin soils and steeper Watauga soils.

Most of this soil is in pasture, and the rest is chiefly in forest. Because of slope, this soil is not suited to cultivation or to hay. It is fairly well suited to pasture if good management practices are used. It is well suited to trees. (Capability unit VIe–1; woodland suitability group 5A; wildlife suitability group 1A)

Watauga stony loam, 15 to 45 percent slopes (WsF).—This micaceous soil is stony and well drained. It is in narrow bands, 4 to 20 acres in size, on side slopes bordering the drainageways.

The surface layer is brown to dark grayish-brown loam 5 to 8 inches thick. Stones larger than 10 inches in diameter and schist fragments make up 5 to 15 percent of the surface layer. The subsoil is strong-brown to yellowish-brown, friable clay loam to loam 15 to 24 inches thick.

Included with this soil in mapping were areas of stony Chandler soil and stony Chester soil. In places there are a few rock outcrops.

Most of this soil is in forest. Because of stoniness and slope, it is not suited to cultivation or to hay, and is only poorly suited to pasture. It is suited to trees. (Capability unit VIIe–1; woodland suitability group 5A; wildlife suitability group 1A)

Use and Management of the Soils

This section discusses use and management of the soils for crops and pasture, woodland, wildlife, and engineering purposes. It does not give detailed information about management of individual soils. For specific suggestions, consult a representative of the local office of the Soil Conservation Service, the Extension Service, or the Agricultural Experiment Station.

Use of Soils for Crops and Pasture[2]

This section has three main parts. The first discusses the system of capability classification. The second discusses the capability units in Alleghany County and gives general management suggestions for each capability unit. The third gives estimated yields for specific crops based on high-level management.

Capability grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of farming. The groups are made according to the limitations of the soils when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive land-forming that would change slope, depth, or other characteristics of the soils. It does not take into consideration possible but unlikely major reclamation projects, and does not apply to horticultural crops or other crops requiring special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, for forest trees, or for engineering.

In the capability system, the kinds of soils are grouped at three levels: the capability class, subclass, and unit. These are discussed in the following paragraphs.

Capability Classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I. Soils have few limitations that restrict their use. (None in Alleghany County)

Class II. Soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III. Soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV. Soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V. Soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife habitat. (None in Alleghany County)

Class VI. Soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture, woodland, or wildlife habitat.

Class VII. Soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture, woodland, or wildlife habitat.

Class VIII. Soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife habitat, or water supply, or to esthetic purposes.

Capability Subclasses are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows

[2] J. E. Pollock, conservation agronomist, and H. E. Singletary, district conservationist, Soil Conservation Service, assisted with this section.

Figure 12.—Pasture on Watauga loam, 10 to 25 percent slopes.

that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States but not in Alleghany County, shows that the chief limitation is climate that is either too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, woodland, wildlife habitat, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe–2 or IIIe–1. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraphs; and the Arabic numeral specifically identifies the capability unit within each subclass.

Management by capability units

In the following pages the capability units in Alleghany County are described, and suggestions for the use and management of the soils are given. To find the names of the soils in any given mapping unit, refer to the "Guide to Mapping Units" at the back of this survey.

CAPABILITY UNIT IIe–1

This unit consists of well-drained, gentliy sloping and sloping soils of the Tate and Tusquitee series. These soils are in upland draws and on foot slopes. They have a very friable loam surface layer, and a friable loam to clay loam subsoil.

The soils of this unit are low to medium in natural fertility and medium to high in organic-matter content. Available water capacity is high to very high, and permeability is moderate to moderately rapid. The plow layer is easy to keep in good tilth and can be worked throughout a wide range of moisture content. Response to applications of lime and fertilizer is good.

This unit is one of the most productive in the county. Most of the acreage has been cleared and is used for row crops, pasture, or hay. The soils have a wide range of suitability for crops, chiefly small grain, tobacco, and truck crops, and are particularly well suited to tobacco (fig. 13). They are well suited to all locally grown legumes and grasses, such as red, white, and Ladino clover, alfalfa, orchardgrass, and fescue. Bluegrass is native to this county and grows well if properly fertilized.

Figure 13.—**Good crop of burley tobacco produced on Tusquitee loam, 6 to 10 percent slopes.**

Erosion is a moderate hazard if these soils are cultivated. Runoff and erosion can be reduced to satisfactory levels by returning all crop residue to the soil and using a crop rotation that includes a close-growing crop, such as perennial grass or legumes, 25 to 50 percent of the time. Some commonly used rotations are (1) a row crop followed in the fall by rye, and grass-clover seeded in the spring and left for 2 years, and (2) a rotation of 2 years of row crops with rye as winter cover followed by 2 years or longer of perennial grass or grass-clover mixture.

If used for pasture or hay, keep forage plants at a top growth height of not less than 3 inches for protection, and for maintaining a high level of production.

CAPABILITY UNIT IIe–2

This unit consists of Chester loam, 2 to 6 percent slopes. This is a well-drained, gently sloping soil on the broader ridges of the uplands. It has a loam surface layer. In some places the plow layer is a mixture of the original surface soil and the subsoil. The subsoil ranges from friable clay loam to sandy clay loam.

This soil is low in natural fertility and organic-matter content. Available water capacity is high, and permeability is moderate. This soil has good tilth where uneroded and can be worked throughout a wide range of moisture content. It responds well to applications of lime and fertilizer.

Most of the acreage has been cleared and is used for row crops, pasture, or hay. The soil has a wide range of suitability for crops, chiefly corn, small grain, tobacco, cabbage (fig. 14), and other truck crops. All locally grown grasses and legumes do well on this soil.

Erosion is a moderate hazard if this soil is cultivated. Runoff and erosion can be reduced by returning all crop residue to the soil. Conservation cropping systems should consist of a minimum of 1 year of row crops and 1 year of protective cover. A longer rotation is more desirable. One desirable rotation for this unit would be 2 years of row crops, a small grain or some other cover crop seeded in fall of the second year, and 2 years of perennial grass. Because of the cost involved in establishing perennial vegetation, it is more desirable to leave the permanent grass, legume, or mixture on the land for at least 3 to 5 years. If this is arranged in contour strips, conservation is more effective.

If these soils are used for pasture or hay, keep forage plants at a top growth height of not less than 3 inches for protection and for maintaining a high level of production.

CAPABILITY UNIT IIw–1

This unit consists of Comus fine sandy loam. This is a well-drained, nearly level soil on flood plains and is subject to very frequent flooding. It has a very friable fine sandy loam surface layer. The subsoil ranges from very friable loam to fine sandy loam.

The soil is low in natural fertility and organic-matter content. It is easy to keep in good tilth, and can be worked throughout a wide range of moisture content. This soil responds well to applications of lime and fertilizer. Available water capacity is high, and permeability is moderate.

This soil is among the most productive in the county. Most of the acreage is cleared and used for row crops, pasture, or hay. This soil is well suited to most locally grown crops. Flooding, two or three times a year, is the major limitation to the use of these soils. Although flooding is usually of extremely brief duration, it can damage crops in some years.

This soil can be used as intensively as any in the county. It can be cropped each year with little damage, if a good cover crop and other crop residue are returned to the soil to add organic matter and improve tilth. Crop yields, organic-matter content, and soil tilth can be maintained at higher levels if soil-conserving crops are included in the cropping system every other year, or 1 year out of 3.

If these soils are used for pasture or hay, keep forage plants at a top growth height of 3 inches for protection and for maintaining a high level of production.

CAPABILITY UNIT IIIe–1

This unit consists of well-drained, slightly and moderately eroded soils of the Clifton, Fannin, Chester, Hayesville, Tate, Tusquitee, and Watauga series. These soils are on uplands, or in upland draws and depressions or on foot slopes. They have a loam to silt loam surface

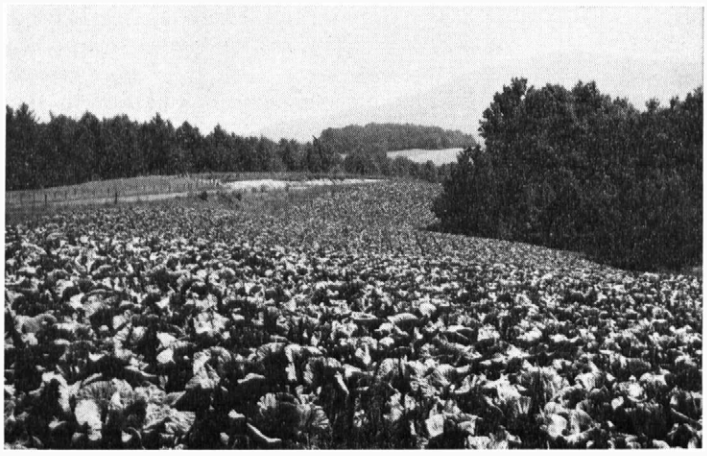

Figure 14.—**Cabbage (foreground) on Chester loam, 2 to 6 percent slopes. Contour farming controls runoff and erosion in this field.**

layer and a loam to clay subsoil. In some places the plow layer is a mixture of the original surface layer and the subsoil.

The soils of this unit are low to medium in natural fertility and low to high in organic-matter content. The available water capacity is medium to very high, and permeability is moderate to moderately rapid. The plow layer is easy to keep in good tilth, especially if tillage is shallow and infrequent and all crop residues are returned to the soil. These soils respond well to applications of lime and fertilizer.

Most of these soils are cleared and used for cultivation, pasture, or hay, and the rest are chiefly in forest. These soils have a wide range of suitability for crops. They are well suited to the production of corn, small grain, tobacco, and truck crops. They are also well suited to most grasses and legumes grown in the county.

Erosion is a severe hazard if these soils are cultivated. Runoff and erosion can be reduced, soil tilth improved, and organic-matter content increased by returning all crop residue to the soil. Management practices should include a close-growing crop 50 to 75 percent of the time, and contour tillage supported by stripcropping, grassed waterways, and field borders. Natural draws and drainage outlets for the disposal of surface water should be vegetated with perennial grass, preferably a sod-forming type. A suitable cropping system for these soils is 2 or more years of soil-conserving crops followed by 1 or 2 years of row crops. Perennial grasses are the best soil-conserving crops.

If these soils are used for pasture or hay, keep forage plants at a top growth height of 3 inches or more for protection and for maintaining a high level of production.

CAPABILITY UNIT IIIw–1

This unit consists of the Codorus complex. These are moderately well drained to poorly drained soils on flood plains and are subject to very frequent flooding of extremely brief duration. They have a very friable silt loam surface layer. The subsoil is friable silt loam, loam, or silty clay loam. Below this is stratified sands, silts, gravel, or stones.

The soils of this unit are low in natural fertility and organic-matter content. The available water capacity is high, and permeability is moderate. These soils are fairly easy to keep in good tilth. They respond well to applications of lime and fertilizer.

Most of these soils have been cleared and are in pasture, hay, or row crops. Because of very frequent flooding and a high water table during wet seasons, these soils have a rather narrow range of suitability for locally grown row crops, unless drained. If properly drained, they are suited to corn, particularly corn for silage. They are well suited to fescue and most other pasture and hay crops, but drainage is needed to obtain highest yields. They can be cropped continuously with little damage to the soil if cover crops, manure, and crop residues are added to the soil each year. A more suitable cropping system, however, is 1 or more years of a sod-forming crop followed by 1 or 2 years of row crops.

If these soils are used for pasture or hay, keep forage plants at a top growth height of 3 inches or more to maintain a high level of production.

CAPABILITY UNIT IIIs–1

This unit consists of excessively drained, nearly level Suncook loamy sand. This sandy soil is on flood plains and is subject to very frequent flooding of extremely brief duration. This soil has a very friable loamy sand surface layer and loamy sand and sand lower layers.

This soil is very low in natural fertility and organic-matter content. It responds fairly well to applications of lime and fertilizer. Available water capacity is low, and permeability is rapid.

Most of this unit is in pasture or hay, and the rest is in row crops or forest. This soil has a fairly narrow range of suitability for crops because of very low natural fertility, droughtiness, and flood hazard. It is fairly well suited to corn and to some early maturing crops, such as watermelons. Fescue and other pasture grasses grow fairly well if liberal amounts of fertilizer, particularly nitrogen, are used. This soil can be used for row crops each year with little damage to the soil if organic matter in large amounts is added. Crop residue and organic matter decompose rapidly, and fertilizer materials, particularly nitrogen, should be applied in split applications.

If this soil is used for pasture or hay, keep forage plants at a top growth height of 3 inches or more to maintain production.

CAPABILITY UNIT IVe–1

This unit consists of well-drained, strongly sloping to moderately steep soils of the Chester, Clifton, Fannin, Hayesville, Porters, Tate, Tusquitee, and Watauga series. These soils are on the uplands. They have a surface layer of loam and silt loam. The subsoil is friable and ranges from loam to dominantly clay loam. In places the plow layer is a mixture of the original surface layer and the subsoil.

The soils of this unit are low to medium in natural fertility. Organic-matter content ranges from low to high, and the available water capacity ranges from medium to very high. Permeability is moderate to moderately rapid. Except for the eroded spots, these soils are easy to keep in good tilth and can be worked throughout a wide range of moisture content. On the eroded spots, the soil crusts or clods if worked when wet, and stands of crops and yields are uneven. Most of these soils respond well to applications of lime and fertilizer. This capability unit has the largest acreage in the county. Most of it is in pasture or cultivation, and the rest is in forest.

These soils are fairly well suited to row crops and are well suited to all grasses and legumes. Slope is the major limitation to the use of these soils.

Erosion is a very severe hazard if these soils are cultivated. Soil and water losses can be reduced, soil tilth improved, and crop yields and organic-matter content increased by returning all crop residue to the soils. To protect the soil from erosion, a soil conserving crop should be used 75 percent or more of the time. Contour cultivation and stripcropping are needed practices. Diversions are needed in places. Perennial grasses are the best soil-conserving crop to use. Natural draws, field borders, and other needed outlets for disposal of surface water should be vegetated with sod-forming perennial grass. A suitable cropping system for these soils is 3 or more years of perennial grass or legumes

followed by 1 year of row crops. Crops should be arranged in strips, particularly on the steeper slopes.

If these soils are used for pasture or hay, keep forage plants to a top growth height of 3 inches or more for protection and for maintaining a high level of production.

CAPABILITY UNIT IVe–2

This unit consists of well-drained, stony, strongly sloping soils of the Chester and Tusquitee series. These soils are on uplands or in upland draws. The surface layer is loam, and the subsoil is friable loam or clay loam to sandy clay loam.

The soils of this unit are low to medium in natural fertility, low to high in organic-matter content, and high to very high in available water capacity. They are easy to keep in good tilth and can be worked throughout a wide range of moisture content, although the stones on the surface make cultivation difficult. Permeability is moderate to moderately rapid. These soils respond well to applications of lime and fertilizer.

Most of this unit is in forest, and the rest is used primarily for pasture. These soils are fairly well suited to well suited to crops; however, because of the stones and difficulty of operating farm machinery, they are better suited to pasture, forest, or wildlife than to other uses.

If these soils are cultivated, erosion is a very severe hazard. Soil and water loss can be reduced, soil tilth improved, and organic-matter content and crop yields increased by returning all crop residue to the soil. The soil should be protected with a soil-conserving crop 75 percent or more of the time. Contour cultivation and stripcropping are needed practices. Diversions are needed in places. Perennial grasses are the best soil-conserving crop to use. Natural draws, field borders, and other outlets needed for disposal of surface water should be vegetated with a sod-forming perennial grass. Examples of suitable cropping systems are (1) 3 or more years of perennial grass or legumes followed by 1 year of row crops, or (2) 4 or more years of perennial grass or legumes followed by 2 years of row crops. The crops should be arranged in strips, particularly on the steeper soils.

If these soils are used for pasture or hay, keep forage plants to a top growth height of 3 inches or more for protection and for maintaining a high level of production.

CAPABILITY UNIT IVw–1

This unit consists of poorly drained, nearly level areas of Alluvial land, wet. The areas are variable in texture and subject to very frequent flooding of very brief duration. They are on flood plains and in upland draws and depressions. The surface layer ranges from silt loam to fine sandy loam, and the underlying layers range from loamy sand to silty clay loam.

Alluvial land, wet, is low in natural fertility and organic-matter content and high in available water capacity. It responds fairly well to applications of lime and fertilizer. Permeability ranges from moderate to rapid.

About one-half of this unit is in pasture or hay, and the rest is mostly in forest. Because flooding is very frequent and water remains at or near the surface much of the time, the soil material has a narrow range of suitability for crops, even with adequate drainage. If drained, it is fairly well suited to corn, corn for silage, pasture, and hay crops, particularly fescue (fig. 15). The areas generally are not used for locally grown row crops.

If these soils are used for pasture or hay, keep forage plants at a top growth height of 3 inches or more for protection and for maintaining a high level of production.

CAPABILITY UNIT VIe–1

This unit consists of well-drained, steep upland soils of the Chester, Clifton, Fannin, Porters, and Watauga series. The surface layer is loam to silt loam. In places the plow layer is a mixture of the original surface soil and the subsoil. The subsoil ranges from loam to clay in texture but is dominantly friable clay.

The soils of this unit are low to medium in natural fertility. They range from low to high in organic-matter content, but are dominantly low. They respond well to applications of lime and fertilizer. Available water capacity ranges from medium to high. Permeability is moderate to moderately rapid. Surface runoff is very rapid and can cause very severe erosion if a protective cover is not maintained at all times.

This unit is about equally divided between forest and pasture; only a small acreage is used for cultivated crops. If properly managed, the soils are suited to pasture, trees, or wildlife. They are not suited to cultivated crops, because of slope and the erosion hazard. These soils are fairly well suited to well suited to fescue, orchardgrass, bluegrass, red, white, and alsike clover, and sericea lespedeza. Pasture seeding or renovation should be done in alternate strips, particularly on the steep or long slopes, to reduce erosion. Pastures should be stocked at a rate to maintain a top growth of not less than 3 inches for all grasses except bluegrass, which can be grazed to a height of 2 inches. The best method of maintaining top growth height is by rotational grazing.

