Series 1956, No. 9

Issued April 1960

SOIL SURVEY

Alamance County North Carolina

OUR SOIL ★ OUR STRENGTH

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
THE NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

HOW TO USE THE SOIL SURVEY REPORT

THIS SURVEY of Alamance County will serve several groups of readers. It will help farmers in planning the kind of management that will protect their soils and provide good yields; it will assist engineers in selecting sites for roads, buildings, ponds, and other structures; and it will add to soil scientists' fund of knowledge.

In making this survey, soil scientists walked over the fields and woodlands. They dug holes and examined surface soils and subsoils; measured slopes with a hand level; noticed differences in the growth of crops, weeds, and brush; and, in fact, recorded all the things about the soil that they believed might affect suitability for farming, engineering, forestry, and related uses.

The scientists plotted the boundaries of the soils on aerial photographs. Then, cartographers prepared from aerial photographs the detailed soil map in the back of the report. Fields, woods, roads, and many other landmarks can be seen on the map.

Locating the soils

Use the index to map sheets to locate areas on the large map. The index is a map of the county on which numbered rectangles have been drawn to show where each sheet of the large map is located. When the correct sheet of the large map is found, it will be seen that boundaries of the soils are outlined, and that there is a symbol for each kind of soil wherever it appears on the map. Suppose, for example, an area located on the map has the symbol AdB. The legend for the detailed map shows that this symbol stands for Appling sandy loam, gently sloping phase. This soil and all others mapped in the county are described in the subsection, Soil Series, Types, and Phases.

Finding information

Few readers will be interested in all the report, for it has special sections for different groups. The section, General Nature of the Area, which discusses geology, climate, and other subjects, will be of interest mainly to those not familiar with the county.

Farmers and those who work with farmers will want to learn about the soils in the subsection, Soil Series, Types, and Phases, and then go to the section, Use and Management of Soils. In this way they first identify the soils on their farms and then learn how those soils can be managed and what yields can be expected. The soils are grouped by capability units; that is, groups of soils that need similar management and respond in about the same way. For example, in the subsection, Soil Series, Types, and Phases, Appling sandy loam, gently sloping phase, is shown to be in capability unit IIe-1. The management needed for this soil, therefore, will be found under the heading, Capability Unit IIe-1, in the subsection, Capability Units in Alamance County.

Soil scientists will find information about how the soils were formed and how they are classified in the section, Genesis, Classification, and Morphology.

Students, teachers, and other users will find information about the soils and their management in various parts of the report, depending on their particular interest. Those interested in general soil areas will want to read the section, Soil Associations. This section tells about the principal kinds of soils, where they are found, and how they differ from each other.

★ ★ ★

Fieldwork for this survey was completed in 1956. Unless otherwise indicated, all statements in the report refer to conditions in the county at that time. Help in farm planning can be obtained from members of the Soil Conservation Service in the county, the county agricultural agent, and the staff of the State agricultural experiment station.

U.S. GOVERNMENT PRINTING OFFICE: 1959

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.

Contents

Series 1956, No. 9

Issued April 1960

SOIL SURVEY OF ALAMANCE COUNTY, NORTH CAROLINA

SOILS SURVEYED BY E. F. GOLDSTON, IN CHARGE, AND DWIGHT L. KASTER, NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION, AND JOHN W. TURPIN, SOIL CONSERVATION SERVICE

REPORT BY DWIGHT L. KASTER

CORRELATION BY GLENN H. ROBINSON, SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE IN COOPERATION WITH THE NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

ALAMANCE COUNTY in on the Piedmont Plateau in the north-central part of North Carolina (fig. 1). It has a total area of 434 square miles, or 277,760 acres. Graham, the county seat, is 180 miles east of Asheville, 30 miles west of Durham, and 50 miles northwest of Raleigh, the State capital. According to the 1950 census, the population of the county was 71,220, and the population of Burlington, the largest city, was 24,560.

The relief of the county is about the same as that on the rest of the Piedmont Plateau. Most of the county is gently sloping to sloping, but slopes range from nearly level to steep. The warm-temperate climate has enough rainfall to meet the needs of growing crops. The native vegetation consisted of various hardwoods mixed with small amounts of shortleaf and Virginia pines.

In the central and northwestern sections of the county, many of the farms are operated by part-time farmers who work in industrial plants. Most of the farms are general farms that produce small grain, corn, soybeans, hay, and pasture. A few hogs and beef cattle are usually kept on each farm.

Many of the farms in the north-central, northeastern, and southwestern parts of the county are operated by tenants. In these sections the chief cash crop is tobacco, but some corn and some small grain are also grown.

Most of the farms in the south-central and southeastern parts of the county are dairy farms that are operated by their owners. On these farms the income is mainly from the sale of dairy products. Small grain, pasture, hay, and some corn for silage are grown.

Many industrial plants are located in the county, particularly in the central and northwestern parts. Most towns and cities have textile or hosiery mills, or both. At Burlington, large factories make electrical parts, textiles, hosiery, and other products.

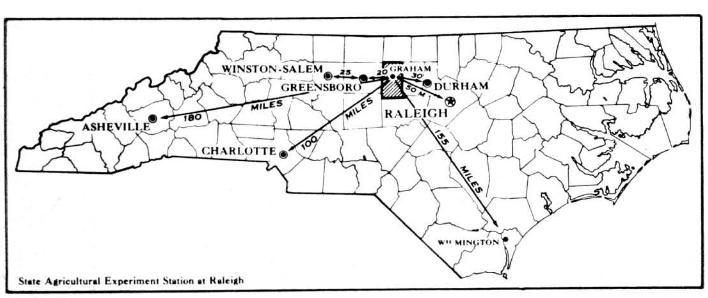

Figure 1.—**Location of Alamance County in North Carolina.**

Soil Associations

In mapping a large tract, it is fairly easy to see obvious differences in shape, gradient, and length of slopes, in kinds of native plants, and even in the kinds of agriculture. The differences that occur in the patterns of soils are more obscure, but they are distinct enough so that the soil patterns and the boundaries of these patterns can be recognized. By drawing lines on a small-scale map around the different patterns of soils that occur together in most places, one obtains a soil association map. Such a map is useful to those who wish to compare different parts of the county and to those who want only a general idea of the soils. It is not sufficiently detailed to plan cropping systems and management procedures for individual fields.

A soil association is normally named for one or several of the dominant soil series in the association, but most associations also include soils other than those of the dominant series. For example, the Lloyd and Cecil soils are the dominant soils in the Lloyd-Cecil association, but the Appling, Starr, Congaree, and Chewacla soils also generally occur with the dominant soils.

The 10 general soil areas of Alamance County are shown in color on the soil association map near the back of this report. The areas are described in the following pages.

Georgeville-Herndon-Alamance

This soil association covers about 14 percent of the county and occurs in the southern and eastern parts. Most of the association is on a smooth upland that has long slopes of 2 to 10 percent, but the major soils in the association are somewhat steeper in places. The Georgeville soils, which are the most extensive and the most severely eroded soils in the association, occur on slopes as steep as 25 percent. The Georgeville soils are generally steeper than the Herndon soils, but, in some places, the Herndon have slopes of 25 percent. The Alamance soils are the least extensive of the major soils. They occur on the crest of smooth ridges.

Small areas of Orange and Efland soils occur in some places in the association. Starr soils and Local alluvial land, well drained, are in some drainways and on broad ridges at the head of small drainways. Worsham soils are generally along drainways, and the Congaree and Chewacla soils are along the larger streams. Except where they are cut by large streams and are U-shaped, the valleys in this association are generally V-shaped.

This soil association is located in the dairy section of the county and is used mainly to grow small grain, corn, hay, and pasture. All of the soils are good for farming, but the Georgeville is generally considered the best.

Orange-Efland-Herndon

This soil association covers about 7.5 percent of the county and occurs in the southeastern and southern parts. Slopes are less than 10 percent. The Orange soils are in the nearly level areas, and the Herndon soils are in the steeper areas. The Efland soils occur in both the nearly level and steeper areas and are more severely eroded than are the Herndon soils that occur on comparable slopes. Small areas of the Georgeville soils are on the steeper slopes and on the crests of the narrow ridges. In the broad V-shaped valleys are Worsham soils and the Mixed alluvial lands.

Although the total acreage of this association is large, only a small part is cultivated. Most of the cultivated acreage in this association is in small grain, corn, and hay. Much of the association is used for woodland and pasture. Rock crops out in many places, and stones are numerous. Most of the tilled crops are grown on the Herndon soils, which are more extensive and more fertile than the other soils in this association.

Cecil-Appling-Durham

This soil association covers about 14 percent of the county and occurs in the southwestern and northeastern parts. Most of the acreage is on broad ridges and gentle slopes, but some areas of the Cecil and Appling soils are on slopes of 15 percent. In these areas, the Cecil soils are generally on the steeper slopes but some of the Appling soils are on slopes of 15 percent. The Durham soils are normally on the broad ridgetops and gentle slopes. They are less severely eroded than the Cecil and Appling soils. All the major soils in this association were derived from the products of granitic rock and are well developed.

Small areas of Helena, Vance, Lloyd, Enon, and Wilkes soils occur in this association. The Colfax and Starr soils and Local alluvial land, well drained, occupy most of the upland depressions on the broad ridges and are at the heads of small drainways. Along the small drainways are Worsham soils and the Mixed alluvial lands.

Much of this association is cultivated. If the soils are managed well, they produce high yields of tobacco, corn, small grain, hay, and forage. They are used more for tobacco than are the soils of any other association in the county. Most of the forage crops are grown on the Cecil and Appling soils, and some are grown on the Local alluvial lands. The Durham and Appling soils are especially well suited to tobacco. The Appling soils are the most extensive in the association and are suitable for a wide range of crops.

The native vegetation consists mostly of the hardwoods common to this area, but abandoned land usually reseeds naturally to Virginia or shortleaf pine. This is one of the better soil associations in the county; the value of the land is generally determined by the acreage that can be used for tobacco.

Lloyd-Cecil

The Lloyd-Cecil association covers only about 1.2 percent of the county and occurs in the northwestern part on nearly level relief. The Lloyd soils are on the broad upland ridges, and the Cecil soils are on steeper slopes along streams. The soils of this association are much like those of the Tirzah-Georgeville association in position, color, and suitability for crops. They were derived, however, from mixed felsic and mafic rocks and normally are more sandy throughout the profile. The more extensive Lloyd soils are well suited to alfalfa; the uneroded Cecil soils are well suited to tobacco. Small areas of Appling soils occur in this association. Starr soils occupy most of the local alluvial areas, and Congaree and Chewacla soils are on the alluvial first bottoms.

Most of this association is cultivated. The soils are suited to many kinds of crops, including corn, soybeans, small grain, alfalfa, lespedeza, and tobacco. Most of the farms are of the general type, but a few dairy farms are also in this association. The native vegetation was primarily the hardwoods common to this region. Small abandoned areas of badly eroded soils on steep slopes have reseeded naturally to Virginia and shortleaf pines.

Enon-Lloyd-Cecil

This soil association covers about 23 percent of the county and occurs in the central and west-central parts. The Enon are the most extensive soils in the association. Relief ranges from nearly level to moderately steep. The Cecil soils occur only on the steeper slopes, but the Enon and Lloyd soils are in the nearly level and moderately steep areas. In the association are small areas of residual soils, alluvial soils, and alluvial land types. The residual soils are in the Iredell, Helena, and Mecklenburg series, and the alluvial soils are in the Congaree and Chewacla series.

This association is used mostly for general farming. It is not well suited to farming, because many areas are moderately steep, shallow, and susceptible to erosion. Corn, lespedeza, and small grain grow fairly well under good management. Some tobacco is grown on the more friable soils, but yields are low. Many severely eroded abandoned areas have reseeded naturally to Virginia and shortleaf pines.

Davidson

This association covers about 2.5 percent of the county. Most of the acreage is gently sloping and consists mainly of deep, well-drained red soils, chiefly of the Davidson series.

This is one of the most productive associations in the county. Practically all of it is cleared and used for such crops as corn, alfalfa and other hay crops, and small grain. The small acreage of steeper land in this association has a good stand of hardwoods, cedar, and shortleaf pine.

Tirzah-Georgeville

This soil association covers about 7 percent of the county and occurs in several fairly small areas in the southern and eastern parts. Most of the association is on broad upland ridges that have slopes of less than 10 percent. The Tirzah soils normally occur on the broader, more gentle slopes. They are among the best soils in the county for farming. The Georgeville soils occur on the steeper slopes and are also productive. Small areas of Herndon, Efland, and Orange soils are also in this association. Starr soils occupy the broad V-shaped valleys, which also have a very small acreage of alluvial soils.

Most of this association is cultivated. If the soils are properly managed, yields of small grain, corn, hay, and forage crops are excellent. The Tirzah soils are generally suited to alfalfa. On the whole, this is one of the best soil associations in the county for farming.

Helena-Vance-Appling

This soil association covers more than 25 percent of the county and is in the south-central, southeastern, and northern parts. It is the largest association of the county. Most of it is gently sloping to sloping, but a few areas are on stream breaks that have slopes as steep as 15 percent. The Helena soils are the most extensive of the group. In most places they surround small areas of Vance and Appling soils that are on the crest of ridges. All of these soils are quite erodible.

Other upland soils that may occur in this association are the Cecil, Lloyd, Enon, and Iredell. Local alluvial land, well drained, occupies the better drained areas, and the Worsham soils are in the more poorly drained areas. The Congaree, Chewacla, and Wehadkee soils and other soils on alluvium also occur in this association.

The soils of this association are better suited to tobacco than they are to corn, small grain, lespedeza, soybeans, and pasture plants. There are a few fair stands of hardwoods. Abandoned areas reseed naturally to Virginia and shortleaf pines.

Wilkes-Helena

This association covers about 3 percent of the county and occurs on the hilly upland in the northern part. The Wilkes soils have a larger acreage than the Helena soils. The Helena soils, however, are more important to agriculture than the Wilkes soils, which are thin and lie on narrow ridges near streams on slopes steeper than 15 percent. Also in this association are the Worsham, Colfax, Wehadkee, and Chewacla soils.

Although fair yields of high-quality tobacco are grown in this association, it is considered one of the poorer associations in the county for farming. Small grain, corn, and lespedeza are grown to some extent, but yields are low. Erosion is a serious hazard in most places. Many of the areas of Wilkes soils are too stony for cultivation. On the steeper slopes are some fair stands of deciduous hardwoods. Large, severely eroded, abandoned areas have reseeded naturally to Virginia and shortleaf pines.

Iredell

This association covers about 3.5 percent of the county and occurs mostly in the west-central part. It is more nearly level than the Davidson association. Large areas with slopes less than 10 percent are common. In addition to the Iredell soils, this association consists of colluvial areas of Worsham soils and Mixed alluvial lands.

In favorable seasons, corn, lespedeza, and small grain grow fairly well in this association. The suitability for crops, however, is limited by the plastic, nonpermeable subsoil. A little tobacco is grown on the sandy loam soils, but the quality is generally low. A few rather large areas are still in a virgin forest that has fair stands of hardwoods and small cedar.

Use and Management of Soils

This section consists of four main parts. The first part describes the nationwide system of capability classification and shows, by an outline, how the soils in the county are placed in capability units, or management groups. The second part groups the soils in capability units and suggests management for each capability unit. The third part consists of a table that lists estimated yields that can be expected under ordinary management and under the management suggested in the second part. The fourth part discusses general problems of good soil management in Alamance County.

Capability Grouping

Capability grouping is a system of classification used to show the relative suitability of soils for crops, grazing, forestry, and wildlife. It is a practical grouping based on the needs and limitations of the soils, the risks of damage to them, and also their response to management. There are three levels above the soil mapping unit in this grouping. They are the capability unit, subclass, and class.

The capability unit, which can also be called a management group, is the lowest level of soil capability grouping. A capability unit is made up of soils similar in kind of management they need, in risk of damage, and in general suitability for use.

The next broader grouping, the subclass, is used to indicate the dominant kind of limitation. The letter symbol "e" indicates that the main limiting factor is risk of erosion if the plant cover is not maintained; "w" means that excess water retards plant growth or interferes with cultivation; "s" shows that the soils are shallow, droughty, or usually low in fertility. In this county, a double designation is used for the subclass if there are two limiting factors that have about the same degree of limitation. For example, "e/s" means that the subclass has the limitations that "e" and "s" stand for. When two kinds of limitations are indicated, the one given first is considered to be dominant and is used for summarizing data by subclasses.

The broadest grouping, the land capability class, is identified by Roman numerals. All the soils in one class have limitations and management problems of about the same degree, but of different kinds, as shown by the subclass. All the land classes except class I may have one or more subclasses.

In classes I, II, and III are soils that are suitable for annual or periodic cultivation of annual or short-lived crops.

Class I soils are those that have the widest range of use and the least risk of damage. They are level, or nearly level, productive, well drained, and easy to work. They can be cultivated with almost no risk of erosion and will remain productive if managed with normal care.

Class II soils can be cultivated regularly, but they do not have quite so wide a range of suitability as class I soils. Some class II soils are gently sloping; consequently, they need moderate care to prevent erosion. Other soils in class II may be slightly droughty or slightly wet, or somewhat limited in depth.

Class III soils can be cropped regularly but have a narrower range of use than class II soils. They need even more careful management.

In class IV are soils that should be cultivated only occasionally or only under very careful management.

In classes V, VI, and VII are soils that normally should not be cultivated for annual or short-lived crops, but they can be used for pasture or range, for woodland, and for wildlife.

Class V soils are nearly level and have little or no erosion hazard, but have other limitations that are impractical to remove and restrict their use largely to pasture, woodland, or wildlife food and cover. Alamance County has no class V soils.

Class VI soils are not suitable for crops because they are steep or droughty or otherwise limited, but they give good yields of forage or forest products when managed properly. Some soils in class VI can, without damage, be cultivated enough so that fruit trees or forest trees can be set out or pasture crops seeded.

Class VII soils provide only poor to fair yields of forage or forest products and have characteristics that limit them severely for these uses.

In class VIII are soils that have practically no agricultural use. Some of them have value as watersheds, wildlife habitats, or for recreation. Alamance County has no class VIII soils.

The soils of Alamance County have been grouped in the following capability classes, subclasses, and units:

Class I.—Nearly level productive soil that is very good for crops and has few limitations.
- Unit I–2.—Well-drained loam with a permeable subsoil.

Class II.—Soils with some limitations that reduce the choice of plants or require some conservation practices.
- Subclass IIe.—Nearly level or gently sloping soils that are likely to erode if not protected.
  - Unit IIe–1.—Gently sloping sandy loams and coarse sandy loams.
  - Unit IIe–2.—Gently sloping silt loams that contain and can store little plant food.
  - Unit IIe–3.—Gently sloping silt loams that contain and can store more plant food than the soils of unit IIe–2.
  - Unit IIe–4.—Gently sloping loams and silt loams that contain and can store more plant food than the soils of unit IIe–3.
- Subclass IIe/s.—Gently sloping soils that are limited by both the hazard of erosion and a subsoil that impairs the growth of roots or the intake of water.
  - Unit IIe/s–1.—Gently sloping sandy loams and coarse sandy loams.
  - Unit IIe/s–2.—Gently sloping silt loams and loams.
- Subclass IIw.—Nearly level soils in which excess water restricts the choice of crops.
  - Unit IIw–1.—Loamy soils and a land type, all susceptible to flooding.

Class III.—Soils that have severe limitations that reduce the choice of plants or require special conservation practices, or both.
- Subclass IIIe.—Sloping soils that are eroded or will erode if not protected.
  - Unit IIIe–1.—Sloping sandy loams that have a low capacity to store water and plant food.
  - Unit IIIe–2.—Sloping silt loams and silty clay loams that have a higher capacity to store water and plant food than the soils in unit IIIe–1.
  - Unit IIIe–3.—Severely eroded and sloping soils that have a deep subsoil.
  - Unit IIIe–4.—Soils that are shallow to bedrock.
- Subclass IIIe/s.—Level to sloping loamy soils that are severely limited by erosion and by a claypanlike subsoil, a low content of plant food, or droughtiness.
  - Unit IIIe/s–1.—Level and gently sloping loamy soils.
  - Unit IIIe/s–2.—Sloping sandy loams.
  - Unit IIIe/s–3.—Sloping loams and silt loams.
- Subclass IIIs.—Soil that is severely limited by a low content of plant food.
  - Unit IIIs–1.—Nearly level loamy fine sand.
- Subclass IIIw.—Soils severely limited by excess water.
  - Unit IIIw–1.—Nearly level sandy loam that is flooded fairly often.
- Subclass IIIw/s.—Soils severely limited by excess water and other factors.
  - Unit IIIw/s–1.—Soils that can be worked only within a narrow range of moisture content and that contain little plant food.

Class IV.—Soils with very severe limitations that restrict the choice of plants or require very careful management, or both.
- Subclass IVe.—Soils that will erode if not protected.
  - Unit IVe–1.—Well-drained strongly sloping sandy loams.
  - Unit IVe–2.—Sloping and strongly sloping silty and clayey loams.
  - Unit IVe–3.—Loamy soils that are shallow or have a claypanlike subsoil.
- Subclass IVw.—Soils severely limited by excess water.
  - Unit IVw–1.—Poorly drained soils that are likely to be flooded frequently.
  - Unit IVw–2.—Poorly drained soils that are covered in wet periods with materials washed from surrounding areas.