CAPABILITY UNIT VIe–2

This unit consists of well-drained to somewhat excessively drained, strongly sloping to moderately steep

Figure 15.—**Good pasture of fescue (foreground) in a drained, well-managed area of Alluvial land, wet, which is in capability unit IVw–1.**

soils of the Ashe, Porters, and Tusquitee series. These soils are on uplands, in upland draws, and on foot slopes. The surface layer ranges from fine sandy loam to loam and is stony in places. The subsoil ranges from friable fine sandy loam to clay loam.

The soils of this unit range from low to medium in natural fertility, from low to high in organic-matter content, and from low to very high in available water capacity. Permeability is moderately rapid. In many places stones or rock outcrop are sufficiently numerous to interfere with tillage. These soils respond fairly well to applications of lime and fertilizer. Surface runoff is very rapid and can cause very severe erosion if a good protective cover is not maintained at all times.

Most of this unit is in forest, and the rest is chiefly in pasture. The soils are not suited to cultivated crops, because of stoniness, slope, low natural fertility, and droughtiness. If properly managed, they are suited to trees, pasture, or wildlife and are fairly well suited to fescue, orchardgrass, bluegrass, red, white, and alsike clover, and sericea lespedeza. Pasture seeding or renovation should be done in alternate strips, particularly on steep or long slopes, to reduce erosion. Pastures should be stocked at a rate to maintain a top growth of not less than 3 inches for all grasses except bluegrass, which should be maintained at a maximum of 2 inches. Pastures are best maintained by rotational grazing.

CAPABILITY UNIT VIIe–1

This unit consists of well-drained to somewhat excessively drained, strongly sloping to very steep upland soils of the Ashe, Chandler, Chester, Clifton, Fannin, Porters, and Watauga series, and of Gullied land. The texture of the surface layer is fine sandy loam, loam, and silt loam to clay loam. The texture of the subsoil ranges from fine sandy loam to clay.

This unit includes eroded and uneroded soils, both stony and nonstony types. In some of the eroded soils, as much as 75 percent of the original surface layer has been removed by erosion, and in places as much as 25 percent of the subsoil. Stones or rock outcrop make up as much as 15 percent of the surface layer of the stony soils.

Gullied land consists of areas where erosion has removed all or nearly all of the surface layer in 75 percent or more of the acreage. Erosion has also removed part or all of the subsoil in many of the places.

The soils of this unit are low to medium in natural fertility, low to high in organic-matter content, and low to high in available water capacity. Permeability ranges from moderate to moderately rapid.

Most of this unit is in forest, and the rest is chiefly in pasture. These soils are not suited to cultivation or hay and generally are unsuited to pasture, because of slope, stoniness, or gullying. Under good management most areas provide limited grazing. They are suited to trees, wildlife, or recreation.

CAPABILITY UNIT VIIs–1

This unit consists of stony, steep and very steep, upland soils of the Ashe and Chandler series, and of Stony steep land. The surface layer ranges from fine sandy loam to silt loam. Stones and rock outcrop make up as much as 90 percent of the surface layer. The subsoil is fine sandy loam, loam, or silt loam. It is thin and contains few to many stones.

The soils of this unit are low in natural fertility, organic-matter content, and available water capacity. They have moderately rapid permeability.

Most of this unit is in forest. The soils are unsuited to tillage, because of stoniness and slope. They are suited to trees, recreation, or wildlife.

CAPABILITY UNIT VIIIs–1

This unit consists of Rock outcrop. In these areas rock material covers more than 90 percent of the surface. The soil material has such severe limitations that it is suited only to wildlife or recreation. The areas have scenic beauty.

Estimated Yields

Table 2 gives estimates of yields of the principal crops grown in Alleghany County. Yields depend upon a combination of soil and climate, the kind of crop, and the level of management. The estimates in table 2 are based on a high level of management. Yields are substantially lower under less intensive management.

The following are practices generally considered necessary to obtain the yields given in table 2:

1. Fertilizer and lime are applied according to the needs indicated by soil tests.
2. High-yielding varieties of crops are grown.
3. Legumes are inoculated.
4. The soils are properly tilled, and the crops are properly cultivated.
5. Weeds, insects, and diseases are controlled.
6. Rotations that conserve moisture and protect the soils from erosion are used.
7. Runoff is adequately controlled.
8. Overgrazing is avoided, and the pastures are well managed.

The estimates given in the table are based on experience with the crops and the soils of the county. All are based on assumptions that the average amount of rainfall will be received over a long period of time, that no supplemental irrigation will be used, that adequate drainage will be provided, and that no flooding or ponding will take place.

Use of the Soils for Woodland [3]

All of the land area that is now Alleghany County was originally covered with dense forests. The trees were primarily broadleaf, deciduous hardwoods. However, several cone-bearing species with needlelike leaves grew among the hardwoods. These coniferous species included eastern hemlock, eastern white pine, shortleaf pine, Virginia pine, pitch pine, and Table-Mountain pine. Eastern redcedar was rather uncommon. These forests had an understory of shade-tolerant trees and shrubs, as well as muscadine grape and other woody vines. In places,

[3] By JOHN E. WIGGINS, JR., forester, Soil Conservation Service.

TABLE 2.—*Estimated average yields per acre of important crops grown under a high level of management*

[Dashed lines indicate that the crop is not commonly grown on the soil or that data on which to base an estimate are not available]

Soil	Corn	Corn for silage	Burley tobacco	Cabbage	Irish potatoes	Hay		Grass-clover pasture
						Alfalfa	Grass-clover	
	Bu.	*Tons*	*Lb.*	*Tons*	*Cwt.*	*Tons*	*Tons*	*Animal-unit-days* [1]
Alluvial land, wet	70	20					2. 5	170
Ashe fine sandy loam, 10 to 25 percent slopes							1. 5	115
Ashe fine sandy loam, 25 to 45 percent slopes								90
Ashe stony fine sandy loam, 25 to 45 percent slopes								40
Ashe stony fine sandy loam, 45 to 65 percent slopes								30
Chandler silt loam, 10 to 25 percent slopes								95
Chandler silt loam, 25 to 45 percent slopes								70
Chandler stony silt loam, 25 to 45 percent slopes								45
Chandler stony silt loam, 45 to 65 percent slopes								40
Chester loam, 2 to 6 percent slopes	100	25	2, 300	34	170	3. 0	2. 5	185
Chester loam, 6 to 10 percent slopes	80	20	2, 000	28	160	2. 5	1. 9	165
Chester loam, 10 to 25 percent slopes	70	16	1, 800	26	145	2. 2	1. 5	150
Chester loam, 25 to 45 percent slopes								120
Chester clay loam, 15 to 45 percent slopes, eroded								100
Chester stony loam, 10 to 15 percent slopes								95
Chester stony loam, 15 to 45 percent slopes								70
Clifton loam, 6 to 10 percent slopes	100	24	2, 100	30	160	3. 8	2. 7	165
Clifton loam, 10 to 25 percent slopes	75	18	1, 900	25	140	3. 0	2. 4	150
Clifton loam, 25 to 45 percent slopes								130
Clifton stony loam, 15 to 45 percent slopes								80
Codorus complex	110	30		40	160		2. 5	190
Comus fine sandy loam	110	30	2, 500	40	180	2. 5	2. 5	210
Fannin silt loam, 6 to 10 percent slopes, eroded	70	15	2, 200	28	155	2. 8	2. 8	160
Fannin silt loam, 10 to 25 percent slopes, eroded	60	12	2, 050	25	145	2. 3	2. 3	145
Fannin silt loam, 25 to 45 percent slopes								110
Fannin silty clay loam, 15 to 45 percent slopes, eroded								70
Gullied land								
Hayesville loam, 6 to 10 percent slopes	80	18	2, 250	21	155	3. 0	3. 0	175
Hayesville loam, 10 to 25 percent slopes	70	14	2, 100	20	145	2. 8	2. 8	165
Porters loam, 10 to 25 percent slopes	90	20	2, 200	28	155	3. 2	2. 6	180
Porters loam, 25 to 45 percent slopes								150
Porters stony loam, 10 to 25 percent slopes						2. 0	1. 8	110
Porters stony loam, 25 to 45 percent slopes								80
Porters stony loam, 45 to 65 percent slopes								
Rock outcrop								
Stony steep land								
Suncook loamy sand	50	10		15	100		1. 5	130
Tate loam, 2 to 6 percent slopes	110	25	2, 500	40	200	3. 1	3. 0	205
Tate loam, 6 to 10 percent slopes	90	23	2, 300	38	180	2. 8	2. 8	190
Tate loam, 10 to 15 percent slopes	80	20	2, 150	35	170	2. 7	2. 7	180
Tusquitee loam, 6 to 10 percent slopes	110	32	2, 500	40	200	3. 8	2. 9	200
Tusquitee loam, 10 to 15 percent slopes	100	25	2, 300	37	180	3. 4	2. 8	190
Tusquitee loam, 15 to 25 percent slopes	80	20	2, 100	35	160	2. 8	2. 5	180
Tusquitee stony loam, 10 to 15 percent slopes	75	20	2, 100	28	150	2. 8	2. 1	135

See footnote at end of table.

TABLE 2.—*Estimated average yields per acre of important crops grown under a high level of management*—Continued

Soil	Corn	Corn for silage	Burley tobacco	Cabbage	Irish potatoes	Hay		Grass-clover pasture
						Alfalfa	Grass-clover	
	Bu.	*Tons*	*Lb.*	*Tons*	*Cwt.*	*Tons*	*Tons*	*Animal-unit-days* [1]
Tusquitee stony loam, 15 to 25 percent slopes								115
Watauga loam, 6 to 10 percent slopes	80	20	2,100	32	165	2.6	2.0	160
Watauga loam, 10 to 25 percent slopes	70	15	1,800	25	145	2.2	1.5	140
Watauga loam, 25 to 45 percent slopes								110
Watauga stony loam, 15 to 45 percent slopes								75

[1] Animal-unit-days is a term used to express the carrying capacity of pasture. It is the number of animal units carried per acre multiplied by the number of days the pasture is grazed during a single grazing season without injury to the sod. An acre of pasture that provides 30 days of grazing for two cows has a carrying capacity of 60 cow-acre-days. An animal unit is one cow, one steer, or one horse; five hogs; or seven sheep or goats.

thick stands of rhododendron and mountain-laurel were conspicuous among the flora of the understory.

The moist soils of the alluvial flood plains, lower mountain slopes, and coves supported stands of variable mixtures of moist-site hardwoods, hemlock, white pine, and shortleaf pine. Broadleaf trees included chestnut; yellow-poplar; red, silver, and sugar maples; sweet birch; black walnut; butternut; white and green ash; American beech; hickories; red and white oaks; basswood; cucumbertree; black locust; persimmon; blackgum; sycamore; and elms. Growing in the understory were flowering dogwood, sourwood, serviceberry, sassafras, American holly, blue beech, hophornbeam, red mulberry, rhododendron, and mountain-laurel.

The upper slopes, knolls, ridge crests, and mountaintops also had a cover of many different broadleaf species and white, shortleaf, Virginia, and pitch pines. Scattered Table-Mountain pine grew on ridge crests and upper slopes at the higher elevations. Among the hardwoods were chestnut, hickories, red and white oaks, maples, beech, yellow-poplar, ash, blackgum, sweet birch, and black locust. Yellow birch grew at the higher elevations, generally above 3,000 feet. Dogwood, holly, sasafras, serviceberry, sourwood, flaming azalea, rhododendron, and mountain-laurel grew in the understory.

Scarlet and chestnut oaks, and shortleaf and pitch pines were characteristic overstory species in stands occupying the drier, shallower soils, such as Ashe and Chandler, on south and southwest slopes.

Chestnut was formerly an important tree in the county for both timber and nut production. Unfortunately, by 1940, the chestnut blight fungus (*Endothia parasitica*) had killed practically all the trees. Some of the dead trees are still standing, especially in the more inaccessible locations. Many have been cut and the wood utilized. The rest have fallen, and the wood is decaying.

Before the American Revolution, early settlers made small clearings in the forest to produce food crops and flax for their immediate needs. Some of the timber cut in clearing for farming was used as building material and as fuel, but much of it was destroyed. At first, the level, relatively fertile bottom lands along the streams were cleared, but as more settlers came, they began clearing small fields on the lower slopes and in the coves. Continual cropping caused the fertility of the soils to be depleted, and production declined. Then the settlers cleared new fields on the slopes and abandoned the old ones. Grass, and in some cases trees, revegetated the abandoned clearings. In this manner, second-growth stands of white, Virginia, and shortleaf pines became established. Some of them are nearly pure. Cultivation continued, however, on most of the bottom lands, and today they are still cropped or are in hay and pasture.

Clearing for cropland, pasture, and other uses has continued until the present. In 1964, 52.8 percent of the total land area of 147,200 acres was in nonforest use. Forests occupied 69,400 acres (*14*), or about 47.2 percent of the county. Of the total forested area, 66,100 acres is classed as commercial forest land; that is, forest land which is capable of producing industrial wood crops and is not withdrawn from timber utilization by statute or administrative regulation. Virtually all of the commercial forest land is in private ownership, and farmers hold the greatest part of it. The remaining 3,080 acres is in the Blue Ridge Parkway and is classed as "productive-reserved" forest land. This is forested area that qualifies as commercial forest, but is withdrawn from timber utilization for recreational or other use.

Generally, forests occupy the steeper, more stony, or less fertile land—those areas that are unsuited or poorly suited to pasture and crops.

Through repeated cutting, most of the high-quality trees in the natural stands of hardwoods have been removed, leaving low-quality, or cull, trees. The market for these trees is very limited. From the standpoint of forest improvement in the county, the greatest need is the utilization of these low-quality hardwoods. Charcoal production is, perhaps, the best outlet for the lowest grades. Better grade hardwoods, such as sugar maple, red maple, and birch, can be used in furniture production.

In many cases, where cleared land is too steep or rough for cropland or pasture, the growing of white pine and Fraser fir for Christmas trees offers an excellent opportunity to landowners for profitable use of such lands. In recent years many owners have been planting seedlings for both Christmas tree and timber production.

Recreational use of forest land offers Alleghany County one of the best opportunities for long-term growth. Development of sites for summer homes is an excellent possibility. The pleasant summer climate, beautiful mountainous landscape, trees and other vegetation, and the opportunity for fishing and other recreational pursuits provide a very desirable environment for this enterprise.

Forest sites and tree growth

A forest site has a distinctive combination of ecological factors that largely determine its productivity of trees and other vegetation. These factors are mainly climate, physiography, soil, the effect of man or other animals, and the interacting effects of plants growing on the site. Some plants are better suited to certain sites than others. Shortleaf, pitch, and Virginia pines, for example, are more tolerant of drought, and consequently more abundant than eastern white pine on the drier, less fertile soils of the ridgetops and south and southwest mountain slopes. Red maple, black willow, and smooth alder are suited to the wet alluvial lands, which are saturated much of the time. Few other mountain species are water tolerant.

Site quality is the productivity of a specific area for a given species or given forest type. Within a limited climatic zone and physiographic area, this productivity is largely controlled by those soil properties and site features that influence the amount and the relationship between available water capacity and air in the soil. In effect, those factors that determine the quality and quantity of space available for root development are the ones most significantly related to tree growth (*4*). Among these are soil depth, texture of the surface and subsoil layers, pore-space distribution, and available water capacity.

Soil depth determines the total volume of soil available for root growth. The thickness of the surface layer; the depth to bedrock; the depth to a fine-textured, a mottled, or a least permeable layer; depth to the seasonally high water table; and total soil depth are related to site quality. The more shallow soils, such as the Ashe soils, have limited space for root growth, and the site quality is thereby lowered.

The available water capacity of the soil and the availability of soil moisture are distinctly related to soil texture. Texture also affects the size and distribution of small roots. For these reasons, it influences site quality. Although coarse-textured soils, such as Suncook loamy sand, provide space for small roots, they have low available water capacity. This results in lowering the site quality. On the other hand, soils that have a clay subsoil have high available water capacity. This may cause such poor soil aeration, however, that root growth is hindered, and site quality is thereby lowered. Soils that have a surface layer of loam, sandy loam, or silt loam and a subsoil of sandy clay, clay loam, or silty clay loam appear to be the most favorable for tree growth.

Topographic factors, such as degree and extent of slope; position on slope; aspect, or the direction the slope faces; and the degree of surface and subsurface drainage affect site quality and species suitability. Tree growth is better on the deeper soils of the lower slopes and coves, such as Tusquitee and Tate, than on the shallower soils of the upper slopes and ridgetops, such as Ashe and Chandler. In general, the steeper the topography, the greater the effect these factors have on the site. Drainage is an important factor affecting site quality, species suitability, and management. The extremes, either an excessively wet or an excessively drained soil condition, lower site quality, restrict the number of suitable species, and present difficult management problems.

Rainfall and the length of the frost-free period per year are climatic factors that also have been correlated with site quality and tree growth.

Site quality, or the potential productivity of a soil, may be rated by determining the site index. The site index of a given soil and site for a specified tree species is the average of the total heights, measured in feet, of the best (dominant and codominant) trees in an even-aged stand when the trees have attained 50 years of age. Yield tables, developed for normal (fully-stocked) or managed stands, are based on site index. Although site index is an indirect indicator, those soils that have the highest site indices produce the highest yield of timber.

The forester or woodland owner can use potential productivity ratings, combined with appropriate yield tables, as a key in solving problems and making important decisions involved in woodland use and management. Among these are predicting growth and yield, designating certain areas for tree crop production, selecting the right species for the site, determining the length of rotations for various wood crops, selecting the species to favor when cutting, determining the time interval between thinnings, and the costs and returns to be expected in management.

Woodland suitability groups

The soils of Alleghany County have been placed in seven woodland suitability groups to aid in planning for the productive use of soils and the management of woodlands. The soils in each group can be determined by consulting the "Guide to Mapping Units." Each group consists of soils that have about the same available water capacity and other major physical properties and characteristics that affect tree growth. Therefore, the potential productivity for important commercial forest tree species is about the same in each group. The soils in each group also present similar problems in planting, tending, and harvesting trees. Consequently, all of the soils in a group require about the same management, including the application of similar conservation practices.

In the following discussion of each woodland suitability group, the soils are briefly described. and the preferred kinds of trees for producing sawtimber, pulpwood, veneer and other wood products, Christmas trees, and wildlife food are discussed.

The site index range (*3*, *5*, *8*,) for each of several commercially important forest trees [4] is given for each group. Yields for the different species may be obtained by consulting appropriate yield tables.

The site indices are based on plot studies made of soil-site-tree growth relationships throughout the Blue Ridge Mountains. Approximately 50 of the plots examined were in Alleghany County. Although nearly 900 plots have been studied in the mountain resource area, in some places little or no information was available for a specific tree species on a particular soil. In such instances the site index is based on data for the same species growing on a similar soil.

Ratings of the soils with respect to plant competition, seedling mortality, equipment restrictions, erosion, windthrow, and certain disease and insect enemies are discussed in the following paragraphs.

Plant competition.—When openings are made in the canopy of a stand of desirable trees by cutting, fire, grazing, or other disturbance, undesirable trees, shrubs, vines, grasses and other plants can invade the site. The invading plants compete with desirable tree seedlings for water, nutrients, and sunlight and either hinder or prevent their establishment and growth. Ratings are given for each woodland suitability group according to the degree of competition that may be expected from unwanted plants. A rating of *slight* indicates that competition from such plants presents no special problem to management. A rating of *moderate* means plant competition does not ordinarily prevent the establishment of an adequate stand of the desired species, but can delay the development of the normal, fully stocked stand because seedling establishment is prolonged and early growth is slower. A rating of *severe* indicates that competition prevents adequate restocking, either natural or artificial, unless there are special site preparation and special maintenance practices, including weeding.

Seedling mortality.—The hazard of seedling mortality, or regeneration potential, refers to the expected degree of loss of naturally occurring, direct-seeded, or planted tree seedlings as a result of unfavorable soil characteristics or topographic features. In evaluating seedling mortality, it is assumed that plant competition is not a limiting factor. For planted seedlings, it is assumed that healthy seedlings of the proper grade have been correctly planted. An adequate seed source is assumed for seedlings established by natural reseeding. Normal environmental factors are assumed for both planted and naturally established seedlings. A rating of *slight* indicates that, ordinarily, no more than 25 percent of either planted or naturally occurring seedlings die. One planting usually produces a satisfactory stand. A rating of *moderate* means that the losses to be expected are between 25 and 50 percent of the stand and natural regeneration cannot always be relied upon for adequate and immediate restocking. A rating of *severe* indicates that more than half of the seedlings are likely to die and that superior planting techniques and much replanting are required to assure adequate stocking.

Equipment limitations (*relative trafficability*).—Physical soil characteristics or topographic features, such as texture, stoniness, slope, and drainage, can restrict or prohibit the use of equipment commonly employed in harvesting trees and other forest management operations. An equipment limitation rating of *slight* indicates that no particular factors limit the use of equipment. A rating of *moderate* means that not all types of equipment can be used; that there are periods not in excess of 3 months when equipment cannot be used because of seasonal soil wetness; that the slopes are 15 to 25 percent; or that there are unfavorable soil characteristics, such as plasticity, a fine-textured surface layer, or deep sands or loamy sands. A rating of *severe* indicates that the use of some kinds of equipment is limited and that special equipment is required; that soils have a seasonal wetness of more than 3 months, have slopes steeper than 25 percent, or 15 percent on stony phases, or have unfavorable soil texture that limits equipment use; and that operation of equipment can be expected to injure tree roots and cause serious damage to the structure and stability of the soil.

Erosion hazard.—Erosion hazard refers to the potential hazard of erosion if the soils are managed according to currently accepted standards. Woodland can be protected from erosion by growing certain kinds of trees, by adjusting the rotation age and cutting cycles, by using special management techniques, and by careful construction and maintenance of roads, trails, and landings. The ratings of erosion hazard are based on the increased risk of erosion on well-managed woodland that is not protected by special practices. A rating of *slight* means that a small loss of soil is expected, generally where slopes are less than 6 percent. A rating of *moderate* indicates that a moderate loss of soil can be expected where runoff is uncontrolled and vegetative cover is inadequate, generally where slopes range from 6 to 15 percent. The erosion hazard is rated as *severe* where slopes are steep, or the soil has a slow infiltration and permeability rate, or where erosion has left the soil bare.

Windthrow hazard.—Windthrow refers largely to windfirmness as reflected by the soil characteristics that influence the development of the root system of the tree. However, windfirmness is also influenced by differences in root systems among species or groups of species. Windfirmness is an important consideration when making recommendations for stand density control in thinnings, release cuttings, and intermediate cuttings; in regeneration; and in final harvest cuttings. A rating of *slight* indicates that no special problem is recognized. A rating of *moderate* indicates that root development of designated species is adequate for stability except during periods of excessive wetness and during periods of greatest wind velocity. A rating of *severe* means that the soils do not permit adequate rooting for stability.

The influence of soils on the growth and management of trees for each woodland suitability group is based primarily upon the field observations, experiences, and judgment of local foresters, soil scientists, and landowners. However, some is based on the results of specific research.

WOODLAND SUITABILITY GROUP 1

This group consists of well-drained to poorly drained soils. These soils are nearly level and are on flood plains. They have a fine sandy loam and silt loam surface

[4] The ratings for yellow-poplar are based on 1957 data, and those for eastern white pine are based on 1960 data. These data were assembled by W. T. DOOLITTLE, Forest Service.

layer and a very friable to friable fine sandy loam to silty clay loam subsoil. Natural fertility and organic-matter content are low. Available water capacity is high, and permeability is moderate. Water and tree roots easily penetrate these soils. Very frequent flooding of extremely brief duration is the chief limitation to producing trees. It can cause seedling mortality and impede logging and other forest management.

Eastern white pine is the preferred species for pulpwood and saw log rotations. Shortleaf pine is also well suited but grows more slowly than white pine. Yellow-poplar, black walnut, white and green ash, red and white oaks, black cherry, sycamore, and other desirable hardwoods also grow exceptionally well on these soils. These species produce high-quality veneer bolts and sawtimber. White pine, Norway spruce, Scotch pine, and Fraser fir are suitable for Christmas trees. Oaks, hickories, black cherry, and dogwood grow well on these soils; these are important for production of food for wildlife.

The site index is 85 to 95 for white pine, 75 to 85 for short-leaf pine, 95 to 115 for yellow-poplar, and 80 to 90 for red oaks.

Plant competition to pines, yellow-poplar, and other desirable hardwoods is moderate to severe. Disking, blading, applying herbicides, or other site treatment may be necessary in many places to eliminate or control competing, undesirable vegetation before planting or seeding pines, yellow-poplar, and other desirable species.

Seedling mortality is generally slight; more than 75 percent of planted seedlings survive. Yellow-poplar seedlings should not be planted in areas where these soils are subject to flooding for 3 days or longer during the summer. Submergence of yellow-poplar seedlings for periods longer than 3 days usually kills them (*6*). Surface drainage is needed in places to eliminate or reduce ponding, which is a greater hazard on the somewhat poorly drained and poorly drained soils than on the well-drained soils. Satisfactory stocking usually can be obtained from natural reseeding where adequate seed trees are present and competing vegetation is controlled.

Restrictions on the use of equipment common to forest management are moderate. During wet periods, many areas of the somewhat poorly drained and poorly drained soils can be too boggy to support heavy equipment. Use of equipment in winter can seriously damage tree roots and soil structure.

The erosion hazard is slight on these soils. Windthrow is not a hazard, except during abnormally high winds.

WOODLAND SUITABILITY GROUP 2

This group consists of Alluvial land, wet. The areas are poorly drained and nearly level. They are on flood plains and in upland draws and depressions. The surface layer is silt loam to fine sandy loam, and the subsoil is loamy sand to silty clay loam. Natural fertility and organic-matter content are low. Available water capacity is high, and permeability is moderate to rapid. Unless artificial drainage is installed, the seasonally high water table restricts penetration of tree roots. Very frequent flooding of extremely brief duration may prevent seed germination, or drown seedlings, and severely limit the use of equipment.

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Eastern white pine, green ash, sycamore, yellow-poplar, and red oaks are preferred species, and are important sources of wildlife food. These soils are well suited to pulpwood and saw log rotations and are capable of producing high-quality veneer bolts.

If the soils are drained, the site index range is 90 to 100 for white pine, 95 to 105 for yellow-poplar, and 85 to 95 for red oaks.

Plant competition to pines and desirable hardwoods is usually severe. Low-grade hardwoods, rhododendron, mountain-laurel and other shrubs, and vines, unless eradicated or controlled, prevent natural seeding or planting of desired species. Blading and clearing, or other site treatment, is required to control competing vegetation and to prepare seedbeds for restocking desirable kinds of trees.

Seedling mortality is usually moderate for most species. Yellow-poplar and white pine are especially vulnerable to excessive wetness. Drainage reduces seedling mortality and improves site quality.

Restrictions on the use of equipment are usually severe. Drainage and road construction are required on these soils to make them accessible for forest management. The use of equipment should be avoided during wet periods to prevent compaction and damage to tree roots.

Erosion and windthrow are not significant hazards.

WOODLAND SUITABILITY GROUP 3

This group consists of nearly level, excessively drained soils on flood plains subject to very frequent flooding of extremely brief duration. They have a loamy sand surface layer and a subsoil of loamy sand and sand over gravel or stones at some depth. Natural fertility and organic-matter content are very low. Permeability is rapid, and available water capacity is low.

Very frequent flooding of extremely brief duration, very low natural fertility, and leaching are major limitations in tree production.

Eastern white pine is the preferred species for pulpwood or saw log rotations. Shortleaf pine is also suitable. Once established, desirable hardwoods, such as yellow-poplar and sycamore, grow well on these soils.

The site index range is 75 to 85 for white pine, 55 to 65 for shortleaf pine, and 85 to 95 for yellow-poplar.

Plant competition to pines and desirable hardwoods is generally moderate. Elimination or control of undesirable vegetation may be required in places.

Seedling mortality ranges from slight to moderate. Flooding, including scouring and silting, can cause loss of seedlings. Extensive replanting may be needed in places. Natural reseeding cannot be relied upon to establish a fully stocked stand of desirable trees.

Limitations on the use of equipment are generally slight.

Erosion and windthrow are negligible hazards to trees growing on these soils.

WOODLAND SUITABILITY GROUP 4

This group consists of well-drained soils in draws and on foot slopes. They are gently sloping to moderately steep. They are known locally as cove land. They have a loam surface layer and a loam to clay loam subsoil. Stones are on the surface in some places. These soils are

low to medium in natural fertility and medium to high in organic-matter content. Permeability of these soils is moderate to moderately rapid, and available water capacity is high to very high. Water and tree roots readily penetrate these soils.

Eastern white pine, shortleaf pine, yellow-poplar, black walnut, black cherry, sugar maple, white ash, northern red oak, white oak, and yellow and black birches are preferred species. These soils are suitable for pulpwood and saw log rotations and are capable of producing high-quality veneer bolts. White pine, Scotch pine, Norway spruce, white spruce, and Fraser fir are well-adapted species suitable for Christmas trees. Oaks, hickories, black cherry, dogwood, and beech are important wildlife food-producing species that grow exceptionally well on these soils.

The site index range is 85 to 95 for white pine; 75 to 85 for shortleaf pine; 90 to 110 for yellow-poplar; and 75 to 85 for red oaks.

Plant competition to pines, yellow-poplar, and other desirable hardwoods is usually severe. Clearing, blading, applying herbicides, or other site treatments may be necessary in many places to control or eradicate competing undesirable vegetation prior to planting or seeding pines, yellow-poplar, and other desirable species.

Seedling mortality is usually slight, and at least 75 percent of planted seedlings survive. Where an adequate number of seed trees is present and competing vegetation is controlled, well-stocked stands of naturally regenerated trees will become established.

Limitations on the use of equipment increase with the steepness of slope and the degree of stoniness. Except on the stony phases of these soils, limitations are slight on slopes of up to 15 percent, moderate on slopes of 15 to 25 percent, and severe on steeper slopes. On the stony phases, equipment limitations are moderate on slopes up to 15 percent and severe on steeper slopes.

The water erosion hazard is slight to moderate on slopes of 6 to 15 percent and severe on steeper slopes. Roads on unprotected slopes in steep areas are subject to severe erosion.

Windthrow is not a significant hazard on these soils, except during abnormally high winds.

Because of adverse climatic conditions, white pine should not be planted at elevations above 4,000 feet; shortleaf pine, above 3,000 feet; and yellow-poplar, above 4,500 feet.

WOODLAND SUITABILITY GROUP 5 (A AND B)

This group consists of well-drained upland soils. These soils are gently sloping to very steep. They have a loam, silt loam, silty clay loam, or clay loam surface layer and a friable, loam to clay subsoil. Natural fertility of these soils is low to medium, and organic-matter content ranges from low to high. Permeability is moderate to moderately rapid, and available water capacity is medium to high. Water and tree roots readily penetrate these soils. They have been placed in two subgroups, according to texture of the surface layer and its effect on workability and seedling mortality.

Subgroup 5A includes the upland soils that have a loam and silt loam surface layer.

Eastern white pine is the preferred coniferous species. Shortleaf pine is also suited, but grows more slowly than white pine. Yellow-poplar, black walnut, sugar maple, black cherry, white and green ash, red and white oaks, and yellow and black birches are suitable hardwood species preferred for sawtimber, veneer, or furniture stock. White pine, Scotch pine, Norway spruce, white spruce, and Fraser fir are species suitable for Christmas trees. Oaks, hickories, black and white walnuts, beech, and dogwood are important wildlife food-producing species that grow well on these soils.

The site index range is 80 to 100 for white pine, 65 to 75 for shortleaf pine, 80 to 100 for yellow-poplar, and 70 to 80 for red oak.

Plant competition to pines and hardwoods is moderate to severe. Clearing, blading, brush cutting, applying herbicides, or a combination of these and other treatments frequently is necessary to eradicate or control competing undesirable vegetation and to prepare sites before planting or seeding desired species.

Seedling mortality is usually slight, and 75 percent or more of planted seedlings survive. Where adequate seed trees of desired species are present, and competing vegetation is controlled, well-stocked stands of naturally regenerated trees can be obtained.

Limitations on the use of equipment increase with the steepness of slope and the degree of stoniness. Except on the stony phases of these soils, limitations are slight on slopes up to 15 percent, moderate on slopes from 15 to 25 percent, and severe on slopes over 25 percent. On the stony phases, equipment limitations are moderate on slopes up to 15 percent, severe on slopes from 15 to 45 percent, and very severe on steeper slopes.

The water erosion hazard is slight on slopes up to 6 percent, moderate on slopes from 6 to 15 percent, and severe on steeper slopes. Roads on unprotected slopes in steep areas are subject to severe erosion. In constructing roads and firebreaks, the grade should not exceed 10 percent.

Windthrow is a negligible hazard on these soils, except during abnormally high winds.

Because of adverse climatic conditions, white pine should not be planted at elevations above 4,000 feet; shortleaf pine, above 3,000 feet; and yellow-poplar, above 5,000 feet.

Subgroup 5B is made up of upland soils that have a clay loam or silty clay loam surface layer. These finer textures are a result of the loss of the original surface layer by erosion and the mixing of the subsoil in the plow layer. This has altered workability of the surface soil, lowered the survival of planted seedlings, and reduced infiltration of water into the soil.

White pine is the preferred species for saw log and pulpwood rotations. Shortleaf pine is also suitable, but grows more slowly than white pine.

The site index range is 80 to 90 for white pine, 60 to 70 for shortleaf pine, and 70 to 80 for Virginia pine.

Plant competition to pines is usually slight.

Seedling mortality is usually moderate, although it may be severe in places, and some replanting may be necessary. Natural reseeding cannot always be relied upon to provide an adequately stocked stand of pines.

Equipment limitations are moderate on slopes up to 15 percent and severe on steeper slopes. Roads on unprotected slopes are likely to become severely eroded. Special precautions should be taken in constructing and main-

taining roads, skid trails, and firebreaks to reduce further soil losses from erosion. Soil structure and tree roots are severely damaged by the trampling of heavy concentrations of livestock.

The hazard of additional erosion is moderate on slopes up to 10 percent and severe on steeper slopes. Provision should be made for adequate ground cover.

The windthrow hazard is usually moderate, except during abnormally high winds.

WOODLAND SUITABILITY GROUP 6

This group consists of somewhat excessively drained upland soils. These soils are strongly sloping to very steep. They have a fine sandy loam surface layer and a friable fine sandy loam and loam subsoil, or a silt loam surface layer and loam and silt loam subsoil. Stones are on the surface in some places. Natural fertility and organic-matter content are low. Permeability is moderately rapid, and available water capacity is low. Penetration of water and tree roots is limited by depth to bedrock. This depth is commonly 2½ feet to 5 feet in the soils that have a fine sandy loam surface layer, and 4 feet to 7 feet in the soils that have a silt loam surface layer.

Eastern white pine is the preferred species for pulpwood and saw log rotations. Shortleaf, Virginia, and pitch pines are also suitable, but grow more slowly. White pine and Scotch pine are suitable for Christmas trees.

The site index range is 75 to 85 for white pine and 55 to 75 for shortleaf pine.