Class VI.—Soils that have severe limitations that make them generally unsuited to cultivation and limit their use largely to permanent cover.

Subclass VIe.—Moderately steep soils highly susceptible to erosion.

Unit VIe–1.—Moderately steep, well-drained, fairly shallow loamy soils.

Class VII.—Soils unsuited to cultivation that have very severe limitations.

Subclass VIIe.—Soils subject to rapid erosion if not protected.

Unit VIIe–1.—Moderately steep or stony, shallow soils.

Unit VIIe–2.—Miscellaneous land types that are gullied or stony.

Capability Units in Alamance County

In the following pages the soils of Alamance County are grouped in capability units, or management groups. Characteristics common to the soils of each group are given, and suitable uses and management of the groups are discussed. For many capability units, suitable cropping systems are listed.

Capability unit I–2

Lloyd loam, level phase, is the only soil in this capability unit. The friable plow layer of this well-drained soil is easy to till. Although the subsoil is firm clay, it can be penetrated readily by air, water, and roots. The available water-supplying capacity is good, and the supply of plant nutrients is fairly high. This soil responds well to lime, fertilizer, and good management. It does not need supplementary practices for water control.

Use suitability and management.—This soil is well suited to all crops grown in the county except bright tobacco.

Suitable cropping systems are:

1. Corn followed by small grain; second year, overseed lespedeza and harvest grain.
2. Corn followed by small grain harvested in second year; third year, small grain and soybeans.
3. Corn; small grain.

Capability unit IIe–1

In this capability unit, there are strongly acid sandy loams and a miscellaneous land type that have a very friable sandy loam plow layer that is easy to work. The subsoil is sandy clay loam and most of the time can store as much water as the common crops need. The soils are gently sloping and porous, and runoff does not cause a great erosion hazard. Artificial drainage is not needed. These soils respond well to lime and fertilizer applied according to the results of soil tests.

The soils in this capability unit are:

Appling coarse sandy loam, gently sloping phase.
Appling coarse sandy loam, eroded gently sloping phase.
Appling sandy loam, gently sloping phase.
Appling sandy loam, eroded gently sloping phase.
Cecil sandy loam, gently sloping phase.
Cecil sandy loam, eroded gently sloping phase.
Cecil fine sandy loam, gently sloping phase.
Cecil fine sandy loam, eroded gently sloping phase.
Durham coarse sandy loam, gently sloping phase.
Durham sandy loam, gently sloping phase.
Durham sandy loam, eroded gently sloping phase.
Local alluvial land, well drained.

These soils have a strongly acid subsoil that is low in plant nutrients. Their capacity to store plant nutrients, especially in the coarse sandy loams, is also low. The coarser soils have a fairly low capacity to store water that plants can use.

Use suitability and management.—If adequately limed and fertilized, these soils are suited to most crops grown in the county; they are especially well suited to bright tobacco.

To build up fertility and to prevent the loss of soil through erosion, a program for conservation farming should be followed. This program should have schedules for liming and fertilization and should include tilling on the contour and keeping the soils covered with small grains or grasses one-third to one-half of the time.

Suitable cropping systems are:

1. Tobacco followed by winter cover; second year, corn followed by small grain and fescue; third year, harvest grain and allow fescue to grow; fourth year, fescue.
2. Corn; small grain; second year, overseed lespedeza and harvest grain; third year, lespedeza.
3. Tobacco followed by small grain and fescue; second year, small grain and fescue.
4. Tobacco followed by small grain; second year, harvest grain.

Capability unit IIe–2

The soils of this capability unit have a friable silt loam plow layer that is fairly easy to work. In most seasons the silty clay loam to clay subsoil stores enough water to sustain the crops commonly grown. The soils are gently sloping, and, except for the subsoil of the Orange soils, porous; erosion, therefore, is not a great hazard. Artificial drainage generally is not needed, except for tobacco grown on the Orange soils in wet seasons. If lime and fertilizer are applied according to soil tests, the soils respond fairly well.

The soils of this unit are:

Alamance silt loam, gently sloping phase.
Orange silt loam, gently sloping moderately well drained variant.
Orange silt loam, eroded gently sloping moderately well drained variant.

These soils contain a small amount of plant food and are acid.

Use suitability and management.—If adequately limed and fertilized, these soils are fairly well suited to most crops in the county. They are less well suited to tobacco than the soils in capability unit IIe–1. The Alamance soil is better suited to tobacco than the Orange soils.

To reduce soil losses and increase productivity, a program of soil conservation needs to be followed. This program should provide liming and fertilization, contour tillage, and keeping the ground covered with small grain or grasses one-third to one-half of the time. A row crop should be followed by a winter cover crop or a small grain.

Suitable cropping systems are similar to those given for capability unit IIe–1.

Capability unit IIe–3

The soils of this capability unit have a friable silt loam plow layer that is fairly easy to work except in a few places where the subsoil is exposed. Most of the time, the subsoil can store enough water to sustain the crops commonly grown in the county. Although the silty clay subsoil is not so porous as that of the soils in capability unit IIe–1, erosion generally is not a great hazard. The hazard, however, may be serious in the more strongly sloping areas. Artificial drainage is not needed. These soils respond well to lime and fertilizer.

The soils of this capability unit are:

Georgeville silt loam, gently sloping phase.
Georgeville silt loam, eroded gently sloping phase.
Herndon silt loam, gently sloping phase.
Herndon silt loam, eroded gently sloping phase.

These soils contain more plant food than the sandier soils and have a larger capacity for its storage.

Use suitability and management.—These soils are suited to most crops grown in the county except bright tobacco. Applications of fertilizer and lime increase the supply of plant food and reduce acidity. The loss of the soil through erosion can be reduced by terracing and by farming on the contour, using grassed waterways, and keeping the ground covered with small grains or grasses one-third to one-half of the time. In addition, a row crop should be followed by winter cover or a small grain.

Suitable cropping systems are:

1. Corn followed by winter cover; corn followed by small grain and fescue; third year, harvest grain, allow fescue to grow, and seed lespedeza or clover; fourth year, fescue and a legume.
2. Corn; small grain; third year, small grain and lespedeza; fourth year, lespedeza.
3. Corn followed by small grain and fescue; second year, small grain and fescue.
4. Corn followed by small grain; second year, harvest grain and seed lespedeza.
5. Corn followed by winter cover; corn followed by small grain and fescue; third year, harvest grain, allow fescue to grow, and seed lespedeza.

Capability unit IIe–4

The soils of this capability unit are well drained and have a fairly friable plow layer that generally is fairly easy to work. Because the deep silty clay to clay subsoil has good structure, the hazards of erosion and rapid runoff are not very great. Although these soils do not respond to lime and fertilizer so well as do other soils of the county, liming and fertilization will improve yields.

The soils of this unit are:

Davidson clay loam, gently sloping phase.
Lloyd loam, gently sloping phase.
Lloyd loam, eroded gently sloping phase.
Tirzah silt loam, gently sloping phase.
Tirzah silt loam, eroded gently sloping phase.

Compared with other soils of the county, these soils have a high capacity to store plant food and water. Roots easily penetrate the deep subsoil.

Use suitability and management.—The loss of soil through erosion and the decrease of productivity can be reduced by conservation that includes liming and fertilization, contour tillage, terracing, sodding grassed waterways, and keeping the soil covered with small grains or grasses one-third to one-half of the time.

Suitable cropping systems are similar to those given for capability unit IIe–3, but they can be adjusted so that clover is used instead of lespedeza.

Capability unit IIe/s–1

The soils of this capability unit have an erosion hazard and a claypanlike subsoil. Their very friable sandy loam plow layer is easy to work. If adequately fertilized and limed, these soils respond fairly well.

The soils of this unit are:

Enon fine sandy loam, gently sloping phase.
Enon fine sandy loam, eroded gently sloping phase.
Helena coarse sandy loam, gently sloping phase.
Helena coarse sandy loam, eroded gently sloping phase.
Helena sandy loam, gently sloping phase.
Helena sandy loam, eroded gently sloping phase.
Vance coarse sandy loam, gently sloping phase.
Vance coarse sandy loam, eroded gently sloping phase.
Vance sandy loam, gently sloping phase.
Vance sandy loam, eroded gently sloping phase.

The plow layer of these soils, especially that of the Helena and Vance coarse sandy loams, has a low capacity for storing plant food and water. The subsoil, especially that of the Helena soils, is strongly acid. These soils are more susceptible to erosion and less productive than most soils of the county that occur on similar slopes. They can be tilled only under a narrow range of moisture content.

Use suitability and management.—These soils are moderately well suited to bright tobacco, small grain, lespedeza, and pasture plants (fig. 2).

To overcome the low fertility and strong acidity, the soils should be fertilized and limed according to the results of soil tests. Because of the low capacity to store water, especially in the Helena and Vance coarse sandy loams, these soils should be irrigated where it is feasible to grow tobacco. Corn and other crops that require a great deal of water should not be grown on coarse sandy loams (fig. 3). The excess subsoil moisture in the moderately well drained Helena soils can be partly reduced by high ridging the tobacco rows.

These soils lose more soil through erosion than do most soils on comparable slopes. This loss can be reduced by following a program of soil conservation. The program should include liming and fertilization, contour

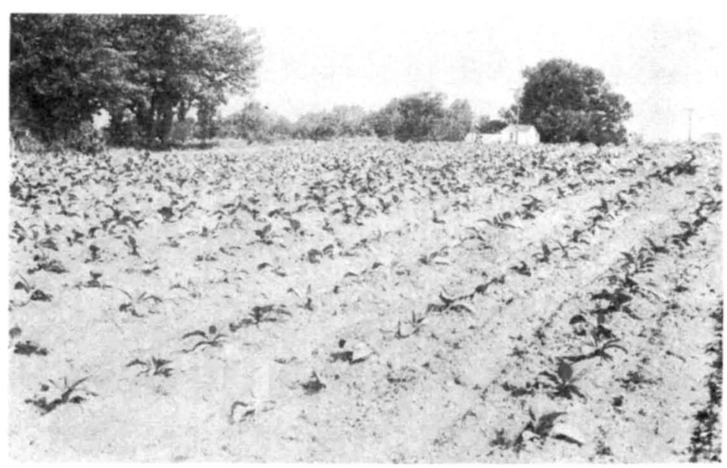

Figure 2.—**Tobacco growing on Helena sandy loam, eroded gently sloping phase. Eroded spot in left foreground.**

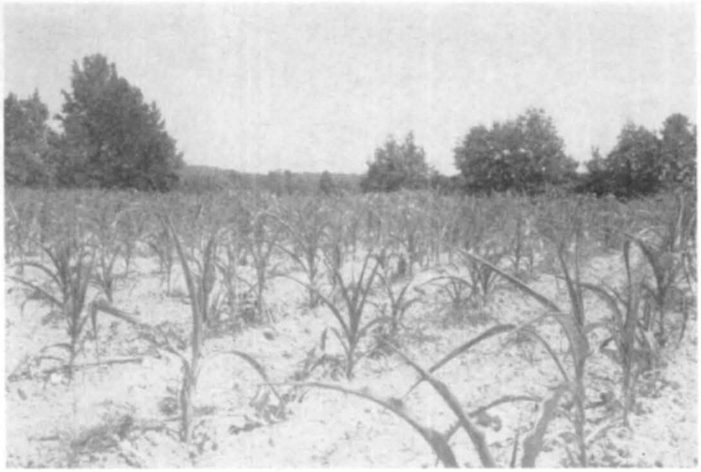

Figure 3.—**Drought in cornfield on Helena coarse sandy loam.**

tillage, keeping the ground covered with small grain or grasses one-half of the time, and following a row crop with a winter cover crop or a small grain. Terraces may be needed on the steeper slopes. Because of the heavy subsoil, however, terraces are difficult to construct and to maintain.

These soils should be tilled only within a narrow range of moisture content. To prevent the stamping out of pasture stands, especially on the Helena soils, they should not be grazed during wet periods.

Suitable cropping systems are:

1. Tobacco followed by small grain and fescue; second year, harvest grain and let fescue grow; third year, fescue.
2. Tobacco followed by winter cover; corn followed by small grain and fescue; third year, harvest grain and allow fescue to grow; fourth year, fescue.
3. Corn; second year, corn or cotton followed by small grain and fescue; third year, overseed lespedeza and harvest small grain; fourth year, fescue and lespedeza.
4. Tobacco followed by small grain and fescue; second year, small grain and fescue.
5. Corn followed by small grain; second year, harvest grain and overseed lespedeza.

Capability unit IIe/s–2

The soils of this unit are susceptible to erosion, and their subsoil takes in moisture slowly. They have a friable loam or silt loam surface soil that is easy to work. The subsoil is exposed in small areas. These soils do not need artificial drainage. They respond well to lime and fertilizer.

The soils of this unit are:

Efland silt loam, gently sloping phase.
Efland silt loam, eroded gently sloping phase.
Enon loam, gently sloping phase.
Enon loam, eroded gently sloping phase.
Mecklenburg loam, eroded gently sloping phase

These soils have a medium capacity for storing plant food. The capacity of their subsoil to store water is high, but the rate of intake is slow.

Use suitability and management.—These soils are moderately well suited to most crops grown in the county except bright tobacco.

The productive capacity of these soils can be increased by fertilization, use of green manure and winter cover, and by the return of residues of well-fertilized crops to the soil. These practices may also improve the structure of the small areas where the subsoil is exposed. Because of the slow intake of water, corn and other crops that need much water should not be grown.

A program of soil conservation should be followed that provides liming and fertilization, contour tillage, terracing, sodding waterways, and keeping the ground covered with small grains one-third to one-half of the time. A row crop should be followed by a winter cover crop or a small grain.

Suitable cropping systems are similar to those given for capability unit IIe–3, but these soils are less well suited to corn than the soils in unit IIe–3. Milo is well suited to these soils; it is more drought resistant than corn. If a grain is needed for feed, milo can be grown instead of corn.

Capability unit IIw–1

The soils of this capability unit have a friable plow layer that is easy to work, but they are susceptible to flooding. Artificial drainage generally is not needed. These soils have no erosion hazard.

The soils of this unit are:

Congaree fine sandy loam.
Starr loam.
Mixed alluvial land, well drained.

The layered material below the surface soil generally contains enough water for crops because the soils occur on first bottoms and in local alluvial areas. Many areas are in depressions.

Use suitability and management.—If adequately fertilized, these soils are especially well suited to corn and pasture. The chance of flooding, however, limits their usefulness for other crops.

The chance of flooding can be lessened by straightening the stream channels. The amount of material transported to these soils from the surrounding areas can be reduced by terracing the upland soils and diverting the water.

The management of these soils should include liming and fertilization according to the results of soil tests, returning the residues of well-fertilized crops to the soil, and selecting crops that are least affected by flooding.

Suitable cropping systems are:

1. Corn followed by small grain; second year, overseed lespedeza and harvest grain.
2. Corn followed by winter cover; corn followed by small grain; third year, overseed lespedeza and harvest grain; fourth year, lespedeza.
3. Corn followed by winter cover; corn followed by small grain and fescue; third year, seed lespedeza, harvest grain, allow fescue to grow.
4. Corn followed by winter cover; corn followed by winter cover; third year, soybeans followed by winter cover.
5. Corn followed by winter cover; soybeans followed by winter cover.

Capability unit IIIe–1

The soils of this capability unit have a very friable sandy loam plow layer that is easy to work. Most of the time, their subsoil can store enough water to sustain the crops commonly grown. Artificial drainage is not needed. These soils respond well to lime and fertilizer applied according to the results of soil tests.

The soils of this unit are:

Appling coarse sandy loam, sloping phase.
Appling coarse sandy loam, eroded sloping phase.
Appling sandy loam, sloping phase.
Appling sandy loam, eroded sloping phase.
Cecil sandy loam, sloping phase.
Cecil sandy loam, eroded sloping phase.
Cecil fine sandy loam, sloping phase.
Cecil fine sandy loam, eroded sloping phase.
Durham coarse sandy loam, sloping phase.
Durham sandy loam, sloping phase.
Durham sandy loam, eroded sloping phase.

The surface soil and subsoil of these soils contain little plant food and are strongly acid. These soils, especially the coarse sandy loams, have a low capacity to store plant food. The capacity to store water is also somewhat low.

Use suitability and management.—These soils are suited to most of the crops of the county. They are especially well suited to bright tobacco.

Applications of lime and fertilizer are needed on these soils to increase plant food and decrease acidity. The productive capacity may be increased by building up the supply of organic matter with green manure and winter cover and by returning the residues of well-fertilized crops to the soil. Where feasible, especially on the coarse sandy loams, tobacco grown on these soils should be irrigated.

Loss of soil can be reduced and productivity increased by following a program of soil conservation. The program should include liming and fertilization, keeping the ground covered with small grains or grasses at least one-half of the time, following a row crop with winter cover or a small grain, and controlling water. Suggested measures of water control are (1) tilling on the contour; (2) terracing and using field diversions; (3) using close-growing perennials and row crops in alternate strips; and (4) seeding waterways to a sod crop.

Suitable cropping systems are:

1. Tobacco followed by small grain and fescue; second year, harvest grain and allow fescue to grow; third year, fescue.
2. Corn followed by small grain and fescue; second year, overseed lespedeza, harvest grain, and allow fescue to grow; third year, fescue and lespedeza.
3. Corn followed by small grain; second year, overseed lespedeza and harvest grain; third year, lespedeza.
4. Corn followed by winter cover; second year, tobacco followed by small grain and fescue; third year, harvest small grain and allow fescue to grow; fourth year, fescue.
5. Tobacco followed by small grain and fescue; harvest grain and allow fescue to grow the second year.

Capability unit IIIe–2

Except for Georgeville silty clay loam, severely eroded gently sloping phase, the soils of this unit have a friable silt loam plow layer that is fairly easy to work. Most of the time, their subsoil can store enough water to sustain crops commonly grown in the county. Artificial drainage is not needed. These soils respond well to adequate lime and fertilizer.

The soils of this unit are:

Georgeville silty clay loam, severely eroded gently sloping phase.
Georgeville silt loam, sloping phase.
Georgeville silt loam, eroded sloping phase.
Herndon silt loam, sloping phase.
Herndon silt loam, eroded sloping phase.

These soils have a greater capacity to store plant nutrients than have the sandier soils.

Use suitability and management.—These soils are suited to most crops grown in the county, but bright tobacco needs special management.

Additions of lime and fertilizer are needed, especially for pasture plants and hay crops. The productive capacity may be increased by building up the supply of organic matter with green manure and the residues of well-fertilized crops. Increasing organic matter may also improve structure. It will increase the rate of water intake in the plow layer in Georgeville silty clay loam, severely eroded gently sloping phase.

A program of soil conservation on these sloping soils will reduce the loss of soil through erosion and increase productivity. The program should provide liming and fertilization according to the results of soil tests, keeping the ground covered with small grains and grasses at least one-half of the time, following a row crop with winter cover or a small grain, and controlling water. Practices for controlling water are the same as those given for capability unit IIIe–1. Because their slopes are longer and more uniform, these soils are more suitable for stripcropping than are the soils of unit IIe–1.

Suitable cropping systems are:

1. Corn followed by small grain and fescue; second year, overseed lespedeza, harvest grain, and allow fescue to grow; third year, fescue and legumes; fourth year, fescue and legumes.
2. Small grain followed by lespedeza that is allowed to grow the second year.
3. Corn followed by small grain; second year, overseed lespedeza and harvest grain; third year, lespedeza.
4. Corn followed by winter cover; second year, milo followed by small grain and fescue; third year, overseed lespedeza, harvest grain, and allow fescue and lespedeza to grow; fourth year, lespedeza.

Capability unit IIIe–3

Except for the severely eroded soils, the soils of this capability unit have a rather friable plow layer that is fairly easy to work. These soils must be worked under a narrower range of moisture content than the sandier soils. Artificial drainage is not needed. The soils do not respond to lime and fertilizer so well as do most of the other soils of the county.

The soils of this unit are:

Davidson clay, severely eroded gently sloping phase.
Davidson clay loam, sloping phase.
Lloyd clay loam, severely eroded gently sloping phase.
Lloyd loam, sloping phase.
Lloyd loam, eroded sloping phase.
Tirzah silty clay loam, severely eroded gently sloping phase.
Tirzah silt loam, sloping phase.
Tirzah silt loam, eroded sloping phase.

These soils have a deep subsoil that is easily penetrated by roots. The severely eroded soils are hard to work and have a low capacity to store plant nutrients.

Use suitability and management.—These soils are suited to all crops grown in the county except bright tobacco. They are especially well suited to legumes used in mixtures that are grown for pasture and hay.

The structure of the plow layer and the productive capacity of these soils can be improved by adding fertilizer and possibly by building up organic matter with green manure, winter cover, and crop residues.

A program of soil conservation on these sloping soils will reduce the loss of soil through erosion and increase productivity. The program should include liming and fertilization according to the results of soil tests, keeping the ground covered with small grain and grasses at least one-half of the time, following a crop with winter cover or a small grain, and controlling water. Suggested measures for water control are the same as those given for capability unit IIIe–1.

Suitable cropping systems for these soils are similar to those given for capability unit IIIe–2.

Capability unit IIIe–4

This capability unit consists only of Wilkes soils, gently sloping phases. These soils are shallow and have a friable plow layer that ranges from sandy loam to loam. Artificial drainage is not needed. These soils respond well to lime and fertilizer.

The plow layer of these soils is acid and contains a small amount of plant nutrients. The capacity for storing plant food is low; the capacity for storing water is very low, particularly in the sandy loam areas.