Where bedrock is very near the surface, chiefly on the stony soils, no commercial wood crop of any species can be produced. Because of the shallowness of the root zone and droughtiness, the wood production potential, alone, does not justify the cost of establishing and managing trees. On such sites, watershed protection is the main objective of planting trees. Onsite investigation should be made on such areas before attempting forest management for wood production.

Plant competition to pines is slight to moderate, depending on depth to bedrock. Clearing, blading, applying herbicides, or other treatments, may be necessary to control competing undesirable vegetation.

On these droughty soils, seedling mortality is usually slight to moderate, although it may be severe on steep slopes or where bedrock is near the surface. Here, superior planting techniques are required to obtain an adequately stocked stand of pines. Replanting may still be necessary. Ordinarily, well-stocked stands cannot be obtained through natural regeneration.

Restrictions on the use of equipment range from slight to very severe, depending on steepness of slope and degree of stoniness. Except on stony phases, limitations are considered to be slight on slopes up to 15 percent, moderate on slopes from 15 to 25 percent, severe on slopes from 25 to 45 percent, and very severe on steeper slopes. On the stony phases, equipment limitations are moderate on slopes up to 15 percent, severe on slopes of 15 to 45 percent, and very severe on slopes of more than 45 percent.

The water erosion hazard is moderate on slopes from 10 to 15 percent and severe on steeper slopes.

Root development is restricted where bedrock is near the surface and by droughtiness. As a result, the windthrow hazard ranges from moderate to severe. It is very severe where bedrock is near the surface.

WOODLAND SUITABILITY GROUP 7

This group consists of several miscellaneous land types, including Gullied land, Rock outcrop, and Stony steep land. These consist of soils that have profiles that have been greatly altered by man or water, or both, and land types that have little or no soil development. These miscellaneous land types are so variable that onsite investigation of an area is required to determine if or how it can be managed for tree production.

The potential productivity of the land types for trees varies widely. Where surface soil remains, merchantable trees can be grown, and eastern white pine and Virginia pine are the preferred species for planting.

Plant competition is usually slight where erosion is still active. Where vegetation has become established and the soil is stabilized, plant competition is severe for the limited supply of moisture.

Seedling mortality is usually severe, unless special site preparation practices are applied. Such practices as construction of check dams, mulching, fertilization, and seeding a protective cover of grasses or legumes are required to establish an adequate stand of trees and to control erosion. Even with the application of these practices, extensive replanting is necessary. Seedlings must be planted by hand. On plantable sites, seedling mortality is widely variable.

The use of most equipment is severely restricted by steep slopes, stoniness, rock outcrops, gullies, or a combination of these.

Erosion is a very severe hazard on Gullied land unless a protective cover is established. The hazard of windthrow is very severe on most of these areas for all kinds of trees.

Use of the Soils for Wildlife [5]

The soils of Alleghany County produce food, cover, and protection for many species of wildlife. Bobwhite, foxes, grouse, rabbits, raccoon, squirrels, and many nongame birds are common over most of the county. Doves are present but are not very abundant, and public sentiment is against hunting them. Deer are fairly abundant in the southern part of the county, along the Blue Ridge Parkway and the areas bordering Surry and Wilkes Counties. A few ducks, mainly wood ducks, mallards, and black ducks, are along the rivers during fall and winter. Only a few remain here all winter. An occasional beaver is also found along the rivers.

Though not classified as a game animal, the groundhog, or woodchuck, receives much hunting pressure during spring, summer, and early fall, and is abundant over most of the cleared land.

Fishing opportunity in Alleghany County is diversified. The smaller, cold streams contain brook trout, whereas the larger and slightly warmer streams provide suitable habitat for rainbow and some brown trout. Rainbow and brook trout are also stocked in those ponds where water temperature does not exceed 75° F. during summer.

[5] By E. R. Smith, biologist, and John P. Edwards, biologist, Soil Conservation Service.

Smallmouth bass, rock bass, channel catfish, and walleye are found in the cool waters of the New River. This beautiful, clear river is famous for its smallmouth bass fishing. Largemouth bass and bluegills are confined to the warmer waters of farm ponds at the lower elevations.

The foods of various species of wildlife differ widely, and the abundance of a particular form of wildlife is dependent on the presence or absence of its preferred foods. In the following paragraphs, the foods and habitat requirements of the major kinds of wildlife are discussed.

Beaver.—Beavers eat only food obtained from plants, mostly bark, roots, tender twigs, and greens. Their favorite food is the tender bark, or the cambium, of alder, ash, birch, hornbeam, maple, pine, and willows. Acorns and corn are also choice foods. In addition, beavers eat the tender shoots of alder, honeysuckle, grass, and weeds. The main feeding areas are within 150 feet of water.

Deer (White-tailed).—Deer eat acorns, alfalfa, clovers, cowpeas, buffalonut, greenbriers, honeysuckle, annual and shrub lespedezas, oats, rye, soybeans, strawberrybush, and wheat. They need an adequate supply of surface water for drinking and wooded areas, 500 acres or more in size, for cover. Food plantings for deer should be well limed and fertilized.

Doves (mourning).—Doves eat browntop millet, corn, Japanese millet, pokeberry seeds, common ragweed, grain sorghum, and several other seeds. They do not eat insects, green leaves, or fruits, and they drink water daily. Doves prefer open land to wooded areas. Therefore, they need feeding areas and watering places free of tall grass or brush.

Ducks.—Ducks eat acorns, beechnuts, browntop millet, corn, Japanese millet, and smartweed seeds. These foods must be covered by water to be readily available. Occasionally, ducks eat acorns and grain on dry land.

Fox.—Gray and red foxes are present in the county and are hunted with hounds exclusively. The food habits of these two animals are similar, and they eat both plant and animal matter. Mice, rabbits, songbirds, and cold-blooded vertebrates make up approximately three-fourths of their diet. They also eat acorns, apples, beechnuts, blueberries, cherries, corn, grapes, hawthorn, persimmons, and pokeberries.

Grouse.—Ruffed grouse are common in suitable woodland cover. Their diet is highly varied, and starvation has never been recorded for this species. They eat acorns, apples, beechnuts, blueberries, branch lettuce, buds of beech and birch, clover and tender grasses, dogwood berries, ferns, greenbriers, hawthorn, insects, mountain ash, mountain-laurel, rose hips, strawberries, sumac, serviceberry, maple, teaberry, wild cherries, and wild grapes.

Quail (bobwhite).—Bobwhites eat acorns, beechnuts, blackberries, browntop millet, buckwheat, wild black cherries, corn, cowpeas, dewberries, flowering dogwood, annual and shrub lespedezas (fig. 16), grain sorghums, mulberries, panicgrass, pines, common ragweed, and soybeans. They also eat many insects. Their food must be close to sheltering vegetation. Many kinds of habitat, including areas of woodland, brushy areas, areas of grassland, and open fields are suitable for these game birds. Suitable protective cover from both predators and adverse weather is vitally necessary to maintain high populations of this game bird.

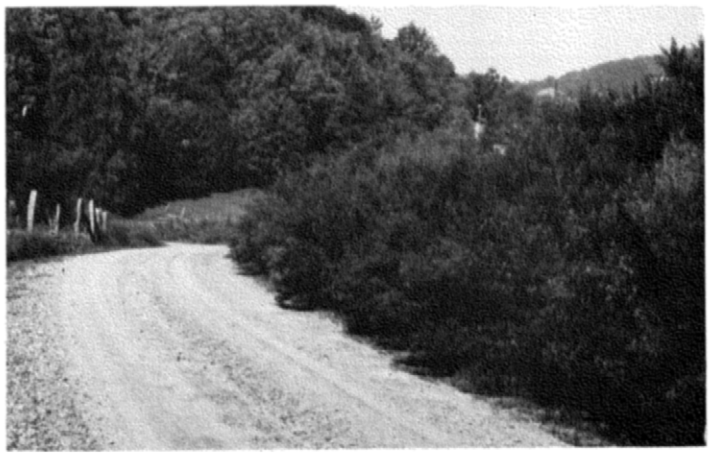

***Figure 16.*—Shrub lespedeza on roadbank provides food for bobwhite quail. The soil is Watauga loam, 10 to 25 percent slopes.**

Rabbits.—Rabbits eat alfalfa, clovers, winter grasses, waste grain, bark and twigs, and other succulent vegetation. Cover, such as blackberry or plum thickets and honeysuckle patches, are necessary for their survival. Food plantings that are well fertilized and limed are more attractive to rabbits than those that are not.

Raccoons.—Raccoons eat a wide variety of foods, both plant and animal. Among favored foods are acorns, corn, grape, greenbrier, holly, persimmon, and pokeberry. Animal foods taken are crayfish, frogs, grasshoppers, insects, and small mammals. Raccoons inhabit bottom lands and swamps where den trees are plentiful.

Squirrels.—Both the gray squirrel and the red squirrel, frequently called the mountain boomer, live in the county. The gray squirrel is hunted more than the red squirrel. The choice foods of these animals are acorns, beechnuts, blackgum, butternut, black cherry, Asiatic chestnuts, corn, flowering dogwood, hickories, mulberries, maple, pine mast, and black walnut.

Woodchuck.—This animal is not considered a game animal, but affords many hours of hunting. Woodchucks are vegetarians, and their favored foods are alfalfa, clover, grasses, honeysuckle, soybeans, and vegetables. They inhabit areas of woodland.

Nongame birds.—The many species of nongame birds differ in the foods they choose. Several species eat nothing but insects; a few eat insects, nuts, and fruits; and others eat insects and seeds. Many desirable species of nongame birds, such as bluebirds, cardinals, robins, mockingbirds, and tanagers, can be attracted by planting dogwoods, Elaeagnus, hollies, pokeberry, privets, pyracantha, multiflora rose, smooth sumac, and sunflowers.

Wildlife suitability groups

Most wildlife species can be related to soils in a two-step relationship. Each animal species is related to its choice foods, and, in turn, each plant is directly related to the soils that have similar characteristics.

The soils in Alleghany County are placed in five wildlife suitability groups, based on their capacity to produce plants that provide food for wildlife. The "Guide to Mapping Units" at the back of this soil survey lists the wildlife suitability group for each of the soils.

Table 3 lists alphabetically the plants that are mentioned as suitable food for wildlife. Each plant's suitability to the soils of each wildlife group is rated by one of three designations: good—the plant grows very well in this group; fair—the plant grows, but not as well as on the soils of the first group; and poor—the plant grows poorly, or not at all.

With a knowledge of each animal's food requirements and of the relationship of the soils to the growth of particular plants, the symbols on the soil maps can be used as a guide to suitability of areas for plant species and for specific kinds of wildlife.

The wildlife suitability groups are described in the following pages.

TABLE 3.—*Suitability of plants for the soils in the wildlife groups*

Kind of plant	Wildlife groups [1]					Choice foods for—
	1A	1B	2	3	4	
Alder	Poor	Poor	Poor	Good	Good	Beaver.
Alfalfa	Good	Fair	Poor	Good	Poor	Deer, quail, rabbit, and woodchuck.
Apple	Good	Fair	Fair	Good	Poor	Deer, grouse, and woodchuck.
Ash	Fair	Fair	Poor	Good	Good	Beaver and duck.
Beech	Good	Fair	Fair	Good	Poor	Duck, fox, grouse, quail, and squirrel.
Birch (black and yellow)	Good	Fair	Poor	Good	Good	Beaver, deer, and grouse.
Blackberry and dewberry	Good	Fair	Fair	Good	Good	Deer, grouse, quail, and nongame birds.
Blackgum	Good	Fair	Poor	Good	Fair	Raccoon, squirrel, and nongame birds.
Blueberry and huckleberry	Good	Fair	Fair	Good	Fair	Deer, fox, grouse, and nongame birds.
Bluegrass	Good	Fair	Fair	Good	Fair	Deer, grouse, rabbit, and woodchuck.
Branch lettuce	Poor	Poor	Poor	Poor	Good	Grouse.
Browntop millet	Good	Fair	Fair	Good	Fair	Dove, duck, quail, and nongame birds.
Buckwheat	Good	Fair	Fair	Good	Fair	Quail.
Buffalonut	Good	Fair	Poor	Good	Fair	Deer.
Butternut	Good	Fair	Fair	Good	Fair	Squirrel.
Cherry (black, pin, and sweet)	Good	Fair	Fair	Good	Poor	Fox, grouse, quail, squirrel, and nongame birds.
Chestnut, Asiatic	Good	Fair	Poor	Good	Poor	Deer and squirrel.
Chinquapin	Good	Fair	Fair	Fair	Poor	Deer and squirrel.
Clover (crimson, red, and white)	Good	Fair	Fair	Good	Fair	Deer, grouse, quail, and rabbit.
Corn	Good	Poor	Poor	Good	Fair	Beaver, dove, duck, fox, quail, raccoon, and squirrel.
Cowpea	Good	Fair	Fair	Good	Fair	Deer and quail.
Dogwood	Good	Fair	Poor	Good	Fair	Grouse, quail, squirrel, and nongame birds.
Elaeagnus	Good	Fair	Fair	Good	Poor	Grouse and nongame birds.
Elderberry	Fair	Fair	Poor	Good	Good	Nongame birds.
Fern	Fair	Poor	Poor	Good	Good	Grouse.
Fescue	Good	Fair	Fair	Good	Good	Deer, grouse, and rabbit.
Grape, wild	Good	Fair	Fair	Good	Fair	Fox, grouse, raccoon, and nongame birds.
Greenbrier	Fair	Poor	Poor	Good	Good	Deer, grouse, rabbit, and raccoon,
Hackberry	Good	Fair	Fair	Good	Fair	Nongame birds.
Hawthorn	Good	Fair	Fair	Good	Fair	Fox, grouse, and quail.
Hazelnut	Good	Fair	Fair	Good	Poor	Squirrel.
Hemlock	Good	Fair	Poor	Good	Fair	Nongame birds.
Hickory (mockernut, pignut, red, and shagbark).	Good	Fair	Poor	Good	Poor	Squirrel.
Holly	Good	Fair	Poor	Good	Poor	Raccoon and nongame birds.
Honeysuckle	Good	Fair	Fair	Good	Good	Beaver, deer, quail, and rabbit.
Hornbeam	Good	Fair	Poor	Good	Poor	Beaver.
Japanese millet	Fair	Poor	Poor	Good	Good	Dove and duck.
Laurel, mountain	Good	Fair	Fair	Good	Fair	Deer and grouse.
Lespedeza, annual	Good	Fair	Fair	Good	Fair	Deer, quail, and rabbit.
Lespedeza, sericea, and shrub	Good	Fair	Fair	Good	Poor	Deer, quail, and rabbit.
Maple	Good	Fair	Fair	Good	Fair	Beaver, deer, grouse, and squirrel.
Mountain ash	Fair	Fair	Fair	Fair	Poor	Grouse.
Mulberry	Good	Poor	Poor	Good	Poor	Fox, quail, squirrel, and nongame birds.
Oak (chesnut, red, scarlet, and white)	Good	Fair	Fair	Good	Fair	Beaver, deer, duck, fox, grouse, quail, raccoon, and squirrel.
Oats	Good	Fair	Fair	Good	Fair	Deer and grouse.
Orchardgrass	Good	Fair	Fair	Good	Fair	Deer and rabbit.
Panicgrass	Good	Poor	Poor	Good	Good	Deer and quail.
Persimmon	Good	Fair	Fair	Good	Fair	Deer, fox, and raccoon.
Pine (pitch, shortleaf, Virginia, and white)	Good	Fair	Fair	Good	Fair	Beaver, dove, quail, and squirrel.
Poison ivy	Good	Fair	Good	Good	Fair	Rabbit and nongame birds.
Pokeberry	Good	Fair	Fair	Good	Fair	Dove, fox, raccoon, and nongame birds.
Poplar, yellow	Good	Poor	Poor	Good	Good	Deer and squirrel.
Privet	Good	Fair	Fair	Good	Fair	Nongame birds.
Pyracantha	Good	Fair	Fair	Good	Poor	Grouse and nongame birds.

See footnote at end of table.

TABLE 3.—*Suitability of plants for the soils in the wildlife groups*—Continued

Kind of plant	Wildlife groups [1]					Choice foods for—
	1A	1B	2	3	4	
Ragweed	Good	Fair	Fair	Good	Good	Dove and quail.
Rescuegrass	Good	Fair	Fair	Good	Fair	Deer and rabbit.
Rhododendron	Good	Fair	Fair	Good	Good	Deer and grouse.
Rose	Good	Fair	Fair	Good	Poor	Grouse and nongame birds.
Rye	Good	Fair	Fair	Good	Fair	Deer, dove, and rabbit.
Sassafras	Good	Fair	Fair	Good	Fair	Deer, grouse, and nongame birds.
Serviceberry	Fair	Poor	Poor	Good	Fair	Grouse.
Smartweed	Fair	Poor	Poor	Good	Good	Dove and duck.
Sorghum, grain	Good	Poor	Poor	Good	Fair	Dove and quail.
Soybean	Good	Fair	Poor	Good	Fair	Deer, quail, and rabbit.
Strawberry	Good	Fair	Fair	Good	Fair	Deer and grouse.
Strawberrybush	Good	Fair	Poor	Good	Poor	Deer.
Sumac	Good	Fair	Fair	Good	Poor	Grouse, rabbit, and nongame birds.
Sunflower	Good	Fair	Fair	Good	Poor	Dove, quail, and nongame birds.
Teaberry	Fair	Fair	Fair	Good	Poor	Grouse.
Tickclover	Good	Fair	Poor	Good	Poor	Deer, quail, and rabbit.
Viburnum	Good	Fair	Fair	Good	Fair	Grouse and nongame birds.
Walnut, black	Good	Fair	Poor	Good	Fair	Squirrel.
Wheat	Good	Fair	Fair	Good	Fair	Dove, deer, and quail.
Willows	Good	Poor	Poor	Good	Good	Beaver.

[1] Soils of group 5 are so variable that they were not rated. Onsite investigation is necessary if these soils are used to grow food for wildlife.

WILDLIFE SUITABILITY GROUP 1A

This group consists of well-drained soils of the Chester, Clifton, Fannin, Hayesville, Porters, Tate, Tusquitee, and Watauga series. These soils are on uplands, in upland draws, and on foot slopes. They have a loam and silt loam surface layer, and below this is a friable loam to clay subsoil. In some places, stones are on the surface.

These soils have low to medium natural fertility and medium to very high available water capacity. They are gently sloping to very steep and have moderate to moderately rapid permeability. Surface runoff varies considerably with steepness of slope and ground cover.

WILDLIFE SUITABILITY GROUP 1B

This group consists of well-drained soils of the Chester and Fannin series. These soils are on uplands. They have a clay loam and silty clay loam surface layer. Below this is a friable clay loam, sandy clay loam, and silty clay loam subsoil. The plow layer consists primarily of the subsoil and remnants of the original surface layer.

WILDLIFE SUITABILITY GROUP 2

This group consists of somewhat excessively drained soils of the Ashe and Chandler series. These soils are strongly sloping to very steep and are on uplands. They have a fine sandy loam and silt loam surface layer, and below this is a friable fine sandy loam, silt loam, or loam subsoil. In places stones and rock outcrop are on the surface and in the surface layer.

These soils are low in natural fertility, organic-matter content, and available water capacity. They have moderately rapid permeability. Surface runoff is very rapid and causes a very severe erosion problem.

WILDLIFE SUITABILITY GROUP 3

This group consists of well-drained to excessively drained, nearly level soils of the Comus and Suncook series. These soils are on the stream flood plains. They have a fine sandy loam and loamy sand surface layer, and below this is a loam to loamy sand and sand lower layer.

These soils are low to very low in natural fertility and organic-matter content and are low to high in available water capacity. They have moderate to rapid permeability. Surface runoff is slow, and erosion is not a hazard.

WILDLIFE SUITABILITY GROUP 4

This group consists dominantly of somewhat poorly drained and poorly drained soils of the Codorus series and of Alluvial land, wet. These soils are on stream flood plains and in upland draws and depressions. The texture of the surface layer is dominantly fine sandy loam and silt loam. Below this is a silty clay loam to loamy sand lower layer.

These soils have low natural fertility and organic-matter content and have moderate to rapid permeability. The depth of the seasonally high water table ranges from the surface to a depth of about 1½ feet. Surface runoff is slow. Very frequent flooding and wetness are major limitations to the use of these soils.

WILDLIFE SUITABILITY GROUP 5

This group consists of Gullied land, Rock outcrop, and Stony steep land. These miscellaneous land types are so variable in characteristics and qualities that onsite investigation is necessary to determine the capacity of the soils to produce food and cover for wildlife.

Engineering Uses of the Soils [6]

Some soil properties are of special interest to engineers because they affect the construction and maintenance of roads, airports, pipelines, building foundations, dwell-

[6] S. T. CURRIN, professional engineer, and AUBREY C. SANDERS, geologist, Soil Conservation Service, assisted in writing this section.

ings, facilities for water storage, earthen dams, erosion control structures, drainage systems, sewage disposal systems, and recreational facilities. They also affect suitability of materials for topsoil, road fill, and subgrade. Among the properties most important to the engineer are permeability, compaction characteristics, and shrink-swell potential. Some other features important to engineers are grain size, plasticity, pH, soil drainage, topography, depth to seasonally high water table, and depth to bedrock. Estimates are generally to depths of about 5 feet, and therefore interpretations normally do not apply to greater depth.

Results of tests on soil samples are given in table 4, estimates of the soil properties significant in engineering in table 5, and interpretations relating to engineering uses of the soils in table 6. The estimates and interpretations of soil properties in these tables can be used to—

1. Make soil and land use studies that will aid in selecting and evaluating areas for developing industrial, business, residential, and recreational sites.
2. Make preliminary estimates of the engineering properties of soils in planning earthen dams.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting highway and airport locations and in planning detailed investigations for the selected locations.
4. Locate sources of construction materials.
5. Correlate the performance of engineering structures with soil mapping units so that information which is useful in designing and maintaining the structures can be obtained.
6. Determine the suitability of the soils for cross-country movement of vehicles and construction equipment.

With the use of the soil map for identification, the engineering interpretations in this section can be used for many purposes. It should be emphasized that they do not eliminate the need for sampling and testing at the site of specific engineering works involving heavy loads or excavations deeper than the depths of layers here reported. Even in these situations, the soil map is useful for planning more detailed field investigations and for suggesting the kinds of problems that may be expected. Because of the mapping scale used, small areas of other soils are included in the mapping units.

Some of the terms used by soil scientists are different from terms and classifications used by engineers. For example, *clay*, *silt*, and *sand* have special meanings in soil science. These and other terms are defined in the Glossary.

Engineering classification of soils

Most highway engineers classify soil materials according to the system used by the American Association of State Highway Officials (AASHO) (*1*). In this system, soils are classified in seven principal groups. They range from A–1 (gravelly soils of high traffic-supporting capacity) to A–7 (clayey soils having low traffic-supporting capacity when wet). The relative engineering value of the soils within each group is indicated by group index numbers, which range from 0 for the best materials to 20 for the poorest. The group index numbers can be determined accurately only if the soils have been analyzed. The group indexes for the soils that have been analyzed are shown in table 4.

Some engineers prefer to use the Unified Soil Classification System (*15*) which classifies soils according to grain-size distribution, plasticity, liquid limit, and organic-matter content. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt.

The classification of a soil by either the AASHO or the Unified System identifies the soil material with regard to gradation and plasticity.

Engineering test data

Samples of four profiles, representing four soil series, were tested by the North Carolina State Highway Commission so that the soils could be evaluated for engineering purposes. The test data are given in table 4, and they indicate the characteristics of the soil at the specified location. The physical characteristics of each soil at other locations may vary from those of the soil sampled. All samples were obtained at a depth of less than 6 feet.

The engineering classifications in table 4 are based on data obtained by mechanical analyses and by tests made to determine liquid limit and plastic limit. Mechanical analyses were made by combined sieve and hydrometer methods.

The tests to determine plastic limit and liquid limit measure the effect of water on the consistence of the soil material. As the moisture content of a clayey soil increases from a dry state, the material changes from a solid to a semisolid to a plastic state. As the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the material passes from a semisolid to a plastic state. The liquid limit is the moisture content at which the material passes from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. The plasticity index indicates the range of moisture content within which soil material is in a plastic condition

Estimated properties of soils

Table 5 gives some of the significant soil characteristics of the soils of the county. It also gives the engineering classification of the principal horizons of the typical profiles.

The depth to bedrock varies considerably for some soils. The range given in the column showing depth to bedrock is that typical of most areas, but in many places soft, weathered rock extends to a greater depth than that given.

The depth of the seasonally high water table is based on field observations. If the depth to the seasonally high water table is shown as a depth of more than 5 feet, this is because a depth of more than 5 feet cannot be satisfactorily estimated.

Depth from surface is shown in inches for the typical profile. The soil material in the main horizons is classified according to textural terms used by the U.S. Department of Agriculture. Except for the soils listed in table

TABLE 4.—*Engineering*

[Tests performed by the North Carolina State Highway Commission, Department of Materials and Tests, in

Soil name and location	Parent material	Report No. S64 NC–3	Depth from surface	Moisture-density data [1]		Mechanical analysis [2]		
						Percentage passing sieve—		
				Maximum dry density	Optimum moisture	1½-in.	1-in.	¾-in.
			In.	*Lb. per cu. ft.*	*Pct.*			
Fannin silt loam:								
5½ miles northeast of Sparta, 0.8 mile west of Edwards Crossroads, 0.2 mile south of Zion Church in cutover woods, 15 yards east of County Road 1428. (Modal profile)	Residuum from mica schist.	7–4	12–20	96	25	------	------	------
		7–6	24–32	102	15	------	------	------
Porters loam:								
2 miles northwest of Whitehead on Cheek Mountain, 1.2 miles west of County Road 1139 in pasture, 50 feet west of field road. (Modal profile)	Residuum from dark-colored gneiss.	3–2	0–5	72	40	[6] 98	98	94
		3–5	12–20	109	12	[7] 90	87	86
		3–7	24–40	--------	--------	------	------	------
Tusquitee loam:								
⅗ mile southwest of Whitehead, 0.4 mile south of Highway 18 in meadow, 35 yards west of County Road 1141. (Modal profile)	Sediments washed from dark-colored upland soils.	4–1	0–8	76	34	------	------	------
		4–5	26–37	108	11	[8] 83	82	79
		4–7	61–70	118	8	[9] 76	70	66
Watauga loam:								
1.5 miles south of Laurel Springs, 100 yards east of Highway 18 in pasture, 100 feet southwest of small cemetery. (Modal profile)	Residuum from mica schist and mica gneiss.	2–1	0–8	96	20	[10] 99	98	95
		2–2	8–21	100	22	------	100	------
		2–4	27–72	90	24	------	------	------

[1] Based on AASHO Designation T 99, Methods A and C (*1*).

[2] Analysis according to AASHO Designation T 88. Results by this procedure differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analysis data used in this table are not suitable for use in determining the textural classes of soils.

[3] Based on AASHO Designation M 145–49 (*1*).

[4] Based on MIL–STD–619B (*15*). The SCS and the Bureau of Public Roads have agreed that any soil having a plasticity index within 2 points of the A-line is to be given a borderline classification. SM–SP is an example of a borderline classification.

test data

accordance with standard procedures of the American Association of State Highway Officials (AASHO) (*1*)]

Mechanical analysis [2]—Continued									Liquid limit	Plasticity index	Classification	
Percentage passing sieve—Continued					Percentage smaller than—						AASHO [3]	Unified [4]
⅜-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.				
									Pct.			
---	100	99	91	65	63	58	44	35	55	19	A–7–5(12)	MH
---	---	100	90	37	30	17	6	4	36	[5]	A–4(0)	SM
93	90	87	78	49	46	37	17	8	58	5	A–5(6)	SM
84	81	79	69	36	32	27	19	14	34	4	A–4(0)	SM
100	99	99	89	30	23	16	12	10	35	2	A–2–4(0)	SM
---	---	100	91	62	59	47	26	14	57	10	A–5(7)	MH
77	75	75	70	38	34	27	18	14	33	6	A–4(1)	SM
58	52	50	40	13	10	8	6	4	25	[5]	A–2–4(0)	SM–SP
92	90	86	81	52	50	44	28	19	47	15	A–7–5(7)	ML
99	97	93	88	58	55	48	32	25	50	13	A–7–5(7)	ML
---	---	100	97	37	30	17	8	6	42	[5]	A–5(0)	SM

[5] Nonplastic.
[6] 100 percent passed the 2-inch sieve.
[7] 90 percent passed the 2-inch sieve; 10 percent made up the coarse fraction greater than 3 inches in diameter.
[8] 84 percent passed the 2-inch sieve; 16 percent made up the coarse fraction greater than 3 inches in diameter.
[9] 80 percent passed the 3-inch sieve; 79 percent passed the 2-inch sieve; 20 percent made up the coarse fraction greater than 3 inches in diameter.
[10] 100 percent passed the 2-inch sieve.

TABLE 5.—*Estimated*

[The symbol < means less than;

Soil series and map symbols	Depth to—		Depth from surface (typical profile)	Classification		
	Bedrock	Seasonally high water table		Dominant USDA texture	Unified	AASHO
	Feet	*Feet*	*Inches*			
Alluvial land, wet: Ad Subject to flooding. Estimates not made, because soil material is too variable.	5	0				
Ashe:						
AhE, AhF	2–5	>5	0–32	Fine sandy loam	SM, ML	A–4
			32–33	Bedrock.		
AsF, AsG	2–5	>5	0–28	Fine sandy loam	SM, ML	A–4
			28–29	Bedrock.		
Chandler:						
CaE, CaF	4–7	>5	0–20	Silt loam	ML	A–4
			20–56	Loam	ML	A–4
			56–57	Bedrock.		
CdF, CdG	4–7	>5	0–15	Silt loam	ML	A–4
			15–48	Loam	ML	A–4
			48–49	Bedrock.		
Chester:						
CeB, CeC, CeE, CeF	>4	>5	0–8	Loam	ML	A–4
			8–38	Clay loam	CL	A–6
			38–60	Fine sandy loam	SM, ML	A–4
ChF2	>4	>5	0–30	Clay loam	CL	A–6
			30–50	Fine sandy loam	SM, ML	A–4
ClD, ClF	>4	>5	0–6	Loam	ML	A–4
			6–49	Clay loam	CL	A–6
			49–50	Bedrock.		
Clifton:						
CmC, CmE, CmF	3–5	>5	0–7	Loam	ML	A–4
			7–38	Clay loam	CL, MH	A–7
			38–56	Loam	ML	A–4
			56–57	Bedrock.		
CsF	3–5	>5	0–6	Loam	ML	A–4
			6–36	Clay loam	CL, MH	A–7
			36–50	Loam	ML	A–4
			50–51	Bedrock.		
Codorus complex: Cx Subject to flooding.	>5	1–1.5	0–40	Silt loam and loam	ML, CL	A–4, A–6
			40–64	Sand and gravel	SM	A–2
Comus: Cy Subject to flooding.	>5	2.5	0–44	Fine sandy loam and loam.	SM, ML	A–4
			44–50	Sand and gravel	SM	A–2
Fannin:						
FnC2, FnE2, FnF	>5	>5	0–6	Silt loam	ML, CL	A–4, A–6
			6–24	Clay loam	MH	A–7
			24–108	Loam	SM	A–4, A–2
FoF2	>5	>5	0–5	Silty clay loam	MH	A–7
			5–20	Clay loam	MH	A–7
			20–90	Loam	SM	A–4, A–2
Gullied land: Gu. Estimates not made, because soil material is too variable.						
Hayesville: HaC, HaE	>5	>5	0–6	Loam	ML	A–4
			6–44	Clay loam	CL, MH	A–7
			44–78	Loam	ML	A–4

properties of soils

the symbol > means more than]

Coarse fraction larger than 3 inches in diameter	Percentage less than 3 inches passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)				
Pct.					*Inches per hour*	*Inches per inch of soil*	*pH value*	
0–5	95–100	90–95	65–80	40–55	2. 0–6. 3	0. 14–0. 16	5. 1–6. 0	Low.
10–20	95–100	90–95	65–80	40–55	2. 0–6. 3	0. 12–0. 14	5. 1–6. 0	Low.
0–5	98–100	95–98	85–95	70–90	2. 0–6. 3	0. 11–0. 13	5. 1–6. 0	Low.
0–5	98–100	90–95	85–90	60–75	2. 0–6. 3	0. 11–0. 13	5. 1–5. 5	Low.
10–15	98–100	95–98	85–95	70–90	2. 0–6. 3	0. 11–0. 13	5. 1–6. 0	Low.
10–15	98–100	90–95	85–90	60–75	2. 0–6. 3	0. 11–0. 13	5. 1–5. 5	Low.
0–5	98–100	95–100	80–90	60–75	2. 0–6. 3	0. 15–0. 17	5. 1–6. 0	Low.
0	98–100	95–100	80–90	70–80	0. 63–2. 0	0. 16–0. 18	5. 1–5. 5	Moderate.
0	95–100	90–95	60–80	40–55	0. 63–2. 0	0. 16–0. 18	5. 1–5. 5	Low.
0–5	98–100	95–100	80–90	70–80	0. 63–2. 0	0. 16–0. 18	5. 1–6. 0	Low.
0	95–100	90–95	60–80	40–55	0. 63–2. 0	0. 16–0. 18	5. 1–5. 5	Moderate.
10–20	98–100	95–100	80–90	60–75	2. 0–6. 3	0. 12–0. 14	5. 1–6. 0	Low.
0	98–100	95–100	80–90	70–80	0. 63–2. 0	0. 16–0. 18	5. 1–5. 5	Moderate.
0–5	98–100	95–100	80–90	60–75	2. 0–6. 3	0. 15–0. 17	5. 6–6. 5	Low.
0	98–100	95–100	85–95	75–95	0. 63–2. 0	0. 16–0. 18	5. 6–6. 0	Moderate.
0	95–100	90–95	80–90	60–75	0. 63–2. 0	0. 16–0. 18	5. 6–6. 0	Moder te.
10–20	98–100	95–100	80–90	60–75	2. 0–6. 3	0. 12–0. 14	5. 6–6. 5	Low.
0	98–100	95–100	85–95	75–95	0. 63–2. 0	0. 16–0. 18	5. 6–6. 0	Moderate.
0	95–100	90–95	80–90	60–75	0. 63–2. 0	0. 16–0. 18	5. 6–6. 0	Low.
0	100	95–100	85–95	60–90	0. 63–2. 0	0. 18–0. 20	5. 1–6. 0	Low.
5–15	85–95	80–90	60–75	12–35	6. 3–20. 0	0. 04–0. 06	5. 1–5. 5	Low.
0	100	100	75–90	40–75	0. 63–2. 0	0. 17–0. 19	5. 1–6. 0	Low.
5–10	85–95	80–90	60–75	12–35	6. 3–20. 0	0. 04–0. 06	5. 1–5. 5	Low.
0	98–100	95–100	85–95	60–80	2. 0–6. 3	0. 10–0. 12	5. 1–6. 0	Low.
0	98–100	95–100	85–95	60–80	0. 63–2. 0	0. 12–0. 14	5. 1–5. 5	Moderate.
0	98–100	95–100	85–95	30–50	0. 63–2. 0	0. 11–0. 13	5. 1–5. 5	Low.
0	98–100	95–100	85–95	70–90	0. 63–2. 0	0. 10–0. 12	5. 1–6. 0	Moderate.
0	98–100	95–100	85–95	60–80	0. 63–2. 0	0. 12–0. 14	5. 1–5. 5	Moderate.
0	98–100	95–100	85–95	30–50	0. 63–2. 0	0. 11–0. 13	5. 1–5. 5	Low.
0	98–100	95–100	85–95	60–75	2. 0–6. 3	0. 15–0. 17	5. 1–6. 0	Low.
0	98–100	95–100	85–95	75–95	0. 63–2. 0	0. 16–0. 18	5. 1–5. 5	Moderate.
0	95–100	90–95	80–90	60–75	0. 63–2. 0	0. 16–0. 18	5. 1–5. 5	Low.