Use suitability and management.—These soils need additions of fertilizer and lime to increase the supply of plant food and decrease acidity. The low productive capacity may be raised by building up the supply of organic matter with green manure and winter cover and by returning the residues of well-fertilized crops to the soil.

In growing tobacco and other crops of high value, it may be feasible to irrigate, particularly in the sandier areas.

A program of soil conservation will reduce the loss of soil through erosion and increase production. The program should include liming and fertilizing according to the results of soil tests, farming on the contour, keeping the ground covered with plants at least one-half of the time, and following a row crop with winter cover or a small grain.

Suitable cropping systems are:

1. Milo followed by small grain and fescue; second year, overseed lespedeza, harvest grain, and allow fescue to grow; third year, fescue and legumes.
2. Tobacco followed by small grain and fescue; second year, harvest grain and allow fescue to grow; third year, fescue.
3. Milo followed by small grain; second year, overseed lespedeza and harvest grain; third year, lespedeza.
4. Tobacco followed by winter cover; second year, milo followed by small grain and fescue; third year, harvest grain and allow fescue to grow; fourth year, fescue.

Capability unit IIIe/s–1

In this capability unit are soils that have an erosion hazard and a claypan subsoil that is difficult for plant roots to penetrate. The friable sandy loam to loam plow layer, however, is easy to work, and the soils respond moderately well to lime and fertilizer. Artificial drainage generally is not needed.

The soils of this unit are:

Iredell loam, level phase.
Iredell loam, gently sloping phase.
Iredell loam, eroded gently sloping phase.
Iredell sandy loam, level phase.
Iredell sandy loam, gently sloping phase.
Iredell sandy loam, eroded gently sloping phase.
Iredell very stony loam, gently sloping phase.
Orange silt loam, gently sloping phase.
Orange silt loam, eroded gently sloping phase.

These soils have an acid plow layer and, especially the Iredell sandy loams, contain a small amount of plant food. The claypan subsoil restricts the growth of roots and impairs the intake of water.

Use suitability and management.—If adequately limed and fertilized, these soils are fairly well suited to pasture, hay, lespedeza, small grains, milo, and corn.

The content of plant food can be increased by adding fertilizer and lime according to the results of soil tests and by returning the residue of well-fertilized crops. Because of the claypan, ladino clover, lespedeza, and other crops that have shallow roots should be grown. Because these soils should be worked only within a narrow range of moisture content, they should be used for small grain, hay, pasture, and other crops that require little tillage. Livestock should not be grazed during wet periods.

To lessen erosion and increase productivity, a program of soil conservation should be followed. The program should include liming and fertilization, keeping the ground in small grains or grasses at least one-half of the time, following a row crop with winter cover or a small grain, and controlling water. Some suggested measures of water control are (1) tilling on the contour; (2) stripcropping the longer and steeper slopes; and (3) seeding the waterways to a sod crop.

Suitable cropping systems are:

1. Corn followed by small grain and fescue; second year, harvest grain and allow fescue to grow; third year, fescue.
2. Corn; milo followed by small grain and fescue; third year, harvest grain and allow fescue to grow; fourth year, fescue.
3. Corn; cotton followed by small grain and fescue; third year, harvest grain, allow fescue to grow, and seed lespedeza or ladino clover; fourth year, fescue and legumes.
4. Milo followed by small grain and fescue; second year, harvest grain and allow fescue to grow.
5. Corn followed by small grain; second year, overseed lespedeza and harvest grain.

Capability unit IIIe/s–2

The soils of this capability unit have a hazard of erosion, a low content of plant food, and a low capacity for storing plant food. Their very friable sandy loam surface soil, however, is easy to work. Their subsoil is firm to very firm clay.

The soils of this unit are:

Enon fine sandy loam, sloping phase.
Enon fine sandy loam, eroded sloping phase.
Helena coarse sandy loam, sloping phase.
Helena coarse sandy loam, eroded sloping phase.
Helena sandy loam, sloping phase.
Helena sandy loam, eroded sloping phase.
Vance coarse sandy loam, eroded sloping phase.
Vance sandy loam, eroded sloping phase.

These soils, especially the Helena and Vance coarse sandy loams, can store little water in the plow layer, but their subsoil has a high water-holding capacity.

Use suitability and management.—These soils are moderately well suited to bright tobacco, small grains, pasture plants, and lespedeza.

The supply of plant food and the reaction can be improved by adding lime and fertilizer according to the results of soil tests. The productive capacity can be inincreased by turning under the residues of well-fertilized crops. Because of their low capacity for storing water, irrigation of high-value crops is advantageous where feasible, especially on the Helena and Vance coarse sandy loams. The moderately well drained Helena soils may need to have the tobacco rows ridged.

These soils need a program of soil conservation with provisions for liming and fertilizing according to the results of soil tests, keeping the ground covered with small grain or grasses more than one-half of the time, following a row crop with winter cover or a small grain, and controlling water. Suggested measures of water control are the same as those for capability unit IIIe–1.

Suitable cropping systems are:

1. Corn followed by small grain and fescue; second year, overseed lespedeza, harvest grain, and allow fescue to grow; third year, fescue and lespedeza.
2. Tobacco followed by small grain and fescue; second year, harvest small grain and allow fescue to grow; third year, fescue.
3. Corn followed by small grain; second year, overseed lespedeza and harvest grain; third year, lespedeza.
4. Corn followed by winter cover; tobacco followed by small grain and fescue; third year, harvest grain and allow fescue to grow; fourth year, fescue.
5. Milo followed by small grain; second year, overseed lespedeza and harvest grain.

Capability unit IIIe/s–3

In this capability unit are soils that have a hazard of erosion and are droughty in summer. Their friable loam and silt loam surface soils, however, are easy to work. Their subsoil is rather firm and permeable.

The soils of this unit are:

Efland silt loam, sloping phase.
Efland silt loam, eroded sloping phase.
Enon loam, sloping phase.
Enon loam, eroded sloping phase.
Mecklenburg loam, eroded sloping phase.
Orange silt loam, sloping moderately well drained variant.
Orange silt loam, eroded sloping moderately well drained variant.

Although the subsoil of these soils has a high capacity for storing water, the rate of intake from summer showers is rather slow. The capacity for storing plant food is not so low as in the sandier soils.

Use suitability and management.—These soils are well suited to pasture, hay, and small grain. They are less well suited to corn, soybeans, and other row crops.

Because the soils are droughty in summer, corn and other crops that need much water should not be grown. The supply of plant food and the reaction can be improved by adding fertilizer and lime according to the results of soil tests. The productive capacity can be raised by returning the residues of well-fertilized crops to the soil.

These soils need a program of soil conservation with provisions for liming and fertilization according to the results of soil tests, keeping the soil in small grains or grasses more than one-half of the time, following a row crop with winter cover or a small grain, and controlling water. Suggested measures of water control are the same as given for capability unit IIIe/s–1.

Suitable cropping sequences are similar to those given for capability unit IIIe/s–1 except that close-growing crops should be grown more of the time.

Capability unit IIIs–1

Buncombe loamy fine sand is the only soil in this capability unit. It has a very low content of plant nutrients and a very low capacity for storing plant nutrients. It also has a low capacity for storing water, but is likely to be flooded at times. Because the water table is generally between 4 and 6 feet from the surface, this soil is less droughty than the coarse-textured soils of the uplands and is better suited to deep rooted plants.

Use suitability and management.—If adequately limed and fertilized, this soil is moderately well suited to corn, pasture, lespedeza, and small grain.

The soil should be limed and fertilized according to the results of soil tests. Its productive capacity can be raised by returning crop residues to the soil. Because the soil is likely to be flooded and to accumulate fresh deposits, corn, pasture, and other crops less affected by flooding should be grown. Tobacco and other crops of high value should not be grown.

Suitable cropping systems are:

1. Corn followed by winter cover; sericea lespedeza for 3 years.
2. Corn followed by small grain and fescue; second year, overseed lespedeza, harvest small grain, and allow fescue to grow; third year, fescue and lespedeza.
3. Corn followed by small grain; second year, overseed lespedeza and harvest small grain; third year, lespedeza.
4. Corn followed by small grain; second year, harvest small grain and seed crotalaria.

Capability unit IIIw–1

Chewacla fine sandy loam is the only soil in this capability unit. This soil is flooded rather often but has a low capacity for storing water. It contains enough moisture for plant growth, however, because the water table is fairly close to the surface. This soil is easy to work and has no hazard of erosion.

Use suitability and management.—If limed and fertilized according to soil tests, this soil is well suited to corn, soybeans, lespedeza, ladino clover and fescue pasture, and small grain. Artificial drainage may be needed for highest crop yields.

The productive capacity can be raised by turning under the residues of well-fertilized crops. Because this soil is flooded rather frequently, crops of high value should not be grown. Since the water table is rather high, crops that are fairly water tolerant should be planted.

Suitable cropping systems are:

1. Corn followed by small grain; second year, harvest small grain and seed lespedeza; third year, lespedeza.
2. Corn followed by winter cover; second year, corn followed by small grain and fescue; third year, overseed lespedeza, harvest small grain, and allow fescue to grow; fourth year, fescue and lespedeza.
3. Corn followed by small grain; second year, overseed lespedeza and harvest small grain.
4. Corn followed by winter cover; second year, soybeans followed by small grain; third year, overseed lespedeza and harvest small grain.
5. Corn followed by winter cover; second year, soybeans followed by winter cover.

Capability unit IIIw/s-1

This capability unit consists of loamy soils that contain little plant food and can be worked within only a narrow range of moisture content. Their very friable to friable plow layer, however, is fairly easy to work.

The soils of this unit are:

Colfax sandy loam.
Colfax silt loam.
Orange silt loam, nearly level phase.

These soils have a low capacity for storing plant food. The Orange soil and some areas of the Colfax soil have a claypanlike subsoil that impairs the growth of plants.

Use suitability and management.—If adequately limed and fertilized, these soils are well suited to corn, soybeans, lespedeza, ladino clover, small grain, and fescue grown for pasture. The claypanlike subsoil, however, may lower yields of corn and similar crops. Accumulation of soil from surrounding areas may cover seedlings early in spring.

The productive capacity can be increased by adding fertilizer and returning crop residues to the soil. Because of the poor moisture relations, particularly in the Colfax soils, water-tolerant crops should be grown.

Suitable cropping systems are:

1. Corn followed by small grain; second year, overseed lespedeza, harvest small grain, and allow fescue to grow.
2. Corn followed by winter cover; second year, corn followed by small grain and fescue; third year, overseed lespedeza or clover, harvest small grain, and allow fescue to grow.
3. Corn followed by small grain; second year, overseed lespedeza and harvest small grain.
4. Corn followed by winter cover; second year, corn followed by small grain; third year, overseed lespedeza and harvest small grain.
5. Corn; second year, soybeans followed by winter cover.

Capability unit IVe-1

In this capability unit are well-drained, strongly acid, loamy soils that are moderately eroded or are susceptible to erosion. They are easy to work.

The soils of this unit are:

Appling sandy loam, strongly sloping phase.
Appling sandy loam, eroded strongly sloping phase.
Cecil fine sandy loam, strongly sloping phase.
Cecil fine sandy loam, eroded strongly sloping phase.

These soils contain little plant food and have a small capacity for storing plant food. Their subsoil generally holds enough water for most crops commonly grown, but in summer these soils are likely to be droughty.

Use suitability and management.—Because of their strong slopes, these soils are better suited to pasture, hay, and small grain than they are to row crops. They will produce fair yields of tobacco or corn if these crops are grown only once in a 4- or 5-year rotation.

These soils should be limed and fertilized according to the results of soil tests. Their productive capacity can be increased by building up the supply of organic matter with green manure, winter cover, and the residues of well-fertilized crops. Crops that use a great deal of water should not be grown.

To conserve these soils, a program should be followed that provides liming and fertilization, keeping the ground covered with close-growing crops most of the time, and controlling water. Suggested measures for control of water are (1) tilling on the contour; (2) stripcropping where feasible; and (3) sodding waterways.

Suitable cropping systems are:

1. Corn followed by 4 years of sericea lespedeza.
2. Corn followed by small grain and fescue; second year, overseed lespedeza, harvest small grain, and allow fescue to grow; third and fourth years, fescue and lespedeza.
3. Tobacco followed by small grain and fescue; second year, harvest small grain and allow fescue to grow; third year, fescue.
4. Small grain followed by lespedeza; second year, lespedeza.

Capability unit IVe-2

In this capability unit are sloping and strongly sloping loams and clays that are severely eroded or susceptible to erosion.

The soils of this unit are:

Appling sandy clay loam, severely eroded sloping phase.
Cecil clay loam, severely eroded sloping phase.
Cecil clay loam, severely eroded strongly sloping phase.
Davidson clay, severely eroded sloping phase.
Davidson clay, severely eroded strongly sloping phase.
Davidson clay loam, strongly sloping phase.
Georgeville silty clay loam, severely eroded sloping phase.
Georgeville silty clay loam, severely eroded strongly sloping phase.
Georgeville silt loam, strongly sloping phase.
Georgeville silt loam, eroded strongly sloping phase.
Herndon silty clay loam, severely eroded sloping phase.
Herndon silty clay loam, severely eroded strongly sloping phase.
Herndon silt loam, strongly sloping phase.
Herndon silt loam, eroded strongly sloping phase.
Lloyd clay loam, severely eroded sloping phase.
Lloyd clay loam, severely eroded strongly sloping phase.
Lloyd loam, strongly sloping phase.
Lloyd loam, eroded strongly sloping phase.
Tirzah silty clay loam, severely eroded sloping phase.

Tirzah silty clay loam, severely eroded strongly sloping phase.
Tirzah silt loam, strongly sloping phase.
Tirzah silt loam, eroded strongly sloping phase.

These soils are adequately drained, but they are rather difficult to work. Their subsoil is rather easily penetrated by air, water, and roots. Generally, they can store enough water to sustain most of the common crops in the area, but yields in dry seasons may be low.

Use suitability and management.—These soils are well suited to pasture, hay, and small grain, and they produce fairly good yields of corn in favorable seasons.

The productive capacity can be raised by turning under the residues of well-fertilized crops.

To conserve these soils a program should be followed that has provisions for liming and fertilizing according to the results of soil tests, keeping the ground covered with small grains or grasses most of the time, and controlling water. Suggested measures for controlling water are the same as those given for capability unit IVe–1.

Suitable cropping systems are:

1. Corn followed by soybeans or cowpeas; alfalfa and orchardgrass for 4 years.
2. Small grain followed by lespedeza and red clover; second year, fescue and legumes for 4 years.
3. Corn followed by small grain and fescue; second year, overseed lespedeza and red clover, harvest small grain, and allow fescue to grow; third year, fescue and legumes.
4. Small grain followed by lespedeza; second year, lespedeza.

Capability unit IVe–3

In this capability unit are loamy soils that are moderately eroded, are severely eroded or susceptible to erosion, and are either shallow or have a claypanlike subsoil.

The soils of this unit are:

Efland silty clay loam, severely eroded sloping phase.
Efland silty clay loam, severely eroded strongly sloping phase.
Efland silt loam, strongly sloping phase.
Enon clay loam, severely eroded sloping phase.
Enon loam, strongly sloping phase.
Enon loam, eroded strongly sloping phase.
Goldston slaty silt loam, sloping phase.
Goldston slaty silt loam, strongly sloping phase.
Helena clay loam, severely eroded sloping phase.
Iredell loam, eroded sloping phase.
Iredell sandy loam, eroded sloping phase.
Mecklenburg clay loam, severely eroded sloping phase.
Mecklenburg loam, eroded strongly sloping phase.
Vance clay loam, severely eroded sloping phase.
Vance sandy loam, eroded strongly sloping phase.
Wilkes soils, sloping phases.
Wilkes soils, eroded sloping phases.
Wilkes soils, strongly sloping phases.
Wilkes soils, eroded strongly sloping phases.

These soils contain little plant food, and some of them have a low capacity for storing water. Runoff is rapid. The soils are difficult to till; they are shallow or have stones near the surface and a clay subsoil within plow depth. Also, the subsoil can be worked only within a narrow range of moisture content, and the slopes are too steep for the use of farm machinery.

Use suitability and management.—These soils are better suited to permanent pasture or lespedeza than to small grains or row crops. In good seasons, however, they will give fair yields of small grain, corn, and tobacco.

These soils should be fertilized according to the results of soil tests. Because of the low water-holding capacity of the shallow soils and the rapid runoff, corn and other crops that use a great deal of water should not be grown. The content of plant food is low but can be improved by fertilization and building up the supply of organic matter.

To minimize the serious hazard of erosion, a program of soil conservation should be followed that includes liming and fertilizing according to the results of soil tests, keeping the ground covered with small grain or grasses most of the time, and controlling water. Suggested measures for controlling water are the same as those given for capability unit IVe–1.

Suitable cropping systems are:

1. Small grain and fescue followed by lespedeza or red clover; 3 years of fescue and legumes.
2. Tobacco followed by small grain and fescue; second year, harvest small grain, allow fescue to grow; third and fourth years, fescue.
3. Corn followed by small grain and fescue; second year, overseed lespedeza, harvest small grain, and allow fescue to grow.
4. Tobacco followed by small grain and fescue; second year, harvest small grain and allow fescue to grow.

Capability unit IVw–1

Wehadkee fine sandy loam and Mixed alluvial land, poorly drained, make up this capability unit. They are strongly acid, poorly drained, and are likely to be flooded frequently. Their water table is high. They respond fairly well to lime and fertilizer.

Use suitability and management.—These mapping units are suited to permanent pasture, corn, and soybeans. They should be limed and fertilized according to the results of soil tests. Except for removing surface water, artificial drainage is not ordinarily feasible. Water-tolerant crops should be grown.

Suitable cropping systems are:

1. Corn followed by small grain and fescue; second year, overseed lespedeza or ladino clover and harvest small grain; third and fourth years, fescue and lespedeza or ladino clover.
2. Corn followed by winter cover; second year, corn or soybeans followed by small grain and fescue; third year, overseed lespedeza or ladino clover, harvest small grain, and allow fescue to grow; fourth year, fescue and lespedeza or ladino clover.
3. Corn followed by small grain; second year, overseed lespedeza and harvest small grain; third year, lespedeza.
4. Corn followed by winter cover; second year, soybeans followed by small grain; third year, overseed lespedeza and harvest small grain.

Capability unit IVw–2

This capability unit consists of poorly drained soils and a poorly drained miscellaneous land type. In wet periods, soil material washes from surrounding areas and covers the surface. These soils are fairly easy to work.

The soils of this unit are:

Worsham sandy loam.
Worsham silt loam.
Local alluvial land, poorly drained.

These mapping units do not contain much plant food or organic matter. Generally, there is no erosion problem.

Use suitability and management.—Except in wet periods, corn, ladino clover and fescue pasture, lespedeza, soybeans, and small grain grow well.

Where feasible, artificial drainage should be used. In other places, water-tolerant crops should be grown. Because of the low capacity for storing plant food and the high acidity, lime and fertilizer should be applied. Organic matter can be built up by using green manure, winter cover, and the residues of well-fertilized crops.

Suitable cropping systems are:

1. Corn followed by small grain and fescue; second year, overseed lespedeza or clover, harvest small grain, and allow fescue to grow; third year, fescue and lespedeza or clover.
2. Corn followed by winter cover; second year, corn or soybeans followed by small grain and fescue; third year, overseed lespedeza, harvest small grain, and allow fescue to grow; fourth year, fescue and lespedeza.
3. Corn followed by small grain; second year, overseed lespedeza and harvest small grain.
4. Corn; second year, soybeans followed by small grain; third year, overseed lespedeza and harvest small grain.

Capability unit VIe-1

In this capability unit are moderately steep, well-drained, fairly shallow soils that have a loamy surface soil and a clayey subsoil. They are susceptible to erosion. These soils have rapid runoff and are droughty during summer.

The soils of this unit are:

Appling sandy loam, moderately steep phase.
Cecil fine sandy loam, moderately steep phase.
Georgeville silt loam, moderately steep phase.
Herndon silt loam, moderately steep phase.
Lloyd loam, moderately steep phase.
Wilkes soils, moderately steep phases.

Use suitability and management.—These soils are not suited to cultivation but may be used for pasture. They are well suited to forest. They support good stands of white, red, and post oaks, hickory, poplar, dogwood, Virginia pine, and shortleaf pine.

To maintain good stands and to prevent erosion, the trees must be carefully selected and carefully harvested. They must also be protected against fire; burned-over land is susceptible to erosion.

To increase the chance of establishing a good pasture, the farmer should (1) have the soil tested to determine the needs of lime and fertilizer; (2) spread lime and phosphate before preparing the soil; (3) prepare the seedbed 4 to 6 weeks before seeding; (4) prepare a well-pulverized, smooth, firm seedbed; (5) apply fertilizer just before or at seeding, according to need; (6) inoculate seeds of alfalfa, ladino, red, or crimson clover just before seeding; (7) spread seed uniformly and cover lightly immediately; (8) seed in early fall or late summer, if possible; (9) irrigate where possible until stands are established; and (10) allow pasture to become well established before using. After the stand is established, care should be used to avoid overgrazing during the hot, dry summer.

Capability unit VIIe-1

This capability unit consists of moderately steep or stony, moderately deep to shallow soils that are weakly developed or severely eroded.