TABLE 5.—*Estimated*

Soil series and map symbols	Depth to—		Depth from surface (typical profile)	Classification		
	Bedrock	Seasonally high water table		Dominant USDA texture	Unified	AASHO
	Feet	*Feet*	*Inches*			
Porters:						
PoE, PoF	3–5	>5	0–10	Loam	ML, MH, SM	A–4, A–5
			10–22	Clay loam	ML, SM	A–6, A–4
			22–42	Loam and fine sandy loam.	ML, SM	A–4, A–2
			42–43	Bedrock.		
PsE, PsF, PsG	2–5	>5	0–8	Loam	SM, ML, MH	A–4, A–5
			8–20	Clay loam	ML, SM	A–6, A–4
			20–32	Loam and fine sandy loam.	ML, SM	A–4, A–2
			32–33	Bedrock.		
Rock outcrop: Ro. Estimates not made, because soil material is too variable.						
Stony steep land: StF. Estimates not made, because soil material is too variable.						
Suncook: Su	>5	2.5	0–58	Loamy sand	SM	A–2
Subject to flooding.			58–84	Sand	SP–SM, SM	A–3, A–2
Tate: TaB, TaC, TaD	>5	2.5	0–7	Loam	ML	A–4
			7–38	Clay loam and sandy clay loam.	CL, SC	A–6, A–7
			38–72	Fine sandy loam	SM, ML	A–4
Tusquitee:						
TlC, TlD, TlE	>5	>5	0–15	Loam	ML, MH, SM	A–4, A–5
			15–48	Clay loam and loam	CL, ML, SM	A–6, A–4
			48–60	Fine sandy loam	SM, ML	A–4
TsD, TsE	>5	>5	0–12	Loam	ML, SM	A–4
			12–40	Clay loam and loam	CL, ML, SM	A–6, A–4
			40–55	Fine sandy loam	SM, ML	A–4
Watauga:						
WaC, WaE, WaF	>5	>5	0–7	Loam	ML, MH	A–5, A–7
			7–21	Clay loam	ML, MH	A–4, A–7
			21–72	Loam	ML, SM	A–4, A–5
WsF	>5	>5	0–8	Loam	ML	A–6, A–7
			8–24	Clay loam and loam	ML, MH	A–6, A–7
			24–50	Loam	ML, SM	A–4, A–5

properties of soils—Continued

Coarse fraction larger than 3 inches in diameter	Percentage less than 3 inches passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)				
Pct.					*Inches per hour*	*Inches per inch of soil*	*pH value*	
0–5	85–95	80–90	70–85	45–75	2. 0–6. 3	0. 19–0. 21	5. 6–6. 5	Low.
5–15	75–90	70–85	60–75	35–70	2. 0–6. 3	0. 19–0. 21	5. 6–6. 5	Low.
0	85–100	85–100	80–95	25–60	2. 0–6. 3	0. 17–0. 19	5. 6–6. 5	Low.
10–20	85–95	80–90	70–85	45–75	2. 0–6. 3	0. 16–0. 18	5. 6–6. 5	Low.
5–15	75–90	70–85	60–75	35–70	2. 0–6. 3	0. 16–0. 18	5. 6–6. 5	Low.
0	85–100	85–100	80–95	25–60	2. 0–6. 3	0. 16–0. 18	5. 6–6. 5	Low.
0	100	100	50–70	15–30	6. 3–20. 0	0. 06–0. 08	5. 1–6. 0	Low.
0–5	95–100	90–100	40–60	5–15	6. 3–20. 0	0. 04–0. 06	5. 1–5. 5	Low.
0	100	100	85–95	60–75	2. 0–6. 3	0. 17–0. 19	5. 1–6. 0	Low.
0	80–95	75–90	60–85	45–75	0. 63–2. 0	0. 17–0. 19	5. 1–6. 0	Low.
0–5	85–95	80–90	70–85	40–55	0. 63–2. 0	0. 16–0. 18	5. 1–5. 5	Low.
0–5	95–100	90–100	85–95	45–75	6. 30–20. 0	0. 21–0. 23	5. 1–6. 0	Low.
0–20	70–95	70–95	60–85	35–80	2. 0–6. 3	0. 19–0. 21	5. 1–6. 0	Low.
10–25	45–80	45–85	35–60	35–55	2. 0–6. 3	0. 16–0. 18	5. 1–6. 0	Low.
10–20	95–100	90–100	85–95	45–75	6. 30–20. 0	0. 17–0. 19	5. 1–6. 0	Low.
0–20	70–95	70–95	60–85	35–80	2. 0–6. 3	0. 15–0. 17	5. 1–6. 0	Low.
10–25	45–80	45–85	35–60	35–55	2. 0–6. 3	0. 15–0. 17	5. 1–6. 0	Low.
0–5	85–95	80–90	65–85	50–75	2. 0–6. 3	0. 17–0. 19	5. 1–6. 0	Low.
0	95–100	90–100	80–90	55–80	0. 63–2. 0	0. 17–0. 19	5. 1–5. 5	Low.
0	95–100	90–100	90–100	35–75	0. 63–2. 0	0. 17–0. 19	5. 1–5. 5	Low.
10–20	85–95	80–90	65–85	50–75	2. 0–6. 3	0. 16–0. 18	5. 1–6. 0	Low.
0	95–100	90–100	80–90	55–80	0. 63–2. 0	0. 16–0. 18	5. 1–5. 5	Low.
0	95–100	90–100	90–100	35–75	0. 63–2. 0	0. 16–0. 18	5. 1–5. 5	Low.

TABLE 6.—*Engineering*

Soil series and map symbols	Suitability as source of—		Degree of limitation and soil features affecting—	
	Topsoil	Road fill	Dwellings	Septic tank absorption fields
Alluvial land, wet: Ad	Poor: limited accessibility; wetness.	Poor: seasonally high water table; wetness.	Severe: very frequent flooding; seasonally high water table.	Severe: very frequent flooding; seasonally high water table.
Ashe: AhE, AhF	Fair: low available water capacity; limited amount of material.	Fair: bedrock at a depth of 2½ to 5 feet.	Moderate: slopes of 10 to 25 percent. Severe: slopes greater than 25 percent.	Severe: bedrock at a depth of 2½ to 5 feet.
AsF, AsG	Poor: coarse fragments; limited amount of material; low available water capacity.	Poor: bedrock at a depth of 2½ to 5 feet; stoniness.	Severe: slope	Severe: slope; bedrock at a depth of 2½ to 5 feet.
Chandler: CaE, CaF	Poor: limited amount of material; material below excavation depth difficult to reclaim; low available water capacity.	Poor: low traffic-supporting capacity.	Moderate: slopes of 10 to 25 percent. Severe: slopes greater than 25 percent.	Severe: slope; bedrock at a depth of 4 to 7 feet.
CdF, CdG	Poor: coarse fragments; limited amount of material; material below excavation depth difficult to reclaim; low available water capacity.	Poor: stoniness; low traffic-supporting capacity.	Severe: slope	Severe: slope; stoniness; bedrock at a depth of 4 to 7 feet.
Chester: CeB, CeC, CeE, CeF	Fair: limited amount of material.	Fair: medium traffic-supporting capacity.	Slight: slopes of 2 to 10 percent. Moderate: slopes of 10 to 25 percent. Severe: slopes greater than 25 percent.	Moderate: slopes less than 10 percent. Severe: slopes greater than 10 percent.
ChF2	Poor: limited amount of material.	Fair: medium traffic-supporting capacity.	Moderate: slopes of 15 to 25 percent. Severe: slopes greater than 25 percent.	Severe: slope
ClD, ClF	Poor: coarse fragments; limited amount of material.	Fair: medium traffic-supporting capacity; stoniness.	Moderate: slopes of 10 to 25 percent. Severe: slopes greater than 25 percent.	Severe: slope; stoniness.

interpretations

Degree of limitation and soil features affecting—Continued			Soil features affecting—		
Campsites	Picnic areas	Intensive play areas	Highway location	Earthen dams: Reservoir area	Earthen dams: Compacted embankment
Severe: very frequent flooding; seasonally high water table.	Severe: very frequent flooding; seasonally high water table.	Severe: very frequent flooding; seasonally high water table.	Seasonally high water table; very frequent flooding.	Seasonally high water table; moderate to rapid permeability.	Soil material variable; slope stability is not predictable.
Severe: slope	Moderate: slopes of 10 to 25 percent. Severe: slopes greater than 25 percent.	Severe: slope	Bedrock at a depth of 2½ to 5 feet; slopes of 10 to 45 percent.	Moderately rapid permeability; bedrock at a depth of 2½ to 5 feet.	Fair stability; pervious; limited amount of material.
Severe: slope	Severe: slope	Severe: slope; stoniness.	Bedrock at a depth of 2½ to 5 feet; slopes of 25 to 65 percent; stones hinder grading operations.	Moderately rapid permeability; bedrock at a depth of 2½ to 5 feet.	Fair stability; pervious; limited amount of material; stoniness.
Severe: slope	Moderate: slopes of 10 to 25 percent. Severe: slopes greater than 25 percent.	Severe: slope	Unstable cut slopes; highly erodible; slopes of 10 to 45 percent; bedrock at a depth of 4 to 7 feet; susceptible to frost heaving.	Moderately rapid permeability; bedrock at a depth of 4 to 7 feet.	Poor to fair stability; pervious material; poor resistance to piping; poor compaction characteristics.
Severe: slope	Severe: slope	Severe: slope; stoniness.	Unstable cut slopes; highly erodible; slopes of 25 to 65 percent; bedrock at a depth of 4 to 7 feet; susceptible to frost heaving; stones hinder grading operations.	Moderately rapid permeability; bedrock at a depth of 4 to 7 feet.	Poor to fair stability; pervious material; poor resistance to piping; poor compaction characteristics; stoniness.
Slight: slopes less than 6 percent. Moderate: slopes of 6 to 10 percent. Severe: slopes greater than 10 percent.	Slight: slopes less than 10 percent. Moderate: slopes of 10 to 25 percent. Severe: slopes greater than 25 percent.	Slight: slopes less than 6 percent. Moderate: slopes of 6 to 10 percent. Severe: slopes greater than 10 percent.	Slopes of 2 to 45 percent; unstable cut slopes; susceptible to frost heaving.	Moderate permeability; bedrock at a depth of more than 5 feet.	Semipervious.
Severe: slope	Moderate: slopes less than 25 percent. Severe: slopes greater than 25 percent.	Severe: slope	Slopes of 15 to 45 percent; susceptible to frost heaving.	Moderate permeability; bedrock at a depth of more than 5 feet.	Semipervious.
Severe: slope	Moderate: slopes of 10 to 25 percent. Severe: slopes greater than 25 percent.	Severe: slope; stoniness.	Slopes of 10 to 45 percent; stones hinder grading operations; susceptible to frost heaving.	Moderate permeability; bedrock at a depth of more than 5 feet.	Semipervious; stoniness.

TABLE 6.—*Engineering*

Soil series and map symbols	Suitability as source of—		Degree of limitation and soil features affecting	
	Topsoil	Road fill	Dwellings	Septic tank absorption fields
Clifton: CmC, CmE, CmF	Fair: limited amount of material.	Poor: low traffic-supporting capacity.	Moderate: slopes less than 25 percent. Severe: slopes greater than 25 percent.	Moderate: slopes less than 10 percent. Severe: slopes greater than 10 percent.
CsF	Poor: coarse fragments; limited amount of material.	Poor: low traffic-supporting capacity; stoniness.	Moderate: slopes less than 25 percent. Severe: slopes greater than 25 percent.	Severe: slope; bedrock at a depth of 3 to 5 feet; stoniness.
Codorus: Cx	Fair: wetness	Fair: depth to seasonally high water table.	Severe: very frequent flooding; seasonally high water table.	Severe: very frequent flooding; seasonally high water table.
Comus: Cy	Good	Fair: depth to seasonally high water table.	Severe: very frequent flooding.	Severe: very frequent flooding.
Fannin: FnC2, FnE2, FnF	Fair: limited amount of material.	Fair: medium traffic-supporting capacity.	Moderate: slopes less than 25 percent. Severe: slopes greater than 25 percent.	Moderate: slopes less than 10 percent. Severe: slopes greater than 10 percent.
FoF2	Poor: limited amount of material.	Fair: medium traffic-supporting capacity.	Moderate: slopes less than 25 percent. Severe: slopes greater than 25 percent.	Severe: slope
Gullied land: Gu. Estimates not made, because soil material is too variable.				
Hayesville: HaC, HaE	Fair: limited amount of material.	Fair: medium traffic-supporting capacity.	Slight: slopes of 6 to 10 percent. Moderate: slopes of 10 to 25 percent.	Moderate: slopes of 6 to 10 percent. Severe: slopes greater than 10 percent.
Porters: PoE, PoF	Fair: limited amount of material.	Fair: medium traffic-supporting capacity.	Moderate: slopes less than 25 percent. Severe: slopes greater than 25 percent.	Severe: slope; bedrock at a depth of 3 to 5 feet.

interpretations—Continued

Degree of limitation and soil features affecting—Continued			Soil features affecting—		
Campsites	Picnic areas	Intensive play areas	Highway location	Earthen dams	
				Reservoir area	Compacted embankment
Moderate: slopes of 6 to 10 percent. Severe: slopes greater than 10 percent.	Slight: slopes of 6 to 10 percent. Moderate: slopes of 10 to 25 percent. Severe: slopes greater than 25 percent.	Moderate: slopes of 6 to 10 percent. Severe: slopes greater than 10 percent.	Slopes of 6 to 45 percent; susceptible to frost heaving.	Moderate permeability; bedrock at a depth of 3 to 5 feet.	Limited amount of material; poor stability; impervious.
Severe: slope	Moderate: slopes of 15 to 25 percent. Severe: slopes greater than 25 percent.	Severe: slope; stoniness.	Slopes of 15 to 45 percent; susceptible to frost heaving; stones hinder grading operations.	Moderate permeability; bedrock at a depth of 3 to 5 feet.	Limited amount of material; poor stability; impervious; stoniness.
Severe: very frequent flooding; seasonally high water table.	Severe: very frequent flooding; seasonally high water table.	Severe: very frequent flooding; seasonally high water table.	Very frequent flooding; seasonally high water table.	Seasonally high water table; moderate permeability.	Fair stability; limited amount of material.
Severe: very frequent flooding.	Severe: very frequent flooding.	Severe: very frequent flooding.	Very frequent flooding.	Moderate permeability.	Fair stability; semipervious; poor resistance to piping; limited amount of material.
Moderate: slopes of 6 to 10 percent. Severe: slopes greater than 10 percent.	Slight: slopes of 6 to 10 percent. Moderate: slopes of 10 to 25 percent. Severe: slopes greater than 25 percent.	Moderate: slopes of 6 to 10 percent. Severe: slopes greater than 10 percent.	Slopes of 6 to 45 percent; susceptible to frost heaving.	Moderate permeability; bedrock at a depth of more than 5 feet.	Poor to fair stability; poor resistance to piping.
Severe: slope	Moderate: slopes of 15 to 25 percent. Severe: slopes greater than 25 percent.	Severe: slope	Slopes of 15 to 45 percent; susceptible to frost heaving.	Moderate permeability; bedrock at a depth of more than 5 feet.	Poor to fair stability; poor resistance to piping.
Moderate: slopes of 6 to 10 percent. Severe: slopes greater than 10 percent.	Slight: slopes of 6 to 10 percent. Moderate: slopes of 10 to 25 percent.	Moderate: slopes of 6 to 10 percent. Severe: slopes greater than 10 percent.	Bedrock at a depth of more than 5 feet; susceptible to frost heaving; slopes of 6 to 25 percent.	Bedrock at a depth of more than 5 feet; moderate permeability.	Fair stability; fair compaction characteristics; semipervious; fair resistance to piping.
Severe: slope	Moderate: slopes of 10 to 25 percent. Severe: slopes greater than 25 percent.	Severe: slope	Bedrock at a depth of 3 to 5 feet; slopes of 10 to 45 percent; susceptible to frost heaving.	Bedrock at a depth of 3 to 5 feet; moderately rapid permeability.	Limited amount of material; poor stability; poor compaction characteristics; poor resistance to piping; semipervious.