The soils of this unit are:

Enon clay loam, severely eroded strongly sloping phase.
Lloyd clay loam, severely eroded moderately steep phase.
Georgeville silty clay loam, severely eroded moderately steep phase.
Goldston slaty silt loam, moderately steep phase.
Wilkes stony soils, strongly sloping phases.
Wilkes stony soils, moderately steep phases.

Use suitability and management.—These soils are poorly suited to pasture, but they will produce fair stands of hardwoods and Virginia, shortleaf, and loblolly pines. Uniform stands that have the proper number of trees should be maintained, and fire and disease should be prevented.

Capability unit VIIe-2

In this capability unit is sloping to steep miscellaneous land that is moderately to severely gullied or stony.

The mapping units of this land are:

Moderately gullied land, Helena, Enon, and Wilkes materials.
Moderately gullied land, Cecil, Appling, and Lloyd materials.
Moderately gullied land, Georgeville and Herndon materials.
Severely gullied land.
Stony land.

Use suitability and management.—Much of this land is idle or has reseeded naturally to Virginia pine. Because loblolly pine and shortleaf pine are more valuable for timber, these varieties should be planted in areas where Virginia pine has not become established. If Virginia pine has become established, however, the trees should not be removed except in thinning for better growth. If uniform stands with recommended spacing are maintained, the growth of the trees will be fair. Control of fire and disease is essential for maximum growth.

Estimated Yields

Table 1 gives, for each soil and land type, estimated yields to be expected for various crops grown in Alamance County under two levels of management—ordinary management and improved management. In columns A are the estimated yields that can be expected by farmers who use average management and apply fertilizer at a moderate rate. The yields given in this column are based on data obtained from farmers. Most of the crops were not irrigated, and the period considered included the years from 1952 to 1956 when there was less rainfall than normal and the soils were more droughty than usual.

The yields in columns B can be expected on farms and experiment stations where the best management known is practiced and fertilizer is applied at a high rate. The annual fertilizer rate per acre for corn was 80 to more than 100 pounds of nitrogen, about 40 pounds of phosphoric acid, and about 100 pounds of potash. The rate for small grain was 60 to 70 pounds of nitrogen, 40 pounds of phosphoric acid, and 40 pounds of potash. The Congaree and other soils on the first bottoms are likely to be damaged every third to fifth year by flooding, but this hazard was not considered when estimating the yields in columns B.

TABLE 1.—*Average acre yields of principal crops to be expected over a period of years under (A) ordinary management and (B) best known management*

[Dashed lines indicate crop is not commonly grown and soil is not well suited to it under management specified]

Soil	Corn		Wheat		Oats		Soybeans		Lespedeza hay		Alfalfa hay		Tobacco		Permanent pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Lb.*	*Lb.*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Alamance silt loam, gently sloping phase	40	75	25	35	40	60	15	26	1. 3	1. 5	1. 25	2. 0	1, 100	1, 700	160	220
Appling sandy loam, gently sloping phase	40	75	20	28	28	40	15	28	1. 3	1. 5	2. 0	3. 0	1, 650	2, 400	------	(2)
Appling sandy loam, eroded gently sloping phase	35	70	22	30	31	43	15	28	1. 3	1. 5	2. 0	3. 0	1, 550	2, 200	160	200
Appling sandy loam, sloping phase	35	70	18	25	26	35	15	28	1. 2	1. 4	1. 75	2. 75	1, 550	2, 200	160	200
Appling sandy loam, eroded sloping phase	30	65	20	27	28	38	15	28	1. 0	1. 25	1. 5	2. 75	1, 450	2, 050	180	220
Appling sandy loam, strongly sloping phase	30	50	15	20	21	28	9	20	1. 0	1. 25	1. 25	2. 00	1, 200	1, 800	160	200
Appling sandy loam, eroded strongly sloping phase	25	45	15	20	21	28	8	18	1. 0	1. 25	1. 25	1. 75	900	1, 650	140	200
Appling sandy loam, moderately steep phase	----	----	----	----	----	----	----	----	------	------	------	------	------	------	80	150
Appling coarse sandy loam, gently sloping phase	35	65	16	26	23	37	12	22	1. 0	1. 25	1. 5	2. 0	1, 650	2, 200	------	(2)
Appling coarse sandy loam, eroded gently sloping phase	30	65	18	28	26	40	12	22	1. 0	1. 3	1. 75	2. 75	1, 550	2, 000	120	150
Appling coarse sandy loam, sloping phase	30	65	14	23	20	32	10	20	1. 0	1. 2	1. 5	2. 0	1, 550	2, 000	------	(2)
Appling coarse sandy loam, eroded sloping phase	25	70	16	25	23	35	15	28	1. 0	1. 25	1. 5	2. 60	1, 450	1, 900	110	150
Appling sandy clay loam, severely eroded sloping phase	20	40	12	20	17	28	12	20	. 75	1. 00	------	------	------	------	80	150
Buncombe loamy fine sand	40	55	----	----	20	30	10	15	------	------	------	------	------	------	80	120
Cecil fine sandy loam, gently sloping phase	40	75	27	35	37	50	15	28	1. 3	1. 5	2. 5	3. 5	1, 300	1, 800	160	200
Cecil fine sandy loam, eroded gently sloping phase	35	70	25	35	35	50	15	28	1. 3	1. 5	2. 5	3. 5	1, 200	1, 600	180	220
Cecil fine sandy loam, sloping phase	35	70	25	35	35	50	15	28	1. 2	1. 4	2. 5	3. 5	1, 200	1, 600	160	200
Cecil fine sandy loam, eroded sloping phase	30	65	22	33	30	46	15	28	1. 0	1. 4	2. 0	3. 0	1, 100	1, 500	180	220
Cecil fine sandy loam, strongly sloping phase	30	60	20	27	28	37	10	20	1. 0	1. 25	------	------	------	------	160	200
Cecil fine sandy loam, eroded strongly sloping phase	25	45	18	25	25	35	10	20	1. 0	1. 25	------	------	------	------	180	220
Cecil fine sandy loam, moderately steep phase	----	----	----	----	----	----	----	----	------	------	------	------	------	------	120	150
Cecil sandy loam, gently sloping phase	40	75	27	35	35	50	15	28	1. 3	1. 5	2. 5	3. 5	1, 200	1, 800	180	220
Cecil sandy loam, eroded gently sloping phase	35	70	25	35	35	50	15	28	1. 3	1. 5	2. 5	3. 5	1, 000	1, 600	180	220
Cecil sandy loam, sloping phase	35	70	25	33	35	46	15	28	1. 3	1. 4	2. 5	3. 5	1, 000	1, 600	160	200
Cecil sandy loam, eroded sloping phase	30	65	22	33	31	46	15	28	1. 0	1. 4	2. 0	3. 0	900	1, 500	190	220
Cecil clay loam, severely eroded sloping phase	20	40	15	25	21	35	----	----	. 5	1. 0	------	------	------	------	120	200
Cecil clay loam, severely eroded strongly sloping phase	20	35	10	20	14	28	----	----	. 5	1. 0	------	------	------	------	120	200
Chewacla fine sandy loam	45	85	----	----	----	----	----	----	1. 3	1. 5	------	------	------	------	260	320
Colfax sandy loam	40	70	18	28	25	38	15	27	------	------	------	------	------	------	160	300
Colfax silt loam	40	70	20	30	28	42	15	27	------	------	------	------	------	------	160	300
Congaree fine sandy loam	50	90	20	30	29	42	20	30	1. 75	2. 5	------	------	------	------	200	275
Davidson clay loam, gently sloping phase	45	75	30	42	42	60	18	28	2. 0	2. 5	3. 5	5. 0	------	------	200	250
Davidson clay loam, sloping phase	40	80	28	40	40	56	18	28	2. 0	2. 5	3. 5	5. 0	------	------	210	275
Davidson clay loam, strongly sloping phase	35	70	23	35	32	50	15	25	1. 5	2. 0	3. 0	4. 0	------	------	225	275
Davidson clay, severely eroded gently sloping phase	30	65	20	30	28	42	12	20	1. 0	1. 6	2. 0	3. 0	------	------	180	200
Davidson clay, severely eroded sloping phase	25	60	18	28	25	40	12	20	1. 0	1. 6	2. 0	3. 0	------	------	180	200
Davidson clay, severely eroded strongly sloping phase	20	55	15	23	21	32	8	15	. 8	1. 25	------	------	------	------	100	180
Durham sandy loam, gently sloping phase	35	65	20	28	28	40	15	26	1. 5	2. 0	------	------	1, 550	2, 200	------	(2)

See footnote at end of table.

TABLE 1.—*Average acre yields of principal crops to be expected over a period of years under (A) ordinary management, and (B) best known management*—Continued

[Dashed lines indicate crop is not commonly grown and soil is not well suited to it under management specified]

Soil	Corn		Wheat		Oats		Soybeans		Lespedeza hay		Alfalfa hay		Tobacco		Permanent pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Lb.*	*Lb.*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Durham sandy loam, eroded gently sloping phase	30	65	22	30	31	42	15	26	1. 5	2. 0	-----	-----	1, 450	2, 000	100	150
Durham sandy loam, sloping phase	30	60	18	25	25	35	12	24	1. 0	1. 5	-----	-----	1, 450	1, 800	-----	(2)
Durham sandy loam, eroded sloping phase	25	55	20	27	28	40	12	24	1. 0	1. 5	-----	-----	1, 350	1, 700	100	150
Durham coarse sandy loam, gently sloping phase	30	60	16	26	22	36	12	24	1. 5	1. 8	-----	-----	1, 550	1, 800	-----	(2)
Durham coarse sandy loam, sloping phase	25	55	14	23	20	32	12	24	1. 5	1. 8	-----	-----	1, 450	1, 700	-----	(2)
Efland silt loam, gently sloping phase	35	65	25	35	35	50	15	23	1. 5	2. 0	-----	-----	900	1, 200	70	110
Efland silt loam, eroded gently sloping phase	30	60	22	32	30	45	15	23	1. 5	2. 0	-----	-----	800	1, 100	160	220
Efland silt loam, sloping phase	30	60	22	32	30	45	15	23	1. 5	2. 0	-----	-----	800	1, 100	160	220
Efland silt loam, eroded sloping phase	25	55	20	30	28	42	12	20	1. 0	1. 6	-----	-----	700	1, 000	160	220
Efland silt loam, strongly sloping phase	25	55	18	25	25	35	10	18	. 8	1. 2	-----	-----	-----	-----	140	200
Efland silty clay loam, severely eroded sloping phase	20	40	12	20	17	28	-----	-----	. 5	1. 0	-----	-----	-----	-----	120	180
Efland silty clay loam, severely eroded strongly sloping phase	20	40	10	15	14	20	-----	-----	. 5	1. 0	-----	-----	-----	-----	120	160
Enon loam, gently sloping phase	35	65	22	30	30	42	15	23	1. 5	2. 0	2. 0	2. 5	900	1, 200	110	160
Enon loam, eroded gently sloping phase	30	60	20	28	28	40	15	23	1. 5	2. 0	2. 0	2. 5	800	1, 100	110	160
Enon loam, sloping phase	30	60	20	28	28	40	15	23	1. 5	2. 0	2. 0	2. 5	800	1, 100	110	160
Enon loam, eroded sloping phase	25	55	18	27	25	38	12	20	1. 0	1. 6	-----	-----	700	1, 000	110	160
Enon loam, strongly sloping phase	25	55	16	25	22	35	10	18	. 8	1. 2	-----	-----	-----	-----	90	145
Enon loam, eroded strongly sloping phase	20	40	14	22	20	30	8	15	. 5	1. 0	-----	-----	-----	-----	90	145
Enon fine sandy loam, gently sloping phase	35	65	22	30	30	42	15	23	1. 5	2. 0	2. 0	2. 5	1, 000	1, 300	80	130
Enon fine sandy loam, eroded gently sloping phase	30	60	20	28	28	38	15	23	1. 5	2. 0	2. 0	2. 5	900	1, 200	85	145
Enon fine sandy loam, sloping phase	30	60	20	28	28	40	15	23	1. 5	2. 0	-----	-----	900	1, 200	80	130
Enon fine sandy loam, eroded sloping phase	25	55	18	27	25	38	12	20	1. 0	1. 6	-----	-----	800	1, 100	90	145
Enon clay loam, severely eroded sloping phase	20	40	10	15	14	20	-----	-----	. 5	1. 0	-----	-----	-----	-----	80	130
Enon clay loam, severely eroded strongly sloping phase	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	80	120
Georgeville silt loam, gently sloping phase	40	75	27	35	38	50	20	28	1. 5	2. 0	3. 0	3. 5	-----	-----	180	240
Georgeville silt loam, eroded gently sloping phase	35	70	25	35	35	50	20	28	1. 5	2. 0	3. 0	3. 5	-----	-----	180	240
Georgeville silt loam, sloping phase	35	70	25	35	35	50	20	28	1. 3	1. 4	3. 0	3. 5	-----	-----	180	240
Georgeville silt loam, eroded sloping phase	30	65	22	33	30	46	15	28	1. 0	1. 4	2. 0	3. 0	-----	-----	180	240
Georgeville silt loam, strongly sloping phase	30	65	20	27	28	38	10	20	1. 0	1. 25	2. 0	3. 0	-----	-----	180	240
Georgeville silt loam, eroded strongly sloping phase	25	55	18	25	25	35	10	20	1. 0	1. 25	-----	-----	-----	-----	160	220
Georgeville silt loam, moderately steep phase	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	170	220
Georgeville silty clay loam, severely eroded gently sloping phase	22	45	15	25	21	35	-----	-----	. 6	1. 0	-----	-----	-----	-----	140	200
Georgeville silty clay loam, severely eroded sloping phase	20	40	12	20	17	28	-----	-----	. 5	1. 0	-----	-----	-----	-----	140	200
Georgeville silty clay loam, severely eroded strongly sloping phase	20	40	10	15	14	20	-----	-----	. 5	1. 0	-----	-----	-----	-----	120	180
Georgeville silty clay loam, severely eroded moderately steep phase	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	110	160
Goldston slaty silt loam, sloping phase	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	80	100
Goldston slaty silt loam, strongly sloping phase	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	70	80

See footnotes at end of table.

TABLE 1.—*Average acre yields of principal crops to be expected over a period of years under (A) ordinary management and (B) best known management*—Continued

[Dashed lines indicate crop is not commonly grown and soil is not well suited to it under management specified]

Soil	Corn		Wheat		Oats		Soybeans		Lespedeza hay		Alfalfa hay		Tobacco		Permanent pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Lb.*	*Lb.*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Goldston slaty silt loam, moderately steep phase	----	----	----	----	----	----	----	----	----	----	----	----	----	----	60	80
Helena coarse sandy loam, gently sloping phase	35	70	16	26	23	36	12	20	.8	1.2	----	----	1,300	1,800	----	(2)
Helena coarse sandy loam, eroded gently sloping phase	30	65	16	26	23	36	12	20	.8	1.2	----	----	1,200	1,600	180	120
Helena coarse sandy loam, sloping phase	30	65	14	23	19	32	12	20	.8	1.2	----	----	1,200	1,600	----	(2)
Helena coarse sandy loam, eroded sloping phase	25	60	14	23	19	32	10	15	.6	1.0	----	----	1,100	1,400	80	120
Helena sandy loam, gently sloping phase	37	75	22	30	30	42	15	23	1.0	1.4	----	----	1,500	2,000	----	(2)
Helena sandy loam, eroded gently sloping phase	32	70	22	30	30	42	15	23	1.0	1.4	----	----	1,450	1,800	120	180
Helena sandy loam, sloping phase	32	70	20	27	28	38	15	23	1.0	1.3	----	----	1,450	1,800	----	(2)
Helena sandy loam, eroded sloping phase	27	65	20	27	28	38	12	20	1.0	1.2	----	----	1,350	1,700	125	180
Helena clay loam, severely eroded sloping phase	18	50	12	20	17	28	10	18	.5	.8	----	----	----	----	80	120
Herndon silt loam, gently sloping phase	40	75	27	35	38	50	15	27	1.5	2.0	2.0	3.5	1,100	1,600	180	240
Herndon silt loam, eroded gently sloping phase	35	70	25	35	35	50	15	27	1.5	2.0	2.0	3.5	1,000	1,500	180	240
Herndon silt loam, sloping phase	35	70	25	35	35	50	15	27	1.5	2.0	2.0	3.5	1,000	1,500	180	240
Herndon silt loam, eroded sloping phase	30	65	22	33	30	46	12	25	1.0	1.75	1.5	2.75	900	1,300	180	240
Herndon silt loam, strongly sloping phase	30	65	20	27	28	38	10	22	1.0	1.75	1.25	2.25	700	1,100	160	240
Herndon silt loam, eroded strongly sloping phase	25	55	18	25	25	35	8	18	1.0	1.5	1.25	2.0	----	----	140	220
Herndon silt loam, moderately steep phase	----	----	----	----	----	----	----	----	----	----	----	----	----	----	120	220
Herndon silty clay loam, severely eroded sloping phase	20	50	12	20	17	28	10	20	.75	1.0	----	----	----	----	120	200
Herndon silty clay loam, severely eroded strongly sloping phase	18	40	10	15	14	20	----	----	.5	1.0	----	----	----	----	120	200
Iredell loam, level phase	25	65	20	27	28	38	15	23	1.5	2.0	----	----	----	----	110	160
Iredell loam, gently sloping phase	30	70	22	30	30	42	15	23	1.5	2.0	----	----	----	----	110	160
Iredell loam, eroded gently sloping phase	20	55	20	28	28	40	15	23	1.5	2.0	----	----	----	----	110	140
Iredell loam, eroded sloping phase	20	55	16	25	23	35	12	18	1.2	1.8	----	----	----	----	110	140
Iredell very stony loam, gently sloping phase	----	----	----	----	----	----	----	----	----	----	----	----	----	----	100	120
Iredell sandy loam, level phase	25	65	20	27	28	38	15	23	1.5	2.0	----	----	1,200	1,600	100	120
Iredell sandy loam, gently sloping phase	30	70	22	30	31	42	15	23	1.5	2.0	----	----	1,200	1,600	100	120
Iredell sandy loam, eroded gently sloping phase	20	55	20	28	28	40	12	20	1.5	2.0	----	----	1,100	1,500	100	120
Iredell sandy loam, eroded sloping phase	20	55	16	25	22	35	12	18	1.5	2.0	----	----	1,000	1,300	110	140
Lloyd loam, level phase	45	80	28	40	40	56	20	27	2.0	2.5	3.0	4.5	----	----	190	240
Lloyd loam, gently sloping phase	45	80	28	40	40	56	20	27	2.0	2.5	3.0	4.5	----	----	190	240
Lloyd loam, eroded gently sloping phase	40	75	26	38	37	53	20	27	2.0	2.5	3.0	4.5	----	----	180	240
Lloyd loam, sloping phase	40	75	26	38	37	53	20	27	2.0	2.5	2.75	4.5	----	----	180	240
Lloyd loam, eroded sloping phase	35	70	23	35	32	50	15	25	1.5	2.0	2.5	4.0	----	----	200	240
Lloyd loam, strongly sloping phase	35	65	23	35	32	50	15	25	1.5	2.0	2.5	4.0	----	----	200	240
Lloyd loam, eroded strongly sloping phase	30	60	20	32	28	45	12	23	1.25	1.75	2.0	3.5	----	----	180	220
Lloyd loam, moderately steep phase	----	----	----	----	----	----	----	----	----	----	----	----	----	----	170	220
Lloyd clay loam, severely eroded gently sloping phase	28	50	20	30	28	42	10	20	1.0	1.6	2.0	3.0	----	----	160	200
Lloyd clay loam, severely eroded sloping phase	22	50	18	28	25	40	10	20	.8	1.4	1.75	2.25	----	----	140	200
Lloyd clay loam, severely eroded strongly sloping phase	20	45	15	23	21	32	8	15	.8	1.25	----	----	----	----	120	160

See footnotes at end of table.