TABLE 6.—*Engineering*

Soil series and map symbols	Suitability as source of—		Degree of limitation and soil features affecting—	
	Topsoil	Road fill	Dwellings	Septic tank absorption fields
Porters—Continued PsE, PsF, PsG	Poor: coarse fragments; limited amount of material.	Poor: stoniness	Moderate: slopes less than 25 percent. Severe: slopes greater than 25 percent.	Severe: slope; bedrock at a depth of 3 to 5 feet; stoniness.
Rock outcrop: Ro. Estimates not made, because soil material is too variable.				
Stony steep land: StF. Estimates not made, because soil material is too variable.				
Suncook: Su	Poor: very low fertility; low available water capacity; texture.	Good	Severe: very frequent flooding.	Severe: very frequent flooding.
Tate: TaB, TaC, TaD	Good	Fair: medium traffic-supporting capacity.	Moderate: at base of slopes and in small draws.	Moderate: seasonally high water table.
Tusquitee: TIC, TID, TIE	Good	Fair: medium traffic-supporting capacity.	Moderate: at base of slopes and in small draws; slope.	Moderate: slopes of 6 to 10 percent. Severe: slopes greater than 10 percent.
TsD, TsE	Poor: coarse fragments.	Fair: medium traffic-supporting capacity; stoniness.	Moderate: slope	Severe: slope; stoniness.
Watauga: WaC, WaE, WaF	Fair: limited amount of material.	Fair: medium to low traffic-supporting capacity.	Moderate: slopes less than 25 percent. Severe: slopes greater than 25 percent.	Moderate: slopes less than 10 percent. Severe: slopes greater than 10 percent.
WsF	Poor: coarse fragments; limited amount of material.	Poor: medium to low traffic-supporting capacity; stoniness.	Moderate: slopes less than 25 percent. Severe: slopes greater than 25 percent.	Severe: slope; stoniness.

interpretations—Continued

Degree of limitation and soil features affecting—Continued			Soil features affecting—		
Campsites	Picnic areas	Intensive play areas	Highway location	Earthen dams	
				Reservoir area	Compacted embankment
Severe: slope	Moderate: slopes of 10 to 25 percent. Severe: slopes greater than 25 percent.	Severe: slope; stoniness.	Bedrock at a depth of 3 to 5 feet; slopes of 10 to 65 percent; susceptible to frost heaving; stones hinder grading operations.	Bedrock at a depth of 3 to 5 feet; moderately rapid permeability.	Limited amount of material; poor stability; poor compaction characteristics; poor resistance to piping; semipervious; stoniness.
Severe: very frequent flooding.	Severe; very frequent flooding.	Severe: very frequent flooding.	Very frequent flooding.	Rapid permeability	Poor to fair stability; poor resistance to piping; pervious; limited amount of material.
Moderate: slopes less than 10 percent; in draws and depressions. Severe: slopes greater than 10 percent.	Moderate in draws and depressions.	Moderate in draws and depressions.	Seasonally high water table.	Moderate permeability.	Limited amount of material; fair stability.
Moderate: slopes of 6 to 10 percent. Severe: slopes greater than 10 percent.	Slight: slopes of 6 to 10 percent. Moderate: slopes of 10 to 25 percent.	Moderate: slopes less than 10 percent. Severe: slopes greater than 10 percent.	Slopes of 6 to 25 percent; susceptible to frost heaving.	Moderately rapid permeability.	Fair stability; semipervious.
Severe: slope	Moderate: slope	Severe: slope; stoniness.	Slopes of 10 to 25 percent; susceptible to frost heaving; stones hinder grading operations.	Moderately rapid permeability.	Fair stability; semipervious; stoniness.
Moderate: slopes less than 10 percent. Severe: slopes greater than 10 percent.	Moderate: slopes less than 25 percent. Severe: slopes greater than 25 percent.	Moderate: slopes less than 10 percent. Severe: slopes greater than 10 percent.	Bedrock at a depth of more than 5 feet; slopes of 6 to 45 percent; susceptible to frost heaving.	Bedrock at a depth of more than 5 feet; moderate permeability.	Poor to fair stability; poor resistance to piping; poor compaction characteristics; semipervious.
Severe: slope	Moderate: slopes less than 25 percent. Severe: slopes greater than 25 percent.	Severe: slope; stoniness.	Bedrock at a depth of more than 5 feet; slopes of 15 to 45 percent; susceptible to frost heaving; stones hinder grading operations.	Bedrock at a depth of more than 5 feet; moderate permeability.	Poor to fair stability; poor resistance to piping; poor compaction characteristics; semipervious; stoniness.

4, for which engineering test data are available, the classifications shown for the Unified and AASHO systems are estimates based on the USDA classification of texture and the description of the soils.

The estimated permeability rates are for soil material in its natural state. They are based on field observations and limited laboratory data.

Available water capacity refers to the capacity of soils to hold water for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The amounts are based on laboratory tests of a limited number of soils; for soils not tested, estimates are based on similar soils.

Reaction, or the degree of acidity or alkalinity, is given in terms of pH values.

Shrink-swell potential indicates the expected change in volume when the moisture content changes. It is estimated primarily on the basis of the amount and type of clay in a soil. In general, soils classified as CH and A–7 have a high shrink-swell potential. Sandy soils have a low shrink-swell potential.

Engineering interpretations

Table 6 gives interpretation of the properties that affect suitability of the soils for engineering. Suitability as a source of sand and gravel is not rated, because sand and gravel deposits are minor in Alleghany County. Soil limitations applicable to some engineering uses are rated as follows. *Slight* means the soils have few or no properties unfavorable for a particular use, or the limitations are minor and are easily overcome. *Moderate* means the soils have one or more properties unfavorable for a particular use, or the limitations can be overcome by correct planning, careful design, and good management. *Severe* means the soils have one or more properties unfavorable for a particular use, or the limitations are severe and difficult to overcome. Major reclamation work is generally required.

Soil factors considered in rating the suitability of the soils as a source of topsoil are fertility, available water capacity, coarse fragments, accessibility, wetness, and thickness of usable material. Topsoil refers to soil material used to grow vegetation.

Soil factors considered in rating the suitability of the soils as a source of road fill are depth to bedrock, stoniness, traffic-supporting capacity, workability, shrink-swell potential, compaction characteristics, erodibility, accessibility, and depth to seasonally high water table. The ratings indicate performance of soil material moved from borrow areas for the purpose of constructing subgrade for road fills.

Soil factors considered in rating the suitability of the soils as sites for dwellings are flood hazard, seasonally high water table, depth to bedrock, shrink-swell potential, and slope. The degree of limitation was considered moderate where the slope is 10 to 25 percent; it was considered severe where the slope is more than 25 percent.

Soil factors considered important in rating soils for septic tank absorption fields are slope, depth to bedrock, flooding, seasonally high water table, and permeability of subsoil and substrata. Criteria and standards used for rating soils are based on the limitations of the soils in absorbing effluent.

Soil ratings for campsites, picnic areas, and intensive play areas are based primarily on slope, stoniness, seasonally high water table, and flooding.

Soil features affecting highway location are depth to bedrock, stoniness, topography, flooding, depth to seasonally high water table, susceptibility to frost heaving, stability of cut slopes, and plasticity of the material. The entire soil profile is evaluated, on basis of undisturbed soil, except that it is assumed the surface material would be removed where organic-matter content is high.

Factors considered for rating reservoir areas are those features and qualities of undisturbed soils that affect their suitability for water impoundment.

The factors are permeability, topography, depth to seasonally high water table or bedrock, or to other unfavorable materials that would allow seepage.

The factors considered for compacted embankments are those features of disturbed soil that affect earth fills. These factors are stability and consolidation potential, compaction characteristics, compacted permeability, susceptibility to piping, and stoniness. Permeability of compacted embankments is the relative rate of water movement through the embankment profile resulting from head differential caused by impoundment of water.

As used in table 6, *pervious*, *semipervious*, and *impervious* refer to the relative permeability of compacted embankments. Water loss is excessive in pervious soils and significant in semipervious soils. It is almost negligible in impervious soils.

Erosion control practices are needed on sloping cultivated soils. Terraces are suitable on most soils in the county on slopes up to 6 percent, except for stony soils and soils that are shallow to bedrock. Adequate outlets are needed for safe disposal of surface runoff from terraces, diversions, and other drainageways. Vegetation is needed in these waterways.

Formation and Classification of the Soils

In this section the factors that have affected the formation and composition of soils in Alleghany County are discussed. The soils are also placed in a scheme of classification.

Formation of Soils

Soil is the product of the combined effects of parent material, climate, plant and animal life, relief, and time. The characteristics of a soil at any given place depend upon a combination of these five environmental factors at the particular place. All of these factors affect the formation of every soil. In many places, however, one or two of the factors are dominant and fix most of the properties of a particular soil.

Parent material

Parent material is the mass from which a soil is formed and is primarily responsible for the chemical and mineralogical composition of the soils. The parent

materials of soils of Alleghany County are in two broad groups: (1) materials residual from the weathering of rocks in place, and (2) materials transported by water or gravity and laid down as deposits of sands, silts, or clays, or as large rock fragments. Materials of the first group are directly related to the underlying rocks from which they are formed; materials of the second group are related to the soil or rock from which they washed or rolled. The rocks are of Cambrian age and consist primarily of kinds of gneiss and schist, and, to a lesser extent, of phyllite.

Parent material has been one of the important factors that has caused differences in the soils of Alleghany County. Chandler, Fannin, and Watauga soils formed in residuum from mica schist or phyllite. These soils are high in mica content.

Chester, Ashe, and Hayesville soils formed in residuum from gneiss and schist.

Codorus, Comus, Suncook, Tate, and Tusquitee are soils formed in alluvium or local alluvium from materials transported by water or gravity. They are scattered throughout the county and occur along streams, in draws and depressions, and on foot slopes on the uplands.

Climate

Climate affects the physical, chemical, and biological relationships in soil primarily through the influence of precipitation and temperature. Water dissolves minerals and transports them, along with organic residues, through the soil profile. The amount of water that actually percolates through the soil throughout a broad area is dependent on amount and duration of rainfall, relative humidity, evapotranspiration, and the length of the frost-free period. Temperature influences the kind and growth of organisms and the speed of physical and chemical reaction in the soils.

Alleghany County has a temperate, humid climate, modified greatly from place to place by the rough mountainous terrain. This type of climate and precipitation causes chemical reaction of the soil and decomposition of organic matter to be fairly rapid at the lower elevations and slower at the higher elevations, particularly on north-facing slopes. Hayesville soils, for example, which occur generally at elevations below 3,000 feet, are low in organic-matter content. Porters soils, which occur at the higher elevations, and particularly the northern slopes, have high organic-matter content. Climate also affects the variations in plant and animal life.

The most important influence of climate on the formation of soils is the alteration of parent material by temperature changes, variations in the amount of precipitation, and the effects on plant and animal life.

Plant and animal life

Plant and animal life, in or on the soil, modify to some extent the formation of soil. The kinds and number of organisms that exist are determined to a large extent by the climate and to a varying degree by parent material, relief, and the age of the soils. Bacteria, fungi, and other microscopic organisms aid in weathering rock and decomposing organic matter. The larger plants and animals furnish organic matter and transfer elements from the subsoil to the surface layer.

The activity of fungi and micro-organisms in the soils of Alleghany County is usually confined to the upper few inches of the soil material. Earthworms and other invertebrates carry on a slow, continuous cycle of soil mixing, mostly in the upper few inches of soil. Rodents have had little effect on soil formation in this county.

Alleghany County was originally covered by forest of a wide variety of hardwoods and several kinds of conifers. These trees took up elements from the subsoil and added organic matter by depositing leaves, roots, twigs, and eventually the whole plant, on the surface. Here it decayed and was acted on by micro-organisms, earthworms and other forms of life, and direct chemical reactions. Organic matter decays fairly rapidly, particularly in well-drained soils, such as Chester and Hayesville. Excess moisture retards oxidation of organic matter; therefore, decay is slow on wet soils that are not subject to flooding and additions of soil material.

Plants and animals, for the most part, determine the kinds of organic matter added to the soil and the way it is incorporated into the soil. They transfer nutrient elements from one horizon to another and in many places transport soil material from one horizon to another. Plants and animals also affect the gains and losses in organic-matter content and gains and losses of nitrogen and other plant nutrients. They also affect the soil structure and porosity of the soil and can affect some other soil characteristics.

Relief

Relief is largely determined by the underlying rock formations and by the geologic history of the region, including crustal movements, dissection by rivers and streams, and landscape development through slope retreat. It influences soil formation through its effect on moisture relationships, erosion, temperature, and plant cover. The influence of relief is modified by the other factors of soil formation.

In Alleghany County the slopes range from 0 to 65 percent. The soils of the broader ridges and milder slopes, such as Chester, Clifton, and Hayesville, have thicker profiles. The soils on the steeper slopes and at higher elevations, such as Ashe, Chandler, and Porters, have thinner profiles. This is largely because the geological removal of soil is more rapid.

Relief largely determines the natural drainage of a soil. The nearly level Codorus soils on flood plains, for example, are somewhat poorly drained.

Time

The length of time required for a soil to develop depends on the other factors of soil formation. Less time is required for a soil to develop in a humid, warm region covered with dense vegetation than in a dry, cold region with sparse vegetation.

The age of soils varies considerably. Old soils generally have better defined horizons than young soils. In Alleghany County the older soils are on the broader ridges and smoother topography. They have well-developed pro-

files. The alluvial soils, such as Suncook, have not been in place long enough to develop well-defined profiles.

Classification of the Soils

Classification consists of an orderly grouping of soils according to a system designed to make it easier to remember soil characteristics and interrelationships. Classification is useful in organizing and applying the results of experience and research.

Soils are placed in narrow classes for discussion in detailed soil surveys and for application of knowledge within farms and fields. The many thousands of narrow classes are then grouped into progressively fewer and broader classes in successively higher categories, so that information can be applied to large geographic areas.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (*2*) and revised later (*11*). The system currently used by the National Cooperative Soil Survey (*13*) was developed in the early sixties and was adopted in 1965, and supplemented in March 1967 and in September 1968. The system is under continual study, and readers interested in the development of the system should refer to the latest literature available.

The current system of classification has six categories (*9*). Beginning with the most inclusive, these categories are the order, the suborder, the great group, the subgroup, the family, and the series. The criteria for classification are soil properties that are observable or measurable, but the properties are selected so that soils of similar genesis are grouped together. The placement of some soil series in the current system of classification, particularly in families, may change as more precise information becomes available.

Table 7 shows the classification of each soil series of the county by family, subgroup, and order, according to the current system.

ORDER.—Soils are grouped into orders according to properties that seem to have resulted from the same processes acting to about the same degree on the parent material. Ten soil orders are recognized in the current system: Alfisols, Aridisols, Entisols, Histosols, Inceptisols, Mollisols, Oxisols, Spodosols, Ultisols, and Vertisols. The properties used to differentiate the soil orders are those that tend to give broad climatic groups of soils. Two exceptions, Entisols and Histosols, occur in many different climates. Three of the ten soil orders are represented in Alleghany County: Entisols, Inceptisols, and Ultisols.

Entisols are recent soils in which there has been little, if any, horizon development. This order is represented in this county by soils of the Suncook series.

Inceptisols occur mostly on young, but not recent, land surfaces. This order is represented by soils of the Ashe, Chandler, Codorus, and Comus series.

Ultisols have a clay-enriched B horizon but are low in base saturation. This order is represented by soils of the Chester, Clifton, Fannin, Hayesville, Porters, Tate, Tusquitee, and Watauga series.

SUBORDER.—Each order is divided into suborders, primarily on the basis of soil characteristics that indicate genetic similarity. The suborders have a narrower climatic range than the order. The criteria for suborders reflect either the presence or absence of waterlogging or soil differences resulting from climate or vegetation.

GREAT GROUP.—Each suborder is divided into great groups on the basis of uniformity in kind and sequence of genetic horizons. The great group is not shown in table 7, because the name of the great group is the same as the last word in the name of the subgroup.

SUBGROUP.—Each great group is divided into subgroups, one representing the central (typic) concept of the group, and other groups, called intergrades, that have properties of one great group but also one or more properties of another great group.

FAMILY.—Families are established within subgroups, primarily on the basis of properties important to plant growth. Some of these properties are texture, mineralogy, reaction, soil temperature, permeability, consistence, and thickness of horizons.

SERIES.—The series is a group of soils that have major horizons that, except for texture of the surface layer, are similar in important characteristics and in arrangement in the profile.

General Nature of the County

Alleghany County and Sparta, the county seat, were established in 1859. The county was formed from part of Ashe County. The early settlers migrated south through the Shenandoah Valley and west from other parts of Virginia. They found extensive forest, primarily hardwoods. The land, when cleared, produced good crops until the fertility was depleted. That the soils were well suited to grass was noted when the old fields were allowed to go out of cultivation. Growth of eastern white pine was found to be excellent in this environment.

Population of the county increased steadily so that by the year 1880, the county numbered 5,486 inhabitants. In 1900 the population had increased to 7,759 persons and has remained more or less constant since. The 1960 census shows a population of 7,734.

Industrial development of Alleghany County is in the early stages. The four factories in the county produce smoking pipes and men's and boy's clothing. There are about six portable sawmills and various types of construction businesses. Many of the products from trees are processed outside the county.

Physiography, Relief, and Drainage

Alleghany County lies in the Blue Ridge chain of the southern Appalachian Mountains. Although these mountains are old compared with other mountain ranges, the geology of this area is rather simple. Most of the soils were derived from kinds of gneiss and schist, and, to a lesser extent, from phyllite. There is also a small area of granite in the vicinity of Stone Mountain. The texture of the soils formed from these materials is predominantly loam to fine sandy loam. In most places the soils contain varying amounts of mica.

TABLE 7.—*Soil series classified by higher categories*

Series	Family	Subgroup	Order
Ashe	Coarse-loamy, mixed, mesic	Typic Dystrochrepts	Inceptisols.
Chandler	Coarse-loamy, micaceous, mesic	Typic Dystrochrepts	Inceptisols.
Chester	Fine-loamy, mixed, mesic	Typic Hapludults	Ultisols.
Clifton	Clayey, mixed, mesic	Humic Hapludults	Ultisols.
Codorus	Fine-loamy, mixed, mesic	Aquic Fluventic Dystrochrepts	Inceptisols.
Comus	Coarse-loamy, mixed, mesic	Fluventic Dystrochrepts	Inceptisols.
Fannin	Fine-loamy, micaceous, mesic	Typic Hapludults	Ultisols.
Hayesville	Clayey, oxidic, mesic	Typic Hapludults	Ultisols.
Porters	Fine-loamy, mixed, mesic	Humic Hapludults	Ultisols.
Suncook	Mixed, mesic	Typic Udipsamments	Entisols.
Tate	Fine-loamy, mixed, mesic	Typic Hapludults	Ultisols.
Tusquitee	Fine-loamy, mixed, mesic	Humic Hapludults	Ultisols.
Watauga	Fine-loamy, micaceous, mesic	Typic Hapludults	Ultisols.