TABLE 1.—*Average acre yields of principal crops to be expected over a period of years under (A) ordinary management, and (B) best known management*—Continued

[Dashed lines indicate crop is not commonly grown and soil is not well suited to it under management specified]

Soil	Corn		Wheat		Oats		Soybeans		Lespedeza hay		Alfalfa hay		Tobacco		Permanent pasture	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Lb.*	*Lb.*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Lloyd clay loam, severely eroded moderately steep phase	--	--	--	--	--	--	--	--	--	--	--	--	--	--	80	120
Local alluvial land, poorly drained	--	--	--	--	--	--	--	--	--	--	--	--	--	--	160	250
Local alluvial land, well drained	50	80	30	40	42	56	17	28	1. 8	2. 0	--	--	--	--	200	300
Mecklenburg loam, eroded gently sloping phase	35	65	22	32	30	45	15	23	1. 5	2. 0	2. 5	3. 0	--	--	160	200
Mecklenburg loam, eroded sloping phase	30	55	20	30	28	42	15	23	1. 5	2. 0	2. 0	2. 5	--	--	160	200
Mecklenburg loam, eroded strongly sloping phase	25	50	18	28	25	40	12	20	1. 0	1. 6	2. 0	2. 5	--	--	140	180
Mecklenburg clay loam, severely eroded sloping phase	20	40	12	20	17	28	10	18	. 5	1. 0	--	--	--	--	90	160
Mixed alluvial land, poorly drained	--	--	--	--	--	--	--	--	--	--	--	--	--	--	160	220
Mixed alluvial land, well drained	--	--	--	--	--	--	--	--	--	--	--	--	--	--	110	160
Moderately gullied land, Helena, Enon, and Wilkes materials	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(2)
Moderately gullied land, Cecil, Appling, and Lloyd materials	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(2)
Moderately gullied land, Georgeville and Herndon materials	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(2)
Orange silt loam, nearly level phase	25	55	18	23	25	32	12	20	1. 0	1. 5	--	--	--	--	120	160
Orange silt loam, gently sloping phase	30	60	20	25	28	35	12	20	1. 0	1. 5	--	--	--	--	120	160
Orange silt loam, eroded gently sloping phase	20	50	18	23	25	32	12	20	1. 0	1. 5	--	--	--	--	120	140
Orange silt loam, gently sloping moderately well drained variant	35	65	22	30	30	42	15	26	1. 3	1. 5	--	--	900	1, 300	180	220
Orange silt loam, eroded gently sloping moderately well drained variant	30	60	20	28	28	40	15	26	1. 3	1. 5	--	--	800	1, 200	120	160
Orange silt loam, sloping moderately well drained variant	30	60	20	28	28	40	15	26	1. 3	1. 5	--	--	700	1, 100	180	220
Orange silt loam, eroded sloping moderately well drained variant	25	55	16	25	21	35	12	23	1. 0	1. 25	--	--	600	900	110	160
Severely gullied land	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(2)
Starr loam	50	85	30	42	42	60	17	28	2. 3	2. 5	3. 5	4. 0	--	--	180	250
Stony land	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(2)
Tirzah silt loam, gently sloping phase	45	75	30	42	42	60	18	27	2. 0	2. 5	3. 5	4. 5	--	--	200	250
Tirzah silt loam, eroded gently sloping phase	40	70	30	42	42	60	18	27	2. 0	2. 5	3. 5	4. 5	--	--	200	250
Tirzah silt loam, sloping phase	40	70	28	40	38	56	15	27	1. 8	2. 2	3. 0	4. 5	--	--	200	250
Tirzah silt loam, eroded sloping phase	35	65	28	40	38	56	15	25	1. 5	2. 0	3. 0	4. 0	--	--	200	250
Tirzah silt loam, strongly sloping phase	35	60	23	35	32	50	15	25	1. 5	2. 0	2. 5	4. 0	--	--	200	250
Tirzah silt loam, eroded strongly sloping phase	30	55	20	30	28	42	12	23	1. 25	1. 75	2. 0	3. 5	--	--	180	250
Tirzah silty clay loam, severely eroded gently sloping phase	30	55	20	30	28	42	10	20	1. 0	1. 6	2. 0	3. 0	--	--	160	200
Tirzah silty clay loam, severely eroded sloping phase	25	50	18	28	25	40	10	20	. 8	1. 4	1. 75	2. 25	--	--	140	200
Tirzah silty clay loam, severely eroded strongly sloping phase	20	45	15	23	21	32	8	15	. 8	1. 25	--	--	--	--	140	200
Vance sandy loam, gently sloping phase	38	70	22	30	31	42	15	28	1. 3	1. 5	--	--	1, 500	2, 100	--	(2)
Vance sandy loam, eroded gently sloping phase	32	65	20	28	28	40	15	28	1. 3	1. 5	--	--	1, 300	1, 900	160	200
Vance sandy loam, eroded sloping phase	28	60	20	28	28	40	15	28	1. 0	1. 25	--	--	1, 300	1, 800	165	200
Vance sandy loam, eroded strongly sloping phase	22	50	18	25	25	35	10	20	. 75	1. 0	--	--	1, 100	1, 400	80	100
Vance coarse sandy loam, gently sloping phase	35	65	18	28	25	40	12	22	1. 0	1. 26	--	--	1, 400	2, 000	--	(2)
Vance coarse sandy loam, eroded gently sloping phase	30	60	16	26	22	37	12	22	1. 0	1. 3	--	--	1, 300	1, 800	120	150
Vance coarse sandy loam, eroded sloping phase	25	55	15	25	21	35	10	20	1. 0	1. 2	--	--	1, 200	1, 600	120	150

See footnotes at end of table.

TABLE 1.—*Average acre yields of principal crops to be expected over a period of years under (A) ordinary management, and (B) best known management*—Continued

[Dashed lines indicate crop is not commonly grown and soil is not well suited to it under management specified]

Soil	Corn		Wheat		Oats		Soybeans		Lespedeza hay		Afalfa hay		Tobacco		Permanent pasture	
	A	B	A	B	A	B	B	A	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Lb.*	*Lb.*	*Cow acre days* [1]	*Cow acre days* [1]
Vance clay loam, severely eroded sloping phase	18	45	10	18	14	25	10	20	.75	1.0	----	----	----	----	110	150
Wehadkee fine sandy loam	25	40	----	----	20	45	----	----	----	----	----	----	----	----	180	240
Wilkes soils, gently sloping phases	25	35	15	25	21	35	----	----	.8	1.25	----	----	900	1,300	80	100
Wilkes soils, sloping phases	20	30	12	20	17	28	----	----	.7	1.25	----	----	800	1,100	80	100
Wilkes soils, eroded sloping phases	15	25	10	15	14	20	----	----	.5	1.0	----	----	700	1,000	60	80
Wilkes soils, strongly sloping phases	----	----	----	----	----	----	----	----	----	----	----	----	600	900	60	80
Wilkes soils, eroded strongly sloping phases	----	----	----	----	----	----	----	----	----	----	----	----	600	900	60	80
Wilkes soils, moderately steep phases	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	(2)
Wilkes stony soils, strongly sloping phases	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	(2)
Wilkes stony soils, moderately steep phases	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	(2)
Worsham sandy loam	25	45	----	----	----	----	15	22	1.2	1.3	----	----	----	----	180	275
Worsham silt loam	25	45	----	----	----	----	15	22	1.2	1.3	----	----	----	----	170	275

[1] Number of days in 1 year that a mature cow, horse, or steer can be grazed on 1 acre of soil without injury to pasture.

[2] Not recommended that soil be used for pasture.

General Problems of Management

A farmer should know the needs of the various soils on his farm so that he can manage them in ways that build up and maintain productivity. Then he should plan a program of management that meets these needs. In Alamance County, the chief problems of management are (1) liming and fertilizing; (2) maintaining organic matter; (3) using a good cropping system; (4) controlling plant diseases, insects, and weeds; (5) controlling erosion; (6) using poorly drained areas; and (7) tilling effectively.

Liming and fertilizing

Adequate amounts of lime and fertilizer must be applied to the soils to prevent them from becoming acid and infertile because of leaching and the removal of crops. Enough lime should be applied to raise the pH to the level that a specific crop needs when it is grown on a particular soil. The pH needed for general crops is about 6 to 6.5, and that for tobacco is about 5.0 to 5.5.

The amount of fertilizer needed for a specific crop should be determined by testing the soil on which the crop is grown. Information about soil testing can be obtained from the county agent or the representative of the Soil Conservation Service.

Corn, grain, and other general crops normally need a fertilizer that has 1 part nitrogen, 2 parts phosphate, and 2 parts of potash. Alfalfa—a heavy feeder—needs about twice as much fertilizer as lespedeza or ladino clover. Iredell loam and other soils that have a high capacity for the storage of plant food do not need so much fertilizer as the Durham and other soils that have a coarse sandy loam surface soil. The coarser textured soils generally need fertilizer more often than the finer textured ones. Tobacco and other specialized crops need special fertilizers in amounts indicated by chemical tests. Soil tests are made by the Soil Testing Division of the North Carolina Department of Agriculture.

Maintaining organic matter

Nearly all of the soils in Alamance County are low in organic matter. Even if the best methods of conservation are used, it is difficult to increase the content of organic matter. This is because the climate is so favorable for the activity of micro-organisms that organic matter decomposes almost as fast as it enters the soil.

The amount of available organic matter is increased by applications of nitrogen fertilizer because the growth of plants is increased. An increase in organic matter increases the capacity to store plant nutrients. It also improves the tilth and structure of the soil and lessens the risk of erosion.

The use of crop residues and applications of manure and nitrogen depends on the kind of crops produced. Animal manure furnishes a considerable amount of nitrogen and organic matter. Decomposed and partly decomposed crop residues on and in the soil may give protection against wind and water erosion and also increases the rate that water enters the soil. Most nonleguminous crop residues, however, take in nitrogen as they decompose. Consequently, severe shortages of nitrogen may be the result of using large amounts of fresh, nonleguminous crop residues.

Cropping system

A good cropping system helps control erosion and plant diseases that come from the soil. It also aids in eliminating insects and weeds. The system should be planned so that it furnishes fresh organic matter to the crops that need it most. The supply of plant nutrients should be available over long periods, thus allowing more time for the normal processes of weathering to replace the used nutrients. The soil should be kept in good physical condition and thus insure permeability to air, water, and roots and a proper rate of infiltration (*5*).[1]

CONTROL OF PLANT DISEASES: Some plant diseases can be controlled by using a suitable crop sequence because the diseases are caused by pathogens that have a narrow range of hosts and are spread chiefly by water. In this class are *Ascochyta* blight of cotton, various anthracnose diseases, and many leaf-spot diseases. Many plant diseases, however, cannot be appreciably controlled by any system of crop sequence because their pathogens are spread by the wind. In this class are rust, downy mildews, and powdery mildews.

In Alamance County many pathogens can live in the soil indefinitely, even when no host is present. Examples are pathogens that cause fusarium wilt, tobacco black shank, and certain smuts. These diseases cannot be eliminated by crop sequences, but they can be reduced by having long intervals between susceptible crops. Some pathogens can live a long time, because they can survive the competition of other organisms in the soil. In this class are pathogens that cause stem and root rot, sore shin, and damping-off. Crop sequences have little effect on these diseases. Various nematode diseases, which break out on the roots of some plants, can be controlled by growing nonhost plants for long periods.

CONTROL OF INSECTS: Cropping sequences can also be used to control insect pests. Crops on which insects cannot live, or at least increase in numbers, should be planted. When insects are in their nonmigratory or slow-moving stage, the kind of crops should be changed. Generally, crop sequences should be used that oppose the feeding habits and other behavior of insects.

CONTROL OF WEEDS: About 1,200 species of weeds are harmful to agriculture, but nearly all can be controlled by using effective crop sequences (*5*). Row crops of tobacco, corn, and soybeans, which grow in summer, are good curbs on weeds. Most troublesome plants are crowded out by a strong perennial winter grain that has perennial grasses drilled with it. Other strong competitive crops and special crops should be used as needed. Strong shade crops that are grown in summer for 2 years will eradicate bermudagrass and nutsedge. Overgrazing and periodic close mowing will control johnsongrass. Chemicals should be used, as needed, to help control weeds.

Controlling erosion

Because a large acreage of the soils in the county is moderately eroded, severely eroded, or gullied, erosion is a major problem. Much of the erosion is a result of the soil being managed poorly in the past. Better management is needed.

The steeper areas should be used mostly for pasture and forest, and careless grazing and burning need to be avoided. Suitable cropping sequences should be used, particularly on slopes. Fields should be tilled on the contour and, in some places, terraced. By maintaining a high level of fertility at all times, the growth of plants and, therefore, the content of organic matter will be increased. An increase in organic matter increases the rate of infiltration and thus reduces the rate of runoff. In some places erosion can be controlled by stripcropping and by sodding drainways.

[1] Italic numbers in parentheses refer to Literature Cited, p. 86.

Using poorly drained areas

A few colluvial soils and soils of the first bottoms are too wet for some crops to be grown. Only water-tolerant crops should be grown on these soils, and, in some places, artificial drainage may be needed. A pasture mixture of ladino clover and fescue is very well suited to wet soils.

Tilling effectively

Because many of the soils in the county have a rather fine-textured surface soil, their structure is difficult to maintain. To prevent puddling, for example, the Iredell, Orange, Mecklenburg, Efland, and Enon soils must be cultivated within a narrow range of moisture content. The soils in the county must not be overcultivated. Their seedbed must be prepared carefully to obtain the mellow, firm seedbed needed by most crops grown in the county. Stands of grasses, legumes, and other small-seeded plants, especially if they are grown on the sandier soils, will be improved if a roller or cultipacker is used.

Soil Survey Methods and Definitions

The scientist who makes a soil survey examines soils in the field, classifies the soils in accordance with facts that he observes, and maps their boundaries on an aerial photograph or other map.

FIELD STUDY.—The soil surveyor bores or digs many holes to see what the soils are like. The holes are not spaced in a regular pattern, but are located according to the lay of the land. Usually they are not more than a quarter of a mile apart, and in places they are much closer. In most soils each boring or hole reveals several distinct layers, called horizons, which collectively are known as the soil profile. Each layer is studied to see how it differs from others in the profile and to learn the things about the soil that influence its capacity to support plant growth (*13*).

Color is usually related to the amount of organic matter. The darker the surface soil, as a rule, the more organic matter it contains. Streaks and spots of gray, yellow, and brown in the lower layers generally indicate poor drainage and poor aeration.

Texture, or the content of sand, silt, and clay, is determined by the way the soil feels when rubbed between the fingers, and is later checked by laboratory analysis. The texture of a soil has much to do with how well the soil retains moisture, plant nutrients, and fertilizer, and whether the soil is easy or difficult to cultivate.

Structure, which is the way the individual soil particles are arranged in larger grains and the amount of pore space between grains, gives us clues to the ease or difficulty with which the soil is penetrated by plant roots and by moisture.

Consistence, or the tendency of the soil to crumble or to stick together, indicates whether it is easy or difficult to keep the soil open and porous under cultivation.

Other characteristics observed in the course of the field study and considered in classifying the soil include the following: The depth of the soil over bedrock or over compact layers; the presence of gravel or stones in amounts that will interfere with cultivation; the steepness and pattern of slopes; the degree of erosion; the nature of the underlying parent material from which the soil has developed; and acidity or alkalinity of the soil as measured by chemical tests.

Classification.—On the basis of the characteristics observed by the survey team or determined by laboratory tests, soils are classified in phases, types, and series. The soil type is the basic classification unit. A soil type may consist of several phases. Types that resemble each other in most of their characteristics are grouped in soil series.

Terms used in the lower categories of soil classification are defined as follows:

Soil type.—Soils similar in kind, thickness, and arrangement of soil layers are classified as one soil type.

Soil phase.—Because of differences other than those of kind, thickness, and arrangement of layers, some soil types are divided into two or more phases. Variations in slope, frequency of rock outcrops, degree of erosion, depth of soil over the substratum, and natural drainage are examples of characteristics that suggest dividing a soil type into phases.

The soil phase (or the soil type if it has not been subdivided) is the unit shown on the soil map. It is the unit that has the narrowest range of characteristics. Use and management practices, therefore, can be specified more easily for soil phases than for soil series or yet broader groups that contain more variation.

Soil series.—Two or more soil types that differ in surface texture, but are otherwise similar in kind, thickness, and arrangement of soil layers, are normally designated as a soil series. In a given area, however, a soil series may be represented by only one soil type. Each series is named for a place near which it was first mapped.

Miscellaneous land types.—Areas that have little true soil are not classified as soil series, but are identified by descriptive names. Examples in this county are Severely gullied land and Stony land. Miscellaneous land types generally are not subdivided, but, in Alamance County, Mixed alluvial land and Local alluvial land are subdivided into poorly drained and well drained units.

Additional terms.—Definitions of additional terms used in soil survey, and more complete definitions of some of the foregoing terms follow:

Acidity. The degree of acidity of the soil mass expressed in pH values and in words follows (*13*):

	pH		*pH*
Extremely acid	4.5	Neutral	6.6–7.3
Very strongly acid	4.5–5.0	Mildly alkaline	7.4–7.8
Strongly acid	5.1–5.5	Moderately alkaline	7.9–8.4
Medium acid	5.6–6.0	Strongly alkaline	8.5–9.0
Slightly acid	6.1–6.5		

Alluvial soils. An azonal group of soils developing from transported materials that have been deposited recently and have been changed only slightly or not at all by the soil-forming processes.

Alluvium. Fine material, such as sand, mud, or other sediments, deposited on land by streams.

Bedrock. The solid rock underlying soils.

Catena. A group of soils, within a specific soil zone, formed from similar parent material but with unlike soil characteristics because of differences in relief or drainage.

Clay. The mineral soil grains less than 0.002 mm. (0.000079 inch) in diameter.

Colluvium. Deposits of rock fragments and soil material accumulated at the base of slopes through the influence of gravity. It includes creep and local wash.

Consistence, soil. The degree of cohesion and adhesion of soil particles, or their resistance to separation or deformation of the soil aggregate. Some of the terms used to describe consistence are *brittle, compact, firm, friable, plastic,* and *sticky.*

Brittle—Soil material, when dry, breaks with a sharp, clean fracture; if struck with a sharp blow, it shatters into cleanly broken, hard fragments.

Compact—Soil material is dense and firm but without cementation.

Firm—Soil material crushes under moderate pressure between thumb and forefinger but resistance is distinctly noticeable.

Friable—Soil material crushes easily under gentle to moderate pressure between thumb and forefinger and coheres when pressed together.

Plastic—Soil material is readily deformed without rupture; pliable but cohesive; readily molded, puttylike.

Sticky—After pressure, soil material adheres to both thumb and forefinger and tends to stretch somewhat and pull apart rather than pulling free from either digit.

Eluviation. The movement of material from one place to another within the soil in either true solution or colloidal suspension.

Erosion. The wearing away or removal of soil material by water and wind.

Felsic rocks. Light-colored, acid rocks consisting chiefly of feldspar, feldsapathoids, and quartz, or a combination of these materials.

Fertility. The inherent capability of a soil to support plant growth as measured by its content of compounds needed for proper or balanced growth of plants.

First bottom. The normal flood plain of a stream; land along a stream subject to overflow.

Horizon, soil. A layer in the soil profile, approximately parallel to the land surface and having well-defined characteristics.

Horizon A—The upper horizon of the soil mass from which material has been removed by percolating waters; the eluviated part of the solum; the surface soil. This horizon is generally divided into two or more subhorizons, of which A_0 is not a part of the mineral soil but an accumulation of organic debris on the surface. Other subdivisions are designated as A_1, A_2, and so on.

Horizon B—The horizon to which materials have been added by percolating waters; the illuviated part of the solum; the subsoil. This horizon also may be subdivided into several subhorizons, depending on the color, structure, consistence, and character of the material deposited. These subhorizons are designated as B_1, B_2, B_3, and so on.

Horizon C—The horizon of partly weathered material underlying the B horizon; the substratum; usually the parent material.

Illuviation. An accumulation of material in a soil horizon through the deposition of suspended mineral or organic matter originating from horizons above.

Mafic rocks. Dark-colored basic rocks that are colored by iron compounds and consist chiefly of magnesium.

Mottles, soil. Contrasting color patches that vary in number and size.

Permeable. Easily penetrated as by water.

Phase, soil. A subdivision of the soil type covering variations within the type that are not sufficient to justify the establishment of a new type but are worthy of recognition; a mapping unit. The variations are chiefly in such external characteristics as relief, stoniness, and erosion. (Example: Enon loam, sloping phase.)

Productivity, soil. The capability of a soil to produce specified plants under a given system of management.

Profile, soil. A vertical section of the soil from the surface into the parent material.

Reaction. See Acidity.

Series, soil. A group of soils having the same profile characteristics (the same general range in color, structure, consistence, and sequence of horizons), the same general conditions of relief and drainage, and usually a common or similar origin and mode of formation. A group of soil types closely similar in all respects except the texture of the surface soil.

Soil. The natural medium for the growth of land plants on the surface of the earth, composed of organic and mineral materials.

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. Structure may refer to the natural arrangement of the soil when in place and undisturbed or to the soil at any degree of disturbance. Soil structure is classified according to *grade, class,* and *type.*

Grade—Degree of distinctness of aggregation; expresses the differential between cohesion within aggregates and adhesion between aggregates. Terms: *Structureless* (single grain or massive), *weak, moderate,* and *strong.*

Class—Size of soil aggregates. Terms: *Very fine* or *very thin; fine* or *thin; medium; coarse* or *thick;* and *very coarse* or *very thick.*

Type—Shape of soil aggregates. Terms: *Platy; prismatic; columnar; blocky, angular blocky,* or *subangular blocky; granular* (nonporous) and *crumb* (very porous). (Example of soil-structure grade, class, and type: Moderate, coarse, blocky.)

Subsoil. Technically, the B horizon; commonly, that part of the profile below plow depth.

Substratum. Material underlying the subsoil.

Surface soil. Technically, the A horizon; commonly, that part of the upper profile usually stirred by plowing.

Terrace (geologic). Old alluvial plain, usually level or smooth, bordering a stream; seldom subject to overflow; frequently a terrace is called a second bottom.

Texture. The relative proportions of the various size groups of individual soil grains in a mass of soil. The various individual soil grains are the size groups, as sand, silt, and clay. A coarse-textured soil is one with a high content of sand; a fine-textured soil has a high content of clay.

Type, soil. A subdivision of the soil series based on the texture of the surface soil.

Upland (geologic). Land consisting of material unworked by water in recent geologic time and ordinarily lying at higher elevations than the alluvial plain or stream terrace.

Soils of Alamance County

In this section, first the soil series in the county and their relations are described. Then, the miscellaneous land types are briefly discussed. Finally, each soil series and the single soils in each series are described.

Soil Series and Their Relations

By listing the soil series, or kind of soils, and giving the important characteristics of the soils in the series, the relations of the different series to each other can be shown. Table 2 groups the soil series of the county according to topographic position and shows for each series the parent material, relief, natural drainage, and color of the soils. The soil series are grouped as (1) soils on alluvial plains, (2) soils on local alluvium, and (3) soils on uplands.

Soils on alluvial plains

Nearly all of the alluvial soils in the county are developing from materials that were washed from residual soils occurring within the county. These soils range from loamy fine sands to silt loams and are friable to very friable. They range from well drained to poorly drained and from dark brown to gray. They are highly fertile and contain a medium amount of organic matter. These soils are likely to be flooded at times. On the alluvial plains in this county are the Buncombe, Chewacla, Congaree, and Wehadkee soils.

TABLE 2.—*Soil series of Alamance County, N.C., grouped according to topographic position*

Soil	Parent material	Relief [1]	Natural drainage	Color of surface soil and subsoil
SOILS ON ALLUVIAL PLAINS				
Underlain by various materials:				
Buncombe	Alluvium	First bottom	Good	Dark-brown surface soil; brown subsoil.
Chewacla	Alluvium	First bottom	Somewhat poor	Light olive-brown surface soil; yellowish-brown subsoil.
Congaree	Alluvium	First bottom	Good to moderately good.	Dark-brown surface soil; yellowish-brown subsoil.
Wehadkee	Alluvium	First bottom	Poor	Dark grayish-brown to dark-gray surface soil; dark-gray subsoil.
SOILS ON LOCAL ALLUVIUM				
Underlain by various materials:				
Starr	Local alluvium	Smooth foot slopes	Good	Dark-brown surface soil; yellowish-red subsoil.
Worsham	Local alluvium	Smooth stream heads.	Poor	Dark-gray surface soil; subsoil mottled gray and dark gray.
SOILS ON UPLANDS				
Underlain by felsic rock:				
Appling	Granite, gneiss, or schist	Smooth to steep	Good	Grayish-brown to yellowish-brown surface soil; subsoil strong brown to strong brown mottled with red.
Cecil	Granite, gneiss, or schist	Smooth to steep	Good	Brown to red surface soil; red subsoil.
Colfax	Granite, gneiss, or schist and colluvial material.	Smooth	Somewhat poor	Gray to pale-olive surface soil; subsoil mottled gray and yellowish brown.
Durham	Granite, gneiss, or schist	Smooth	Good	Dark-gray to grayish-brown surface soil; yellow to brownish-yellow subsoil.

See footnote at end of table.

TABLE 2.—*Soil series of Alamance County, N.C., grouped according to topographic position*—Continued

SOILS ON UPLANDS

Soil	Parent material	Relief [1]	Natural drainage	Color of surface soil and subsoil
Underlain by mixed felsic and mafic rock:				
Enon	Mixed mafic and felsic rock.	Smooth to steep	Good	Light olive-brown to light yellowish-brown surface soil; olive-brown to yellowish-brown subsoil.
Helena	Mixed felsic and mafic crystalline rock.	Smooth to hilly	Moderately good	Gray to grayish-brown surface soil; subsoil mottled gray and yellowish brown.
Lloyd	Mixed felsic and mafic crystalline rock.	Smooth to hilly	Good	Dark reddish-brown to dark-red surface soil; dark-red subsoil.
Vance	Granite, gneiss, or schist	Smooth to sloping	Good	Light olive-brown to dark yellowish-brown surface soil; subsoil mottled yellow and brown.
Wilkes	Mixed felsic and mafic rock.	Smooth to steep	Excessive	Gray surface soil; subsoil mottled light gray and olive yellow.
Underlain by mafic rock:				
Davidson	Mafic crystalline rock	Smooth	Good	Brownish-red to dark-red surface soil; dark-red subsoil.
Iredell	Mafic crystalline rock	Smooth	Moderately good	Very dark brown surface soil; olive-brown subsoil.
Mecklenburg	Mafic crystalline rock	Smooth to steep	Good	Very dark brown to reddish-brown surface soil; yellowish-red to strong-brown subsoil.
Underlain by volcanic slate:				
Alamance	Volcanic slate	Smooth	Good	Light olive-gray to pale-yellow surface soil; brownish-yellow to yellow subsoil.
Efland	Volcanic slate	Smooth	Good	Dark yellowish-brown surface soil; strong-brown to yellowish-red subsoil.
Georgeville	Volcanic slate	Smooth to steep	Good	Yellowish-brown to yellowish-red surface soil; red subsoil.
Goldston	Volcanic slate	Steep	Excessive	Grayish-brown surface soil; thin, brownish subsoil in a few places; in many places no subsoil developed.
Herndon	Volcanic slate	Smooth to steep	Good	Dark-brown to yellowish-brown surface soil; subsoil mottled red and yellow.
Orange	Volcanic slate	Smooth	Somewhat poor to moderately good.	Very dark gray to brownish-yellow surface soil; strong-brown or yellowish-brown subsoil.
Tirzah	Volcanic slate	Smooth	Good	Dark reddish-brown to yellowish-red surface soil; dark-red subsoil.

[1] As used in this table, relief refers to the dominant relief that the soils generally occupy. Slopes less than 6 percent are called smooth; those of 6 to 15 percent, hilly; and those greater than 15 percent, steep.

Soils on local alluvium

These soils are on foot slopes and near the heads of streams. They are developing from sediments that sloughed or were washed from adjacent soils. They range in texture from sandy loam to silt loam and in color from dark brown or red to gray. In many places these soils have a buried residual subsoil that ranges from friable sandy clay loam to firm sandy clay. The soils are highly fertile and contain a medium amount of organic matter, but overwash deposited from the surrounding areas is likely to damage crops. In this county, the Starr and Worsham soils are on local alluvium.

Soils on uplands

The soils on uplands in Alamance County have developed in place from parent material that weathered from four kinds of rock—(1) felsic crystalline rock; (2) mixed felsic and mafic crystalline rock; (3) mafic crystalline rock; and (4) volcanic slate.

The upland soils underlain by felsic crystalline rock have a surface soil that ranges from yellowish brown to gray and from nearly loose loamy coarse sand to friable sandy loam. Their subsoil ranges in color from red to gray mottled with brown, yellow, or red. The subsoil ranges in texture from friable to firm and in consistence from sandy clay loam to sandy clay or clay. The Appling, Cecil, Colfax, and Durham soils are the upland soils in this county that are underlain by felsic crystalline rock. Except for the somewhat poorly drained Colfax soils, these soils are well drained. They have medium to low fertility and contain a small amount of organic matter.

The upland soils underlain by mixed felsic and mafic crystalline rock occur on about the same kind of relief as do those underlain by felsic crystalline rock. These soils have a surface layer that ranges from nearly loose loamy coarse sand to friable loam. In color, the surface soil ranges from dark reddish brown to gray. The subsoil is plastic clay that is firm to very firm when dry. In color, it ranges from dark red to gray mottled with yellow or brown. Most of these soils are well drained, but some are moderately well drained, and some are excessively drained. The natural fertility and content of organic matter range from medium to low. The Enon, Helena, Lloyd, Vance, and Wilkes soils are upland soils underlain by mixed felsic and mafic crystalline rock.

The upland soils underlain by mafic rock occur on relief that ranges from level to steep; the dominant relief is gently sloping to sloping. The surface layer of these soils is very dark-brown to dark reddish-brown friable loam or clay loam. Their clay subsoil ranges from firm to very firm in consistence and from light olive brown to dark red in color. It is plastic when wet. The Davidson, Iredell, and Mecklenburg soils are the upland soils in the county that are underlain by mafic rocks. Except for the moderately well drained Iredell soils, these soils are well drained. They are medium to low in natural fertility.

Upland soils underlain by volcanic slate are in positions similar to those of the other upland soils in the county. Their slopes, however, are less irregular than those of the other upland soils and, in most places, are gentle to moderate. These soils have a friable silt loam surface layer that ranges in color from dark gray to grayish brown and dark brown. The subsoil, when moist, ranges from friable to very firm in consistence; it is plastic when wet. It ranges from silty clay loam to clay in texture. The color ranges from dark red to gray mottled with yellowish brown. In this group of upland soils are the Alamance, Efland, Georgeville, Goldston, Herndon, Orange, and Tirzah soils. Except for the excessively drained Goldston soil and the somewhat poorly drained to well drained Orange soils, these soils are well drained.

Miscellaneous Land Types

Areas that have little or no true soil are mapped as miscellaneous land types. Five miscellaneous land types, some of which have been subdivided into phases, have been mapped in the county.

Local alluvial land, which is subdivided into well-drained and poorly drained phases, occurs on mixed alluvial material that was washed from surrounding soils. It is on smooth foot slopes. Mixed alluvial land is also divided into well-drained and poorly drained phases. It occurs on narrow first bottoms. The material of this land was washed from distances farther than that of the Local alluvial land. Moderately gullied land has three phases, which are separated according to the kind of soil material. These units occur on mixed felsic and mafic rock and are sloping to moderately steep. Drainage ranges from moderately good to good. Severely gullied land has gullies that are deeper and cover a larger area than those of the Moderately gullied land. Stony land has many stones and rock outcrops. It occurs on slopes of 6 to 15 percent, and its only agricultural use is for growing trees.

Soil Series, Types, and Phases

This subsection is provided for those who want detailed information about the soils of the county. It describes the single soils, or mapping units, in this county; that is, the areas on the detailed soil map that are bounded by lines and identified by a symbol. For more general information about the soils, the reader can refer to the section, Soil Associations, in which the broad patterns of the soils are described.

An important part of this subsection is the description of the series. This description gives statements about the general nature of the soils in the series and compares those soils with the soils of other series. It also includes statements on topography, drainage, parent material, and native vegetation.

The descriptions of the single soils follow the series description. All the soils in one series that have the same texture are together. For example, all Davidson soils that have a clay loam surface soil are together, then all Davidson soils that have a clay surface soil. The symbol that identifies the soil on the detailed map follows the soil name and is in parentheses. The capability unit in which the soil has been placed is given at the end of each soil description. A profile description for a soil in each series can be found in the section, Genesis, Classification, and Morphology.

The location and distribution of the single soils are shown on the soil map at the back of this report. Their approximate acreage and proportionate extent are given in table 3. It will be helpful to refer to the section, Soil Survey Methods and Definitions, where "series," "types," "phases," and other special terms used in describing soils are defined.

Alamance series

The Alamance soils are reddish yellow, friable, loamy, and moderately well drained to well drained. They occur on and near the top of upland hills in the southern and eastern parts of the county. They are underlain by light-gray to gray, fine-grained rocks that are called Carolina Slates. This formation is dominantly rhyolite but contains quartz schist and impure quartzite. The native vegetation was oaks, dogwood, blackgum, hickory, cedar, and shortleaf pine.

The Alamance soils are closely associated with the Herndon, Orange, Georgeville, and Efland soils. Their parent material is similar to that of the Herndon and Orange soils. Their subsoil is light yellowish brown, whereas that of the Herndon soils is yellowish red. It is less plastic than the subsoil of Orange soils. The Alamance soils are not so extensive as the Georgeville soils or so well developed. Alamance silt loam, gently sloping phase, is the only soil of this series shown on the soil map, but this mapping unit includes small areas of other slightly different Alamance soils.

Alamance silt loam, gently sloping phase (2 to 6 percent slopes) (AaB).—This soil commonly occurs in the hilly upland section of the county near the top of slopes above the Herndon and Georgeville soils. It is described in detail in the subsection, Descriptions of Soil Profiles.

The surface soil, 2 to 4 inches thick, is pale-yellow, friable silt loam that has a coarse, crumb structure. The subsoil is brownish-yellow, friable silty clay loam mottled with pale yellow. It has a moderate, fine or medium, subangular blocky structure. In places near the Orange soils, the subsoil grades toward a finer texture; near the Herndon soils, it is more reddish yellow.

TABLE 3.—*Approximate acreage and proportionate extent of the soils mapped*

Soil	Area	Extent
	Acres	*Percent*
Alamance silt loam, gently sloping phase	1,036	0.4
Appling sandy loam, gently sloping phase	1,577	.6
Appling sandy loam, eroded gently sloping phase	6,679	2.4
Appling sandy loam, sloping phase	1,597	.6
Appling sandy loam, eroded sloping phase	3,065	1.1
Appling sandy loam, strongly sloping phase	1,094	.4
Appling sandy loam, eroded strongly sloping phase	748	.3
Appling sandy loam, moderately steep phase	617	.2
Appling coarse sandy loam, gently sloping phase	598	.2
Appling coarse sandy loam, eroded gently sloping phase	1,123	.4
Appling coarse sandy loam, sloping phase	341	.1
Appling coarse sandy loam, eroded sloping phase	1,159	.4
Appling sandy clay loam, severely eroded sloping phase	629	.2
Buncombe loamy fine sand	729	.3
Cecil fine sandy loam, gently sloping phase	1,022	.4
Cecil fine sandy loam, eroded gently sloping phase	3,537	1.3
Cecil fine sandy loam, sloping phase	551	.2
Cecil fine sandy loam, eroded sloping phase	1,542	.6
Cecil fine sandy loam, strongly sloping phase	581	.2
Cecil fine sandy loam, eroded strongly sloping phase	265	.1
Cecil fine sandy loam, moderately steep phase	298	.1
Cecil sandy loam, gently sloping phase	646	.2
Cecil sandy loam, eroded gently sloping phase	1,786	.6
Cecil sandy loam, sloping phase	296	.1
Cecil sandy loam, eroded sloping phase	565	.2
Cecil clay loam, severely eroded sloping phase	633	.2
Cecil clay loam, severely eroded strongly sloping phase	255	.1
Chewacla fine sandy loam	1,210	.4
Colfax sandy loam	2,237	.8
Colfax silt loam	780	.3
Congaree fine sandy loam	1,540	.6
Davidson clay loam, gently sloping phase	4,628	1.7
Davidson clay loam, sloping phase	1,754	.6
Davidson clay loam, strongly sloping phase	488	.2
Davidson clay, severely eroded gently sloping phase	251	.1
Davidson clay, severely eroded sloping phase	981	.4
Davidson clay, severely eroded strongly sloping phase	479	.2
Durham sandy loam, gently sloping phase	1,329	.5
Durham sandy loam, eroded gently sloping phase	1,560	.6
Durham sandy loam, sloping phase	328	.1
Durham sandy loam, eroded sloping phase	365	.1
Durham coarse sandy loam, gently sloping phase	1,656	.6
Durham coarse sandy loam, sloping phase	268	.1
Efland silt loam, gently sloping phase	562	.2
Efland silt loam, eroded gently sloping phase	1,745	.6
Efland silt loam, sloping phase	473	.2
Efland silt loam, eroded sloping phase	928	.3
Efland silt loam, strongly sloping phase	329	.1
Efland silty clay loam, severely eroded sloping phase	1,094	.4
Efland silty clay loam, severely eroded strongly sloping phase	353	.1
Enon loam, gently sloping phase	684	.2
Enon loam, eroded gently sloping phase	4,185	1.5
Enon loam, sloping phase	538	.2
Enon loam, eroded sloping phase	3,297	1.2
Enon loam, strongly sloping phase	976	.4
Enon loam, eroded strongly sloping phase	1,283	.5
Enon fine sandy loam, gently sloping phase	983	.4
Enon fine sandy loam, eroded gently sloping phase	3,373	1.2
Enon fine sandy loam, sloping phase	736	.3
Enon fine sandy loam, eroded sloping phase	2,854	1.0
Enon clay loam, severely eroded sloping phase	2,713	1.0
Enon clay loam, severely eroded strongly sloping phase	1,503	.5
Georgeville silt loam, gently sloping phase	2,683	1.0
Georgeville silt loam, eroded gently sloping phase	10,305	3.7
Georgeville silt loam, sloping phase	2,578	.9
Georgeville silt loam, eroded sloping phase	4,628	1.7
Georgeville silt loam, strongly sloping phase	2,318	.8
Georgeville silt loam, eroded strongly sloping phase	998	.4
Georgeville silt loam, moderately steep phase	1,332	.5
Georgeville silty clay loam, severely eroded gently sloping phase	208	.1
Georgeville silty clay loam, severely eroded sloping phase	2,287	.8
Georgeville silty clay loam, severely eroded strongly sloping phase	1,615	.6
Georgeville silty clay loam, severely eroded moderately steep phase	438	.1
Goldston slaty silt loam, sloping phase	422	.1
Goldston slaty silt loam, strongly sloping phase	1,194	.4
Goldston slaty silt loam, moderately steep phase	1,345	.5
Helena coarse sandy loam, gently sloping phase	4,112	1.5
Helena coarse sandy loam, eroded gently sloping phase	5,209	1.9
Helena coarse sandy loam, sloping phase	2,646	1.0
Helena coarse sandy loam, eroded sloping phase	7,362	2.6
Helena sandy loam, gently sloping phase	2,019	.7
Helena sandy loam, eroded gently sloping phase	4,916	1.8
Helena sandy loam, sloping phase	1,543	.6
Helena sandy loam, eroded sloping phase	4,615	1.7
Helena clay loam, severely eroded sloping phase	2,905	1.0
Herndon silt loam, gently sloping phase	1,968	.7
Herndon silt loam, eroded gently sloping phase	3,583	1.3
Herndon silt loam, sloping phase	2,434	.9
Herndon silt loam, eroded sloping phase	2,838	1.0
Herndon silt loam, strongly sloping phase	1,878	.7
Herndon silt loam, eroded strongly sloping phase	348	.1
Herndon silt loam, moderately steep phase	1,019	.4
Herndon silty clay loam, severely eroded sloping phase	756	.3
Herndon silty clay loam, severely eroded strongly sloping phase	306	.1
Iredell loam, level phase	703	.3
Iredell loam, gently sloping phase	1,477	.5
Iredell loam, eroded gently sloping phase	3,075	1.1
Iredell loam, eroded sloping phase	586	.2
Iredell very stony loam, gently sloping phase	1,078	.4
Iredell sandy loam, level phase	265	.1
Iredell sandy loam, gently sloping phase	1,225	.4
Iredell sandy loam, eroded gently sloping phase	2,834	1.0
Iredell sandy loam, eroded sloping phase	1,028	.4
Lloyd loam, level phase	203	.1
Lloyd loam, gently sloping phase	711	.3
Lloyd loam, eroded gently sloping phase	6,526	2.3
Lloyd loam, sloping phase	509	.2
Lloyd loam, eroded sloping phase	5,863	2.1
Lloyd loam, strongly sloping phase	670	.2
Lloyd loam, eroded strongly sloping phase	378	.1
Lloyd loam, moderately steep phase	570	.2
Lloyd clay loam, severely eroded gently sloping phase	323	.1
Lloyd clay loam, severely eroded sloping phase	2,056	.7
Lloyd clay loam, severely eroded strongly sloping phase	1,247	.4
Lloyd clay loam, severely eroded moderately steep phase	174	.1
Local alluvial land, poorly drained	5,523	2.0
Local alluvial land, well drained	1,140	.4
Mecklenburg loam, eroded gently sloping phase	3,157	1.1
Mecklenburg loam, eroded sloping phase	2,054	.7
Mecklenburg loam, eroded strongly sloping phase	649	.2
Mecklenburg clay loam, severely eroded sloping phase	1,124	.4
Mixed alluvial land, poorly drained	4,880	1.8
Mixed alluvial land, well drained	884	.3

TABLE 3.—*Approximate acreage and proportionate extent of the soils mapped*—Continued

Soil	Area	Extent
	Acres	*Percent*
Moderately gullied land, Helena, Enon, and Wilkes materials	4, 659	1. 7
Moderately gullied land, Cecil, Appling, and Lloyd materials	2, 534	. 9
Moderately gullied land, Georgeville and Herndon materials	802	. 3
Orange silt loam, nearly level phase	192	. 1
Orange silt loam, gently sloping phase	2, 286	. 8
Orange silt loam, eroded gently sloping phase	1, 955	. 7
Orange silt loam, gently sloping moderately well drained variant	1, 786	. 6
Orange silt loam, eroded gently sloping moderately well drained variant	1, 377	. 5
Orange silt loam, sloping moderately well drained variant	1, 094	. 4
Orange silt loam, eroded sloping moderately well drained variant	1, 364	. 5
Severely gullied land	2, 206	. 8
Starr loam	2, 151	. 8
Stony land	470	. 2
Tirzah silt loam, gently sloping phase	667	. 2
Tirzah silt loam, eroded gently sloping phase	3, 590	1. 3
Tirzah silt loam, sloping phase	410	. 1
Tirzah silt loam, eroded sloping phase	1, 039	. 4
Tirzah silt loam, strongly sloping phase	331	. 1
Tirzah silt loam, eroded strongly sloping phase	140	(1)
Tirzah silty clay loam, severely eroded gently sloping phase	98	(1)
Tirzah silty clay loam, severely eroded sloping phase	832	. 3
Tirzah silty clay loam, severely eroded strongly sloping phase	549	. 2
Vance sandy loam, gently sloping phase	420	. 1
Vance sandy loam, eroded gently sloping phase	2, 001	. 7
Vance sandy loam, eroded sloping phase	1, 217	. 4
Vance sandy loam, eroded strongly sloping phase	262	. 1
Vance coarse sandy loam, gently sloping phase	355	. 1
Vance coarse sandy loam, eroded gently sloping phase	842	. 3
Vance coarse sandy loam, eroded sloping phase	837	. 3
Vance clay loam, severely eroded sloping phase	290	. 1
Wehadkee fine sandy loam	786	. 3
Wilkes soils, gently sloping phases	430	. 1
Wilkes soils, sloping phases	1, 928	. 7
Wilkes soils, eroded sloping phases	447	. 2
Wilkes soils, strongly sloping phases	3, 628	1. 3
Wilkes soils, eroded strongly sloping phases	1, 677	. 6
Wilkes soils, moderately steep phases	3, 776	1. 4
Wilkes stony soils, strongly sloping phases	980	. 4
Wilkes stony soils, moderately steep phases	1, 310	. 5
Worsham sandy loam	7, 412	2. 7
Worsham silt loam	1, 042	. 4
Miscellaneous: Made land, mines and pits, streams and ponds	2, 436	. 9
Total area in county	277, 760	100. 0

[1] Less than 0.1 percent.