The approximate elevations in the county range from a maximum of 4,200 feet on Peach Bottom Mountain to a minimum of 2,000 feet at the base of Stone Mountain, on the Wilkes County line. Only a few acres occur at this lowest elevation; the more significant lower elevations are about 2,600 feet, along the New River at the point where it leaves Alleghany County. Much of the county is on milder intermountain areas, at elevations of about 3,000 feet.

The topography is mostly rolling to steep and mountainous. It has rather extreme surface gradient variations from 0 percent through 65 percent. The milder slopes are on the narrow flood plains, the alluvial-colluvial fans, and on the broader ridges of the uplands.

Drainage of Alleghany County is almost entirely into the New River and its many tributaries, the one exception being the small area around Roaring Gap that drains into tributaries of the Yadkin River. Most of these streams flow rather rapidly, and flooding of the lower lying areas is generally of extremely brief duration.

Water Supply

The water supply for Alleghany County is abundant.

The New River and a number of creeks and other tributaries form the major stream system of the county. Numerous ever-flowing springs throughout the county feed this system. These springs are a major source of water for rural home and farm use. Water for the town of Sparta is supplied from wells, but wells are of little importance elsewhere in the county.

Climate [7]

Alleghany County has a varied climate because of its rough, mountainous terrain. Differences in elevation, exposure, slope, and air drainage may cause wide variation in temperature, precipitation, and wind movement within relatively short distances. Data used in preparing table 8 and figure 17 (see pages 54 and 55) are for open, fairly level ground at an elevation of about 3,000 feet above mean sea level. Considerable modification may be required in applying the data to other elevations and exposures.

On a broad scale, the climate of Alleghany County is determined by its latitude, modified by elevation and by continental and maritime influences. Constantly changing weather patterns passing over the area bring a variety of weather, changeable both by season and within seasons. Airflow coming from the large continental areas to the west and north tends to bring fair, cold weather in winter and dry, moderate weather in summer. Winds from the Gulf of Mexico and the Atlantic Ocean bring abundant precipitation.

The average temperature for any given time of year is lowest at the higher elevations. The drop is about 3° F. for each 1,000 feet of increase in altitude. In individual cases, however, the coldest early morning temperature may occur on the valley floor. This takes place at times because cold air moves to low places in clear, calm weather. The direction of a slope generally influences temperature considerably. A south-facing slope, for example, is warmed by the sun more effectively than a north-facing slope. Areas protected from the wind tend to have a greater day-to-night change in temperature than areas more fully exposed.

Precipitation is also influenced by elevation and exposure. The driest areas in the mountains are, in general, valleys surrounded by higher areas. Such valleys may receive only about three-fourths as much precipitation as that listed in table 8, and the exposed higher slopes may receive considerably more than that listed. On the average, however, the amount of precipitation received throughout the county is normal for the region.

Weather observations made in Alleghany County are limited. Precipitation measured at Sparta and Roaring Gap, and temperature observations made at the North Carolina Research Station near Laurel Springs, along with other data observed in nearby counties, have been considered in preparing this section. These data have been supplemented by a general knowledge of the climate of the area. Soil temperatures listed in the last column of table 8 are estimates based on average air temperatures for the various months. These estimates are applicable only to bare, level soil exposed to average sunshine at elevations of nearly 3,000 feet. Soils on an exposed south-facing slope have higher temperatures, and those on a north-facing slope, or in an area protected from sunlight, are cooler.

[7] By A. V. HARDY, State climatologist for North Carolina, National Weather Service, U.S. Department of Commerce.

TABLE 8.—*Temperature and precipitation data*

[Based on a typical elevation 3,000 feet above mean sea level]

Month	Temperature				Precipitation					Average soil temperature at depth of 4 inches in bare, level soil (estimated)
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with—		Average total	One year in 10 will have—		Number of days with snow cover	Average depth of snow on days with snow cover	
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—			
	°F.	°F.	°F.	°F.	Inches	Inches	Inches		Inches	°F.
January	45	24	58	5	3.5	1.2	6.0	8	3	35
February	47	24	64	6	4.4	1.6	6.5	8	4	37
March	52	29	69	16	5.3	2.2	7.5	5	8	42
April	64	38	79	23	4.5	1.8	7.0	0	0	52
May	71	46	82	32	4.0	1.2	6.0	0	0	61
June	77	53	84	41	4.4	1.4	7.5	0	0	67
July	79	56	84	47	4.9	2.0	9.2	0	0	70
August	79	56	85	46	5.4	2.0	10.0	0	0	70
September	73	49	82	35	4.6	1.0	12.4	0	0	63
October	65	39	74	23	3.5	.7	9.1	(1)	(1)	56
November	54	30	67	18	3.4	1.2	6.8	(1)	(1)	45
December	45	24	58	7	4.0	1.5	6.5	5	2	37
Year	63	39	[2] 89	[3] −1	51.9	38.0	59.8	27	4	53

[1] Less than one-half.
[2] Average annual highest maximum.
[3] Average annual lowest minimum.

The first four columns of table 8 provide guidelines to both average temperatures and the average variability of temperature at characteristic 3,000-foot elevations in Alleghany County. A 90-degree temperature is rare in these areas, and a 100-degree temperature unrecorded. The lowest for a given year is usually not far from zero; a reading of −10° may occur on an average of about once in 10 years. Warm spells in winter frequently bring the temperature up to the sixties; cold snaps in summer often lower the temperature to the forties.

The data on probabilities of low temperatures in spring and fall (fig. 17), are for open, level areas at about 3,000 feet elevation. The causes of early morning low temperatures are such that great variability may occur from place to place. Usually, early fall and late spring frosts and freezes occur in clear, calm weather.

Actual records of precipitation in Alleghany County indicate average amounts over a period of years varying between 47 and 55 inches. All these measurements were made at elevations between 2,500 and 3,500 feet. In general, the greater amount of rainfall is at the higher elevations. Some of the well-protected valleys may receive an average amount of as little as 40 inches per year, but some of the exposed slopes may have 60 inches or more. In all areas precipitation is sufficient to support ordinary farming and good growth of native forests.

Summer rainfall is mainly in the form of thundershowers, and may vary greatly from place to place on any given day. Some areas may receive so few summer showers that crops need irrigation water. In winter, precipitation is usually in the form of widespread storms brought in by the movement of low-pressure systems across the county. Winter precipitation is nearly uniform throughout the county.

Summer thunderstorms sometimes bring rain heavy enough to cause flash floods or erosion damage. At any given place in Alleghany County, as much as 2 inches of rain may be expected in a single hour on an average of about once in 7 or 8 years. Three inches in a single hour may be expected only about once in 40 years. There may be an occurrence of this sort within the county almost any summer, but the area affected is usually very small.

The amount of precipitation that falls as snow varies more from place to place than does the total precipitation. Snowfall is nearly always greatest at the highest elevations, but wind drifting may cause heavy accumulations in depressions. Data on amounts of snowfall are limited in most mountainous areas of North Carolina; most of the data given in table 8 are estimated. The average annual amount of snowfall ranges from 10 to 30 inches, depending on elevation and exposure.

Summer thunderstorms are sometimes accompanied by hail, damaging winds, or both, but affected areas are generally small. There is no record of tornadoes. Tropical hurricanes rarely, if ever, cause damage in this county, but they may cause an increase in rainfall and moderate windiness.

Ice storms occur on an average of once in several years. They may cause breakage to tree limbs, shrubs, and telephone and power lines. Winter cold fronts bring falling temperatures and gusty winds, and sometimes snow flurries. Rough terrain and higher elevations to the northwest usually modify their force before they reach Alleghany County.

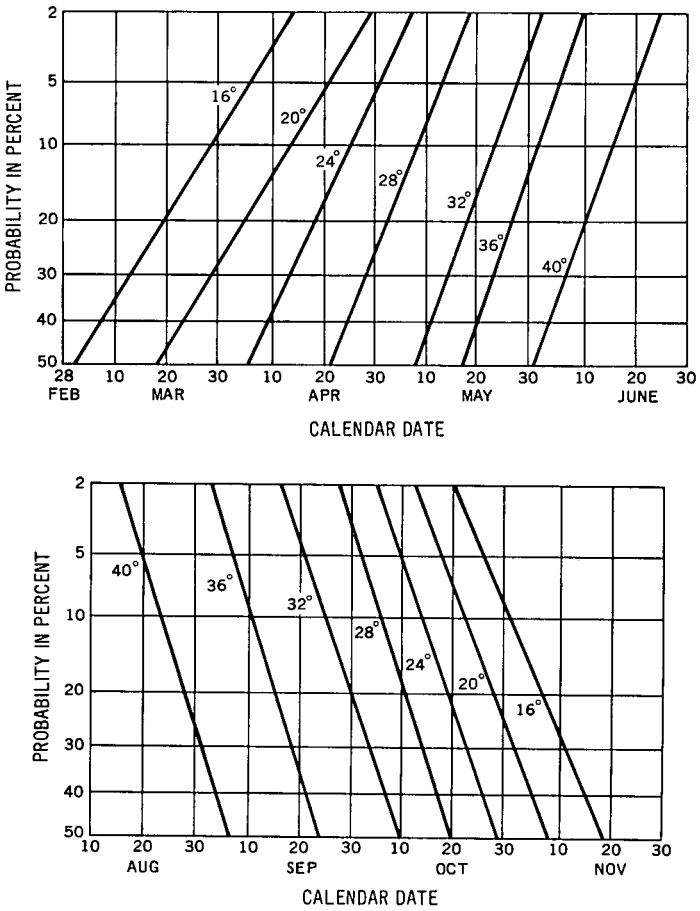

Figure 17.—**Probability that the temperature will be 16°, 20°, 24°, 28°, 32°, 36°, or 40° after the dates indicated in spring and before the dates indicated in fall. (Representative of rural areas at an elevation of 3,000 feet.)**

The prevailing winds are from the southwest, but wind direction is frequently from the north. Near the surface, however, the wind direction is often influenced by mountainous terrain, and in a given location, the prevailing direction may be entirely controlled by topography. The average windspeed near the earth's surface is 8 to 10 miles per hour. Windspeed is higher in early afternoon and lower between midnight and dawn; it is higher on the mountain peaks and lower in sheltered valleys.

The sun shines about half the daylight hours. Relative humidity averages nearly 70 percent, from 50 percent at midafternoon to 90 percent at sunrise. Although there is little variation in relative humidity, the greatest changes take place in winter.

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Glossary

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes easily under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Brittle.—When dry, breaks or cracks easily under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Compact.—Firmly and closely packed particles; degree can be expressed using "very" or "extremely."

Drainage class (natural). Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and have mottling in the lower B and C horizons.

Somewhat poorly drained soils are wet for significant periods, but not all the time. Some soils commonly have mottlings below 6 to 16 inches, in the lower A horizon and in the B and C horizons.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is a movement of water through soil layers or material.

Mapping unit. Areas of soil of the same kind outlined on the soil map and identified by a symbol.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Parent material. Disintegrated and partly weathered rock from which soil has formed.

Permeability. The quality of a soil horizon that enables water or air to move through it. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

Extremely acid	Below 4.5	Mildly alkaline	7.4 to 7.8
Very strongly acid	4.5 to 5.0	Moderately alkaline	7.9 to 8.4
Strongly acid	5.1 to 5.5	Strongly alkaline	8.5 to 9.0
Medium acid	5.6 to 6.0	Very strongly alkaline	9.1 and higher
Slightly acid	6.1 to 6.5		
Neutral	6.6 to 7.3		

Residual material. Unconsolidated, partly weathered mineral material that accumulates over disintegrating solid rock. Residual material is not soil but is frequently the material in which a soil has formed.

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are (1) *single grain* (each grain by itself, as in dune sand) or (2) *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically, the part of the soil below the solum.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it may soak into the soil or flow slowly to a prepared outlet without harm. Terraces in fields are generally built so they can be farmed. Terraces intended mainly for drainage have a deep channel that is maintained in permanent sod.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Upland (geology). Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace. Land above the lowlands along rivers.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. In referring to a capability unit, a woodland suitability group, or a wildlife suitability group, read the introduction to the section it is in for general information about its management. All wildlife groups described on page 36. Other information is given in tables as follows:

Acreage and extent, table 1, page 5.
Estimated yields, table 2, page 27.
Suitability of the plants for wildlife, table 3, page 35.
Engineering uses of the soils, tables 4, 5, and 6, pages 38 through 49.

Map symbol	Mapping unit	Described on page	Capability unit		Woodland suitability group		Wildlife suitability group
			Symbol	Page	Number	Page	Number
Ad	Alluvial land, wet	5	IVw-1	25	2	31	4
AhE	Ashe fine sandy loam, 10 to 25 percent slopes	6	VIe-2	25	6	33	2
AhF	Ashe fine sandy loam, 25 to 45 percent slopes	6	VIIe-1	26	6	33	2
AsF	Ashe stony fine sandy loam, 25 to 45 percent slopes	6	VIIs-1	26	6	33	2
AsG	Ashe stony fine sandy loam, 45 to 65 percent slopes	7	VIIs-1	26	6	33	2
CaE	Chandler silt loam, 10 to 25 percent slopes	7	VIIe-1	26	6	33	2
CaF	Chandler silt loam, 25 to 45 percent slopes	8	VIIe-1	26	6	33	2
CdF	Chandler stony silt loam, 25 to 45 percent slopes	8	VIIs-1	26	6	33	2
CdG	Chandler stony silt loam, 45 to 65 percent slopes	8	VIIs-1	26	6	33	2
CeB	Chester loam, 2 to 6 percent slopes	8	IIe-2	23	5A	32	1A
CeC	Chester loam, 6 to 10 percent slopes	9	IIIe-1	23	5A	32	1A
CeE	Chester loam, 10 to 25 percent slopes	9	IVe-1	24	5A	32	1A
CeF	Chester loam, 25 to 45 percent slopes	9	VIe-1	25	5A	32	1A
ChF2	Chester clay loam, 15 to 45 percent slopes, eroded	9	VIIe-1	26	5B	32	1B
ClD	Chester stony loam, 10 to 15 percent slopes	9	IVe-2	25	5A	32	1A
ClF	Chester stony loam, 15 to 45 percent slopes	10	VIIe-1	26	5A	32	1A
CmC	Clifton loam, 6 to 10 percent slopes	10	IIIe-1	23	5A	32	1A
CmE	Clifton loam, 10 to 25 percent slopes	10	IVe-1	24	5A	32	1A
CmF	Clifton loam, 25 to 45 percent slopes	11	VIe-1	25	5A	32	1A
CsF	Clifton stony loam, 15 to 45 percent slopes	11	VIIe-1	26	5A	32	1A
Cx	Codorus complex	12	IIIw-1	24	1	30	4
Cy	Comus fine sandy loam	12	IIw-1	23	1	30	3
FnC2	Fannin silt loam, 6 to 10 percent slopes, eroded	13	IIIe-1	23	5A	32	1A
FnE2	Fannin silt loam, 10 to 25 percent slopes, eroded	13	IVe-1	24	5A	32	1A
FnF	Fannin silt loam, 25 to 45 percent slopes	13	VIe-1	25	5A	32	1A
FoF2	Fannin silty clay loam, 15 to 45 percent slopes, eroded	13	VIIe-1	26	5B	32	1B
Gu	Gullied land	14	VIIe-1	26	7	33	5
HaC	Hayesville loam, 6 to 10 percent slopes	14	IIIe-1	23	5A	32	1A
HaE	Hayesville loam, 10 to 25 percent slopes	14	IVe-1	24	5A	32	1A
PoE	Porters loam, 10 to 25 percent slopes	15	IVe-1	24	5A	32	1A
PoF	Porters loam, 25 to 45 percent slopes	15	VIe-1	25	5A	32	1A
PsE	Porters stony loam, 10 to 25 percent slopes	15	VIe-2	25	5A	32	1A
PsF	Porters stony loam, 25 to 45 percent slopes	16	VIIe-1	26	5A	32	1A
PsG	Porters stony loam, 45 to 65 percent slopes	16	VIIe-1	26	5A	32	1A
Ro	Rock outcrop	16	VIIIs-1	26	7	33	5
StF	Stony steep land	16	VIIs-1	26	7	33	5
Su	Suncook loamy sand	17	IIIs-1	24	3	31	3
TaB	Tate loam, 2 to 6 percent slopes	17	IIe-1	22	4	31	1A
TaC	Tate loam, 6 to 10 percent slopes	17	IIIe-1	23	4	31	1A
TaD	Tate loam, 10 to 15 percent slopes	18	IVe-1	24	4	31	1A
TlC	Tusquitee loam, 6 to 10 percent slopes	19	IIe-1	22	4	31	1A
TlD	Tusquitee loam, 10 to 15 percent slopes	19	IIIe-1	23	4	31	1A
TlE	Tusquitee loam, 15 to 25 percent slopes	19	IVe-1	24	4	31	1A
TsD	Tusquitee stony loam, 10 to 15 percent slopes	19	IVe-2	25	4	31	1A
TsE	Tusquitee stony loam, 15 to 25 percent slopes	19	VIe-2	25	4	31	1A
WaC	Watauga loam, 6 to 10 percent slopes	20	IIIe-1	23	5A	32	1A
WaE	Watauga loam, 10 to 25 percent slopes	20	IVe-1	24	5A	32	1A
WaF	Watauga loam, 25 to 45 percent slopes	21	VIe-1	25	5A	32	1A
WsF	Watauga loam, 15 to 45 percent slopes	21	VIIe-1	26	5A	32	1A

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