Because they are similar to this soil and have limited acreage, the following Alamance inclusions that occur in this mapping unit are not shown separately on the soil map: Eroded, gently sloping silt loam; sloping silt loam; eroded, sloping silt loam; gently sloping very fine sandy loam; eroded, gently sloping very fine sandy loam; sloping very fine sandy loam; and eroded, sloping very fine sandy loam.

Use and management.—Most of this soil is cultivated. It is well suited to small grain, hay, and pasture. It is less well suited to tobacco, corn, and soybeans. Because it has more gentle slopes and is more friable than other upland soils, it is less likely to erode. It occurs in the dairy section where close-growing crops are needed. Management should provide a good cropping system, contour cultivation for row crops, and proper liming and fertilization.

The eroded inclusions of this mapping unit need more careful management, including more intense use of close-growing and green-manure crops. These inclusions do not have so favorable a content of moisture and organic matter as the uneroded gently sloping soil, and they are not so fertile or so easily worked.

Because the sloping inclusions are more likely to erode, they may need terraces and stripcropping to control erosion. Most of the sloping acreage is in virgin forest. It grows fair stands of white, black, post, and red oaks, hickory, yellow-poplar, shortleaf pine, and a few redcedars and blackjack oaks. Capability unit IIe-2.

Appling series

This series consists of grayish-brown, well-drained, friable loamy soils. These soils occur chiefly in the northeastern, north-central, and central parts of the county. They developed from residuum of granite, gneiss, and coarse-grained schist. The native vegetation was oaks, shortleaf pine, sourwood, blackgum, and hickory.

These soils are in close association with the Cecil and Durham soils. They are less closely associated with the Vance soils. In color, the subsoil is intermediate between the subsoil of the Cecil and Durham soils. It is more friable and not so fine textured as the subsoil of the Vance soils, especially in the lower part.

The Appling soils are important to the agriculture of the county. Some of these soils are well suited to tobacco.

Appling sandy loam, gently sloping phase (2 to 6 percent slopes) (AdB).—This soil is on uplands near the top of slopes. It is described in detail in the subsection, Descriptions of Soil Profiles.

In wooded areas, the surface soil is grayish-brown friable sandy loam that has a medium and fine, crumb structure. In cultivated areas, the surface soil is lighter in color. The subsoil is red, strong-brown, and yellowish-brown firm sandy clay that has a moderate and fine, subangular blocky structure. This soil has slightly coarser material throughout the profile and a more friable subsoil than the associated Cecil soil.

The subsoil, mottled in most places, ranges from reddish brown to near red where it is near the Cecil soils, and where it is near the Durham soils it ranges from yellowish red to yellowish brown. The thickness of the soil profile over weathered rock ranges from 4 to 7 feet. Small areas of fine sandy loam are included in this mapping unit.

This soil is moderate in available water-holding capacity and is relatively low in its capacity to store plant food. It is acid in reaction.

Use and management.—Most of this soil is cultivated. It is probably better suited to the crops of the area than any other soil in the county. It is well suited to tobacco, corn, and small grain and less well suited to pasture and hay. Because of the gentle slopes and favorable water relations, this soil is not susceptible to severe erosion. Erosion can be held at a minimum by using a good cropping system and cultivating on the contour. This soil should be fertilized according to the results of soil tests. Capability unit IIe–1.

Appling sandy loam, eroded gently sloping phase (2 to 6 percent slopes) (AdB2).—This soil has a thinner surface soil than Appling sandy loam, gently sloping phase, because more than one-fourth of its original surface soil has been removed by erosion. It has moderately rapid runoff and moderate internal drainage.

Included with this soil are small, gently sloping, severely eroded areas of Appling soil that have a sandy clay loam surface soil. Most of the original surface soil of these inclusions is gone; and in some places as much as one-fourth of the subsoil has been removed. Some areas have shallow gullies.

This soil has medium permeability and moderate available water-holding capacity. It responds well to lime and fertilizer. The severely eroded inclusions are more difficult to till, slower to absorb water, and generally less fertile than this eroded gently sloping soil.

Use and suitability.—This soil is suited to about the same kinds of crops as Appling sandy loam, gently sloping phase. Cultivation should be on the contour and cropping systems that include close-growing crops should be used.

The severely eroded inclusions can be improved by adding organic matter in the form of crop residues, barnyard manure, and green manure. The severely eroded areas need more close-growing crops and sod crops than this soil, and good stands are more difficult to obtain. Capability unit IIe–1.

Appling sandy loam, sloping phase (6 to 10 percent slopes) (AdC).—This soil occurs with Appling sandy loam, gently sloping phase, on the smooth uplands between the major streams. It is nearer the middle of the slopes than the gently sloping soil. Because surface runoff is more rapid, it is more likely to erode.

This soil is moderately permeable and has moderate available water-holding capacity. It is medium in fertility and responds well to lime and fertilizer.

Use and management.—Much of this soil is in forest, but it probably could be profitably cleared for crops, particularly tobacco. Nevertheless, it is well suited to trees. Because this soil is on longer and steeper slopes than Appling sandy loam, gently sloping phase, it needs more careful management. Capability unit IIIe–1.

Appling sandy loam, eroded sloping phase (6 to 10 percent slopes) (AdC2).—This soil has a thinner surface soil than that of Appling sandy loam, sloping phase. In the more severely eroded areas, the surface soil is redder than it is in other areas, because the subsoil is mixed with it. Some of the more severely eroded areas are inclusions of clay loam too small to be shown on a map of the scale used. Except in the severely eroded spots, this soil has about the same water-holding capacity, permeability, and fertility as the sloping phase.

Use and management.—If properly managed, this soil is well suited to tobacco, corn, small grain, and pasture. It must be managed with care, however, to prevent further erosion and to maintain tilth and fertility. If row crops are grown, they should be planted in a cropping system that includes close-growing crops and the soil should be terraced and cultivated on the contour. Capability unit IIIe–1.

Appling sandy loam, strongly sloping phase (10 to 15 percent slopes) (AdD).—This soil has a thinner profile than Appling sandy loam, sloping phase, and it occupies different parts of slopes. It occurs near the middle of the steeper slopes or at the lower, more strongly sloping parts of the more gentle slopes.

Included with this soil are small areas of coarse sandy loam. Because they are small and are similar to this soil, these inclusions were not mapped separately.

Use and management.—This soil is in forest, which is a good use on the steeper slopes. Permanent pasture and hay can also be grown. If row crops are grown, they should be in strips alternating with sod crops; at least three-fourths of the field should be in sod. Although this soil has a lower available water-holding capacity than Appling sandy loam, sloping phase, it needs about the same management. Capability unit IVe–1.

Appling sandy loam, eroded strongly sloping phase (10 to 15 percent slopes) (AdD2).—This soil has a thinner surface soil than Appling sandy loam, strongly sloping phase. Because runoff is very rapid, the hazard of erosion is greater than on the strongly sloping phase.

Included with this soil are small, strongly sloping areas that have a surface soil of coarse sandy loam or sandy clay loam. The coarse sandy loam inclusions have larger particles of sand in the surface soil than has this soil. The sandy clay inclusions are more severely eroded; in places one-fourth of the subsoil has been removed, and there may be slight gullies. In these inclusions, the subsoil has been mixed with the surface soil through tillage, and, therefore, the surface soil is redder and finer textured than the corresponding layer in this soil.

Use and management.—This soil should be used for permanent pasture or hay. If it is cultivated, crops should be planted in strips, and long rotations that keep the soil in grass or legumes nearly all the time should be used. The severely eroded inclusions need additions of organic matter. On these spots, good stands of pasture will be more difficult to establish. All of the soil in this mapping unit should be limed and fertilized according to the results of soil tests. Good management practices must be followed to establish pasture. Capability unit IVe–1.

Appling sandy loam, moderately steep phase (15 to 25 percent slopes) (AdE).—This soil lies on short, moderately steep slopes of stream breaks. The soil above the substratum is normally thinner than the less steep Appling sandy loams, and in many places it is stonier and has some outcrops of rock. Because the stony and rocky spots are never uniform throughout an area, they are shown on the map by symbols.

Included with this soil are eroded areas that are too small to map separately at the scale used. These inclusions have a thinner surface soil than this soil; 25 to

75 percent of their surface soil has been lost, and some small spots are even more severely eroded.

Use and management.—Most of this soil is in a forest of shortleaf pine, white, post, black, scarlet, and chestnut oaks, hickory, sweetgum, dogwood, and yellow-poplar. If carefully managed, fair permanent pasture can be grown in some areas. This soil is not suited to crops. Capability unit VIe–1.

Appling coarse sandy loam, gently sloping phase (2 to 6 percent slopes) (AbB).—This soil differs from Appling sandy loam, gently sloping phase, in that it contains larger sand particles in the surface soil. The particles range from fine sand to fine gravel, the greater part being sand and coarse sand. In most places small amounts of coarse sand occur through the profile. This soil is generally associated with Helena and Durham coarse sandy loams.

This soil is not susceptible to severe erosion. It is permeable and has moderate available water-holding capacity. It responds well to lime and fertilizer.

Use and management.—This soil is used for tobacco and corn. It is very well suited to tobacco and well suited to corn. Because the surface soil has lower available water-holding capacity than has Appling sandy loam, gently sloping phase, this soil is not so well suited to small grains, pasture, or hay.

Lime and fertilizer should be applied according to the results of soil tests. Erosion can be controlled by tilling on the contour and using suitable crop rotations. Capability unit IIe–1.

Appling coarse sandy loam, eroded gently sloping phase (2 to 6 percent slopes) (AbB2).—Because this soil is moderately eroded, it has a thinner surface soil than Appling coarse sandy loam, gently sloping phase. Where the subsoil has been mixed with the surface soil, the plow layer is redder in color and finer in texture than the rest of this soil. Included are some severely eroded areas.

This soil is permeable and has a moderate available water-holding capacity. Its capacity to store plant food is low.

Use and management.—This soil is used for about the same kinds of crops as is Appling coarse sandy loam, gently sloping phase. The severely eroded inclusions can be improved by adding organic matter from crop residues, manure, or green manure. Capability unit IIe–1.

Appling coarse sandy loam, sloping phase (6 to 10 percent slopes) (AbC).—This soil is similar to Appling coarse sandy loam, gently sloping phase, but it occurs on steeper slopes and is more susceptible to erosion. In many places the slopes are longer than those of the gently sloping phase, and this increases the hazard of erosion. This soil is normally associated with Helena and Durham coarse sandy loams. It is permeable, moderate in available water-holding capacity, and medium in fertility.

Use and management.—Much of this soil is still in forest that produces good yields of timber. It probably could be profitably cleared and cultivated, especially for tobacco. Because it occurs on longer and steeper slopes than the gently sloping Appling soils, more careful cropping systems, tilling on the contour, terracing, liming, and fertilization should be followed. Capability unit IIIe–1.

Appling coarse sandy loam, eroded sloping phase (6 to 10 percent slopes) (AbC2).—This soil occurs in positions similar to those of Appling coarse sandy loam, sloping phase, but, because it is moderately eroded, it has a thinner surface soil than that soil. In some small spots where the surface soil is thinnest, a redder and finer textured plow layer results from mixing the subsoil with the surface soil. Permeability, available water-holding capacity, and fertility are about the same as those for the sloping phase. Included are some severely eroded spots.

Use and management.—This soil is used for about the same kinds of crops as is Appling coarse sandy loam, sloping phase. If tobacco, corn, or other row crops are grown, fairly long cropping systems, terracing, and tilling on the contour may be needed to maintain the surface soil, tilth, and fertility. The severely eroded spots can be improved by additions of organic matter and proper liming and fertilization. Capability unit IIIe–1.

Appling sandy clay loam, severely eroded sloping phase (6 to 10 percent slopes) (AcC3).—This soil is the result of gradual erosion and mixing of the surface soil and the subsoil through tillage. The moderately eroded Appling mapping units may contain small spots of this severely eroded soil, but in this mapping unit the entire area has had the original surface soil washed away. In some places as much as 25 percent of the subsoil has been removed. The surface soil is finer in texture and redder than that of the Appling sandy loams. Tillage is more difficult because of the heavy, rather plastic plow layer. This soil has poor tilth, is slowly permeable, and rather droughty, especially in summer. It is susceptible to further erosion.

Use and management.—Because it is droughty, this soil is less well suited to row crops than it is to permanent pasture, small grain, and hay. Because it is severely eroded and slightly gullied, a crop sequence of close-growing or sod crops should be used. Capability unit IVe–2.

Buncombe series

In this series are brownish-gray, very friable or loose, well-drained, sandy alluvial soils. These soils occur on the first bottoms along streams or on recent stream levees. They are developing from material that was washed from soils underlain by granite, gneiss, and, to a lesser extent, schist. The native vegetation consisted of various oaks, birch, elm, ash, hickory, poplar, sycamore, and willow.

These soils are closely associated with the Congaree, Chewacla, and Wehadkee soils. They are coarser textured than the Congaree soils and have less profile development. They are better drained than either the Chewacla or Wehadkee soils.

Only one Buncombe soil is mapped in this county. This soil is used for crops and pasture.

Buncombe loamy fine sand (0 to 2 percent slopes) (Ba).—This soil lies on natural stream levees. In many places it is slightly higher than the surrounding soils on first bottoms. This soil is described in detail in the subsection, Descriptions of Soil Profiles.

The surface soil is dark-brown, loose loamy fine sand that is single grained (structureless) or has a very weak, fine, crumb structure. It is underlain by dark-brown, loose fine sand to loamy fine sand that shows no development.

The surface layer of this soil ranges from dark brown to grayish brown or yellowish brown. As is typical of soils formed on recent natural levees, the lower layers contain pockets and beds of coarse sand and gravel. Included with this soil are small areas of fine sand.

This soil is very permeable and acid in reaction. It has a low available water-holding capacity and a low capacity for storing plant food. It is rather droughty in dry periods and likely to be severely leached. It is easy to work and responds well to fertilizer and lime. It is likely to be flooded about once in 3 years.

Use and management.—This soil is used for corn, tobacco, soybeans, pasture, and small grain. It is fairly well suited to these crops. Because of its low capacity for storing plant food, it should be limed frequently and fertilized according to the results of soil tests. Additions of organic matter are also needed. Capability unit IIIs–1.

Cecil series

This series consists of well-drained soils that have a yellowish-brown surface soil and a red, clayey subsoil. These soils occur chiefly in the northern and central parts of the county on sheared granite, gneiss, and schist. They developed under a forest of white and red oaks, Virginia pine, blackgum, hickory, sourwood, and dogwood.

These soils are associated with the Appling, Durham, Georgeville, Lloyd, and Wilkes soils. They have a redder subsoil than the Appling soils, which, in turn, have a redder subsoil than the Durham soils. Cecil soils are deeper and more developed than the Wilkes soils. They lack the brown surface soil of the Lloyd soils and are lighter colored in the subsoil. In color, they resemble the Georgeville soils, but they contain more sand and less silt in all horizons.

Cecil fine sandy loam, gently sloping phase (2 to 6 percent slopes) (CbB).—This soil occurs on or near the top of slopes in the smooth uplands. It is described in detail in the subsection, Descriptions of Soil Profiles.

The surface soil is yellowish-brown, friable sandy loam that has a weak crumb structure. It ranges from 2 to 8 inches in thickness. The subsoil is red, firm clay that has a strong medium and fine subangular blocky structure. The combined surface soil and subsoil range from 30 to 50 inches in thickness, but in places they may be as much as 80 inches thick. The color of the subsoil ranges from a yellowish red, similar to the color of the Appling subsoil, to a dark red, similar to the color of the Lloyd subsoil. Areas of this soil that contain enough stones or gravel to interfere with tillage are shown on the soil map by symbols.

Included with this soil are small areas of Cecil soil that have a loam surface soil. Also included are small areas of Wickham soil that have a fine sandy loam surface soil. Wickham soils are not mapped separately in this county. The Wickham inclusion developed on second bottoms, or stream terraces, along the larger streams of the county. It is similar to the Cecil soil but is not so well developed and probably is a little darker in the surface soil.

This soil contains little organic matter and is medium acid throughout the profile. It is permeable, has a moderate available water-holding capacity, and a medium capacity for storing plant foods. It is easy to till and responds well to lime and fertilizer.

Use and management.—Most of this soil is cultivated. It is well suited to corn, tobacco, small grain, and hay. Tobacco is grown mostly where the surface soil is thicker than normal. The Wickham inclusion is suited to and used for the same kinds of crops as this soil. This soil is not susceptible to severe erosion and can be maintained by using crop sequences that include some close-growing crops. It should be fertilized according to the results of soil tests. Capability unit IIe–1.

Cecil fine sandy loam, eroded gently sloping phase (2 to 6 percent slopes) (CbB2).—This soil has a thinner surface soil than Cecil fine sandy loam, gently sloping phase, because one-fourth to three-fourths of its surface soil has been removed by erosion. It is permeable and has moderate available water-holding capacity. Its capacity for storing plant food is medium, and it contains little organic matter. Included are small severely eroded areas that are redder and finer textured than this soil.

Use and management.—This soil is well suited to small grain, corn, tobacco, and hay. Because it is moderately eroded, it should be cultivated on the contour, and cropping systems that include some close-growing crops should be used. The tilth of the severely eroded spots can be improved by adding manure and other organic matter. Capability unit IIe–1.

Cecil fine sandy loam, sloping phase (6 to 10 percent slopes) (CbC).—This soil occurs on slopes below Cecil fine sandy loam, gently sloping phase. It is similar to the gently sloping phase in profile characteristics.

Use and management.—Much of this soil is in forest, but it could be cultivated. It is well suited to small grain, pasture, hay, corn, and tobacco; trees, both hardwoods and pines, also do well. This soil is permeable and has moderate available water-holding capacity. It is moderately acid and contains little organic matter. It responds well to lime and fertilizer. Capability unit IIIe–1.

Cecil fine sandy loam, eroded sloping phase (6 to 10 percent slopes) (CbC2).—This soil has a thinner surface soil than Cecil fine sandy loam, sloping phase, and, because of its heavy clay subsoil, it is harder to till. Except in the more severely eroded areas, this soil is similar to the sloping phase in permeability, available water-holding capacity, content of organic matter, and fertility.

Use and management.—This soil is well suited to small grain, pasture, and hay. If managed well, corn, tobacco, and soybeans can be grown in long crop sequences that include close-growing crops. The tilth of the more severely eroded areas can be improved by adding organic matter. Capability unit IIIe–1.

Cecil fine sandy loam, strongly sloping phase (10 to 15 percent slopes) (CbD).—This soil is similar to Cecil fine sandy loam, sloping phase, but it normally occurs farther down the slope and on or near stream breaks. If cultivated, it is very likely to erode. It is shallower and droughtier than the sloping phase, but the two soils are similar in available water-holding capacity, acidity, content of organic matter, and fertility.

Included with this soil are small strongly sloping areas of Cecil soil that have a sandy loam surface soil. These inclusions differ from this soil mainly in having larger sand particles in the surface layer.

Use and management.—Most of this soil is in forest, probably its best use. Under good management, permanent pasture and hay crops do well. Crops such as small grain and corn may be grown in long rotations with grass and legumes. This soil should be fertilized according to the results of soil tests. Capability unit IVe–1.

Cecil fine sandy loam, eroded strongly sloping phase (10 to 15 percent slopes) (CbD2).—This soil has a thinner surface soil than Cecil fine sandy loam, strongly sloping phase. In places there are small outcrops of rock. Included with this soil are small strongly sloping areas of Cecil soil that have a sandy loam surface layer. These inclusions differ from this soil mainly in the texture of the surface layer.

Use and management.—This soil is suited to permanent pasture and hay. If it is necessary to grow cultivated crops, these crops should be grown in long rotations with grass and legumes. This soil should be limed and fertilized according to the results of soil tests, and other good practices of pasture management should be followed. Capability unit IVe–1.

Cecil fine sandy loam, moderately steep phase (15 to 25 percent slopes) (CbE).—Because of its moderately steep slopes and rapid runoff, this soil is more susceptible to erosion and is droughtier than are the other Cecil soils. The soil material may be washed away by runoff, or it may creep down the slope because of tillage operations. This soil is somewhat similar to Cecil fine sandy loam, strongly sloping phase.

Because of their small acreage, the following Cecil inclusions that occur in this mapping unit are not shown separately on the map: Moderately steep sandy loam; eroded, moderately steep sandy loam; steep sandy loam; eroded, steep sandy loam; eroded, moderately steep fine sandy loam; steep, fine sandy loam; eroded, steep fine sandy loam; severely eroded, moderately steep clay loam; and severely eroded, steep clay loam.

The sandy loam and clay loam inclusions differ from this soil mainly in texture of the surface soil, but the clay loams are also more severely eroded. The steep inclusions are on slopes greater than 25 percent, normally on or near stream escarpments.

Use and management.—Most of this soil is in forest consisting of shortleaf pine, white, post, black, scarlet, and chestnut oaks, sweetgum, dogwood, and yellow-poplar. It is better suited to forest than to cultivated crops. Under good management, it can be used for permanent pasture. The steep clay loam inclusions, however, can be used only for forest. Capability unit VIe–1.

Cecil sandy loam, gently sloping phase (2 to 6 percent slopes) (CcB).—This soil contains larger sand particles, particularly in the surface soil, than Cecil fine sandy loam, gently sloping phase. The sand ranges from fine to coarse, but most of it is medium. In most other characteristics the two soils are about the same, but this soil has the more friable subsoil.

Included with this soil are small, severely eroded, gently sloping areas that have a clay loam surface soil. The texture of these inclusions differs from that of this soil because the subsoil has been mixed with the surface soil through tillage.

This soil has medium permeability and moderate available water-holding capacity, although the surface soil is droughtier than that of the fine sandy loam. This soil is acid in reaction. It is easy to till and responds well to lime and fertilizer.

Use and management.—Most of this soil is cultivated. It is well suited to corn, tobacco, soybeans, and small grain. It is less well suited to pasture and hay than Cecil fine sandy loam, gently sloping phase, partly because its surface soil is lower in available water-holding capacity. The small hazard of erosion can be lessened by cultivating on the contour and by using crop rotations. Capability unit IIe–1.

Cecil sandy loam, eroded gently sloping phase (2 to 6 percent slopes) (CcB2).—This soil has a thinner surface soil than Cecil sandy loam, gently sloping phase. Some small, more severely eroded areas have a redder surface soil and a slightly finer textured subsoil than the rest of this soil. In these areas the subsoil has been mixed with the surface soil. Except in the more severely eroded spots, the permeability, available water-holding capacity, and fertility of this soil are about the same as those for the gently sloping phase.

Use and management.—This soil is used for about the same kinds of crops as Cecil sandy loam, gently sloping phase. To prevent further erosion, rotations that include close-growing crops should be used and tillage should be on the contour. The more severely eroded spots can be improved by additions of organic matter in the form of crop residues and barnyard manure. This soil needs to be fertilized and limed according to the results of soil tests. Capability unit IIe–1.

Cecil sandy loam, sloping phase (6 to 10 percent slopes) (CcC).—This soil is more strongly sloping than Cecil sandy loam, gently sloping phase, and normally occurs farther down the slopes. It is more susceptible to erosion because runoff is more rapid. Especially in cultivated areas, this soil is moderately permeable, moderate in available water-holding capacity, low in organic matter, and acid. The soil responds well to lime and fertilizer.

Use and management.—Much of this soil is in forest, but it could be cleared and cultivated. Trees grow rapidly in the forested areas. This soil is suited to about the same kinds of crops as Cecil sandy loam, gently sloping phase, but close-growing crops should be grown on this soil more of the time. The soil should be tilled on the contour. It needs to be fertilized and limed according to the results of soil tests. Capability unit IIIe–1.

Cecil sandy loam, eroded sloping phase (6 to 10 percent slopes) (CcC2).—This soil has a thinner surface soil than Cecil sandy loam, sloping phase. Some small, more severely eroded areas have a darker surface soil than normal because the red subsoil has been mixed with it. In these areas the heavy clay subsoil may impair tillage during dry seasons. This soil is moderate in available water-holding capacity, low in organic matter, and acid in reaction. It responds well to lime and fertilizer.

Use and management.—Close-growing crops should be used more of the time on this soil than on Cecil sandy loam, eroded gently sloping phase. The soil should be cultivated on the contour, and the more gentle slopes should be terraced. Apply lime and fertilizer according

499150—60——3

to the results of soil tests. The severely eroded spots can be improved by adding organic matter. Capability unit IIIe–1.

Cecil clay loam, severely eroded sloping phase (6 to 10 percent slopes) (CaC3).—This soil has a thinner and droughtier surface soil than have the Cecil fine sandy loams or the Cecil sandy loams. All of its original surface soil and some of the heavy subsoil have been lost through erosion. About one-fourth of the acreage is gullied. The plow layer is more friable than the layer below because the clayey subsoil has been mixed with the original surface soil through tillage.

This soil is slowly permeable, droughty, low in organic matter content, and acid. It has poor tilth but responds well to lime and fertilizer.

Use and management.—This soil is well suited to pasture and hay. Under proper management, it produces fair yields of corn, soybeans, and small grain. Crops should be planted on the contour. Row crops should not be used more than once in 3 years. Organic matter needs to be added in the form of crop residues and green-manure crops, and the soil should be limed and fertilized according to the results of soil tests. Capability unit IVe–2.

Cecil clay loam, severely eroded strongly sloping phase (10 to 15 percent slopes) (CaD3).—This soil has steeper gradients than Cecil clay loam, severely eroded sloping phase, and is nearer the bottom of the slopes on stream breaks. Because of the strong slopes, rapid runoff, and plastic surface soil, this soil becomes droughty during the hot, dry summer. The surface soil hardens and cracks, and productivity is lowered.

Use and management.—This soil is suited to pasture and hay. Although the hazard of further erosion is very severe, crops such as small grain and corn can be grown if these crops are planted in strips and grown in long rotations that provide grasses and legumes. Capability unit IVe–2.

Chewacla series

This series consists of pale–brown, somewhat poorly drained, very friable, loamy soils. These soils are widely distributed on first bottoms along the larger creeks where, in some places, they are associated with other soils on first bottoms. They are forming from sediments that were washed from the Cecil, Appling, Davidson, Lloyd, and other soils that occur on igneous and metamorphic rocks. Their native vegetation is water-loving hardwoods, mainly oaks, elm, hornbeam, hackberry, and alder.

The Chewacla soils are closely associated with the Congaree, Buncombe, and Wehadkee soils. They are intermediate in drainage between the Congaree and Wehadkee soils. They are more poorly drained and less sandy than the Buncombe soils. The Chewacla soils normally occur farther from the streams than the Buncombe or Congaree soils.

Only one Chewacla soil is mapped in the county. It has a fairly large acreage and is moderately important because of its suitability for pasture.

Chewacla fine sandy loam (0 to 2 percent slopes) (Cd).—This soil commonly lies on the flat flood plains. It is described in detail in the subsection, Descriptions of Soil Profiles.

***Figure 4.*—Cornfield on Chewacla fine sandy loam flooded by a small stream.**

The surface soil is dark, yellowish-brown, friable fine sandy loam. It has a very weak, fine, granular structure and is very slightly plastic when wet. It is underlain by a substratum of dark-brown, yellowish-brown, and light brownish-gray, friable fine sandy loam that contains beds of sand and gravel.

This soil is permeable and has a moderate available water-holding capacity. It contains a medium amount of organic matter. It has a fairly high water table but is easy to till when dry. Like other first-bottom soils in the area, it is flooded about once in 3 years (fig. 4).

Use and management.—Much of this soil is cultivated. It is especially well suited to pasture. Lespedeza, corn, and soybeans grow well if they are properly managed. Some areas still have virgin stands of hardwoods.

Because of the high water table and poor drainage, this soil should be artificially drained. It should be limed and fertilized according to the results of soil tests. Capability unit IIIw–1.

Colfax series

In this series are gray or dark-gray, strongly acid, moderately well drained to somewhat poorly drained soils that have a claypanlike layer in the subsoil. These soils are wet much of the time. They occur at the heads of small drainways, mainly in the northeastern, north-central, and southwestern parts of the county. They developed from the residuum of light-colored granite and coarse-grained gneiss. Their native vegetation consists of mixed deciduous trees and pine trees.

These soils are in the same catena as the Cecil soils. They are closely associated with the Durham soils and were once included with them. They were separated because of their imperfect drainage and the claypanlike layer in the subsoil. Small areas of Colfax silt loam are closely associated with the Alamance and Orange soils in the southern and eastern parts of the county.

Colfax sandy loam (2 to 6 percent slopes) (Ce).—This soil commonly occurs in gently sloping, saddlelike areas in close association with Durham and Appling soils. It is described in detail in the subsection, Descriptions of Soil Profiles.

This soil has a gray, very friable surface soil that has a weak, medium, crumb structure. The subsoil is gray, yellowish-brown, and yellowish-red firm sandy clay with a moderate, coarse, angular blocky structure. The thickness of the surface soil is 8 to 18 inches; that of the surface soil and subsoil combined is 22 to 38 inches. The lower part of the subsoil ranges from sandy clay loam to heavy sandy clay.

Some areas of this soil have thin layers of material that washed from adjacent slopes. Because of the saddlelike positions and the slopes that are generally less than 4 percent, the hazard of erosion is slight.

This soil has moderate available water-holding capacity and medium fertility. It covers a small acreage and is not very important to the agriculture of the county.

Use and management.—Small areas of this soil are cultivated. The soil is best suited to corn, soybeans, and lespedeza. It is less well suited to pasture plants and small grain. Most of the larger areas are still in virgin hardwood forests, but the trees do not grow to maximum size. Erosion can be controlled by cultivating on the contour and by using crop rotations. This soil should be fertilized and limed according to the results of soil tests. Capability unit IIIw/s–1.

Colfax silt loam (2 to 6 percent slopes) (Cf).—This gray, friable, strongly acid soil occurs in low depressions near the heads of streams. In topographic position and drainage, it is similar to Colfax sandy loam. It is associated with Durham soils.

Underlying the silt loam surface layer, the upper subsoil is yellowish-brown friable to firm silty clay loam. The lower subsoil is firm silty clay. In some places the surface soil is covered with a thin layer of material that washed from adjacent soils. Some included areas have a very fine sandy loam surface soil.

This soil is rather slowly permeable and low in fertility. It has a high available water-holding capacity.

Use and management.—This soil is well suited to corn, soybeans, pasture, and hay. Most of the soil, however, is still in forest similar to that on Colfax sandy loam. The trees seem to grow more slowly on this soil than on Colfax sandy loam, according to observations made during the survey. Erosion can be controlled by cultivating on the contour. Most areas need some artificial drainage. This soil needs to be limed and fertilized according to the results of soil tests. Capability unit IIIw/s–1.

Congaree series

In this series are light grayish-brown to dark-brown, very friable, loamy soils that are moderately well drained to well drained. These soils are widely distributed throughout the county on flood plains. Congaree soils normally contain sediments washed from Appling, Cecil, Davidson, Georgeville, and other soils on uplands. The native vegetation is lowland oaks, elm, gum, hickory, beech, and elder with an understory of reeds, vines, and grasses.

These soils are the best drained members of the Congaree-Chewacla-Wehadkee catena. They are associated with the other members of this catena and with the Buncombe soils. They differ from the Buncombe soils in being less sandy throughout the profile.

Only one Congaree soil is mapped in this county. This soil is used for crops, pasture, and hay.

Congaree fine sandy loam (0 to 2 percent slopes) (Cg).—This soil lies along streams on first bottoms. It is described in detail in the subsection, Descriptions of Soil Profiles.

The surface layer is brown, very friable fine sandy loam that has a very weak, granular structure. Any part of the profile may contain thin beds of sandy sediment, but the upper layers are not coarser than a sandy loam.

In some places where the material has been transported from the Davidson or similar soils, the surface soil is reddish brown. The lower layer of the profile has a variable texture; in places, it is replaced by beds of sand and gravel.

Included with this soil are small areas of silt loam and sandy loam. Also included are gently sloping areas of State soil that have a fine sandy loam surface soil. The State soils are not mapped separately in this county. They occur on low second bottoms. They have developed from old alluvium and have distinct horizons.

Use and management.—This soil is well suited to corn, small grain, soybeans, pasture plants, and hay. Because of its low capacity to store plant food, it should be fertilized frequently and limed according to soil tests. Capability unit IIw–1.

Davidson series

This series consists of reddish–brown, well-drained, slightly acid soils that are well distributed throughout the county. They occur on undulating to steep slopes, and overlie basalt, diorite, diabase, hornblende, and schist. The native vegetation was oaks, hickory, yellow-poplar, walnut, locust, and some shortleaf and loblolly pines.

These soils are associated with the Mecklenburg and Iredell soils and are on the same kind of parent material but are more strongly developed than the associated soils. In the slate areas in the southern part of the county, Davidson soils occur with the Georgeville and Tirzah soils. They are darker red than Georgeville soils and contain more calcium and less potassium. Although slightly acid, these soils are more nearly neutral than any of the other soils of the Piedmont Plateau.

The Davidson soils are important to the agriculture of the county, but they are not suitable for growing tobacco. Because they are deep and have excellent structure, their productivity is affected by erosion less than the productivity of the other soils in the county.

Davidson clay loam, gently sloping phase (2 to 6 percent slopes) (DbB).—This soil occurs on smooth upland flats, normally between stream breaks. It is described in detail in the subsection, Descriptions of Soil Profiles.

The surface soil is dark reddish-brown, friable clay loam that has a moderate, fine, granular structure. The subsoil is dark-red, firm clay with a medium to fine, subangular blocky structure. Throughout the profile are black or brown concretions about 0.1 inch in diameter. In some areas the lower subsoil is somewhat firmer than in other areas and resembles the lower subsoil of the Mecklenburg soils. The horizons are barely discernible because of their uniform texture and color. The depth of the soil over bedrock ranges from 4 to 20 feet (fig. 5).

Included with this soil are small, nearly level areas, which total about 100 acres, and small, eroded gently

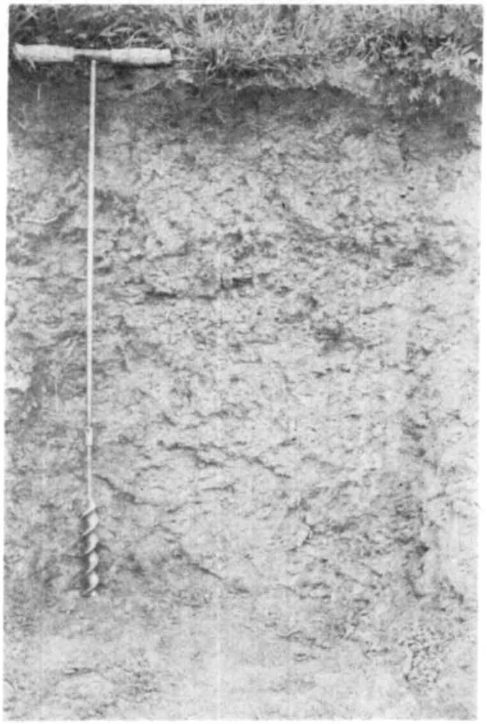

Figure 5.—**Soil profile in a virgin area of Davidson clay loam.**

sloping areas. These inclusions are small and are similar to this soil. They are not shown separately on the soil map.

This soil is moderately permeable and high in available water-holding capacity. It contains a medium to high amount of organic matter and has a medium to high capacity for storing plant food.

Use and management.—Most of this soil is used for small grain, pasture, hay, corn, soybeans, and vegetables. It is well suited to these crops, but early vegetables grow slowly because this soil warms late in spring. It is the best soil in the county for clover or alfalfa. Because it is not susceptible to severe erosion, this soil does not need exacting management. Crops should be grown in rotations that have some close-growing crops. The soil needs to be cultivated on the contour and limed and fertilized according to the results of soil tests. Capability unit IIe–4.

Davidson clay loam, sloping phase (6 to 10 percent slopes) (DbC).—This soil occurs in smooth upland areas nearer the middle of slopes than Davidson clay loam, gently sloping phase. Because it has stronger slopes than the gently sloping phase, its runoff is rapid and it is more susceptible to erosion. Some areas of this mapping unit are eroded. This soil is similar to the gently sloping phase in permeability, available water-holding capacity, content of organic matter, and other characteristics that affect the growth of plants.

Use and management.—Some of this soil is in forest, which has good stands of white, black, post, scarlet, southern red, and chestnut oaks, yellow-poplar, hickory, and dogwood. The understory is southern redcedar. These forested areas could be cleared and seeded to pasture and hay. This soil must be more strictly managed than Davidson clay loam, gently sloping phase, and its cropping systems should provide more close-growing crops. It needs to be cultivated on the contour, terraced, and, in some places, stripcropped. Lime and fertilizer should be applied according to results of soil test. Capability unit IIIe–3.

Davidson clay loam, strongly sloping phase (10 to 15 percent slopes) (DbD).—This soil is similar to Davidson clay loam, sloping phase, in most profile characteristics, but it is shallower to bedrock than the sloping phase and other Davidson soils that occur on more gentle slopes.

Use and management.—This soil is mostly in a forest that consists of hardwoods common to the area. These forested areas could be cleared and planted to small grain, pasture, and hay. The management of this soil should include stripcropping on the longer slopes and liming and fertilizing based on the results of soil tests. Capability unit IVe–2.

Davidson clay, severely eroded gently sloping phase (2 to 6 percent slopes) (DaB3).—This soil has lost all of its original surface soil and nearly one-fourth of its subsoil. The plow layer is finer textured and less permeable than the original surface soil because tilling has mixed the clayey subsoil with the surface soil. The soil is droughty, hard to till, and susceptible to further erosion.

Use and management.—This soil is well suited to small grain, pasture, and hay. Because it is droughty, row crops grow only fairly well. Since severe erosion and slight gullying have damaged this soil, close-growing and green-manure crops should be used much of the time in the cropping systems. Crop residues should be worked in the soil to improve tilth and water relations. Capability unit IIIe–3.

Davidson clay, severely eroded sloping phase (6 to 10 percent slopes) (DaC3).—This soil occurs on steeper parts of the smooth upland areas than Davidson clay, severely eroded gently sloping phase, and nearer the middle of the slopes. The two soils are similar in most profile characteristics.

This soil is slowly permeable. It is high in its capacity for storing available water and plant food, and it responds well to lime and fertilizer. It is fairly easy to work.

Use and management.—Because this soil is severely eroded and slightly gullied, probably its best use is for small grain, hay, and pasture. If row crops must be grown, they should be planted in strips that alternate with strips of close-growing crops. Capability unit IVe–2.

Davidson clay, severely eroded strongly sloping phase (10 to 15 percent slopes) (DaD3).—This soil is somewhat similar to the other severely eroded Davidson soils. It normally occurs on the rough stream breaks.

Use and management.—The use of this soil is limited by severe erosion and slight gullies. Probably its best use is for permanent pasture. Grazing should be controlled in order to maintain good stands. The soil should be limed and fertilized according to the results of soil tests. Capability unit IVe–2.

Durham series

This series consists of grayish-brown, moderately well drained to well drained, very friable soils on the uplands. These soils occur in the northeastern, north-central, and extreme southwestern parts of the county. They developed from light-colored granite and coarse-grained gneiss. The native vegetation was oaks, hickory, poplar, soft maple, dogwood, sourwood, and shortleaf pine.

Durham soils are closely associated with Appling and Colfax soils. The parent materials of the soils of these three series are similar. The subsoil of the Durham soils, however, is yellow, whereas that of the Appling soils is yellowish red to reddish brown. Durham soils are better drained than the Colfax soils, and they do not have a claypanlike or mottled horizon.

The Durham soils are important to the agriculture of the county, particularly for growing flue-cured tobacco.

Durham sandy loam, gently sloping phase (2 to 6 percent slopes) (DdB).—This soil commonly occurs near the top of slopes on the smooth uplands. It is described in detail in the subsection, Descriptions of Soil Profiles.

This soil has a grayish-brown, very friable sandy loam surface soil that has a weak, fine and medium, crumb structure. The subsoil is yellowish-brown friable sandy clay loam with a moderate, fine, subangular blocky structure. In cultivated areas, the upper and lower layers of the surface soil are mixed together. The subsoil ranges in texture from sandy clay loam to sandy clay and, in places, is mottled. The particles of sand or quartz in the soil are angular and have sharp edges. Bedrock is at depths of 4 to 6 feet. This soil is lighter colored and normally more friable than the associated Appling soils.

Some areas of this soil in the southwestern part of the county have, at depths below 22 to 24 inches, a sandy clay subsoil. This subsoil is finer textured (sandy clay) and firmer than is normal for this soil.

This soil is moderate in available water-holding capacity and is fairly low in its capacity for storing plant food. It is quite permeable and strongly acid.

Use and management.—Most of this soil is cultivated; a few areas remain in forest. The soil is well suited to tobacco. It is less well suited to corn and soybeans, and only fairly well suited to small grain, hay, and pasture. Because of its gentle slopes, erosion is easily controlled. This soil should be tilled on the contour, and crops should be grown in rotations. It needs to be limed and fertilized according to the results of soil tests. Capability unit IIe–1.

Durham sandy loam, eroded gently sloping phase (2 to 6 percent slopes) (DdB2).—This soil has a thinner surface soil than Durham sandy loam, gently sloping phase, because one-fourth to three-fourths of its surface soil has been lost through erosion. Included with this soil are small spots where the subsoil has been mixed with the surface soil. The resulting plow layer in these spots is finer textured than that of the rest of the mapping unit.

This soil is permeable, moderate in available water-holding capacity, and medium in fertility.

Use and management.—This soil is suited to about the same kinds of crops as Durham sandy loam, gently sloping phase. Because it is moderately eroded, management should include tilling on the contour, using close-growing crops in rotations, and liming and fertilizing according to the results of soil tests. The more severely eroded spots can be improved by increasing organic matter through the application of crop residues and barnyard or green manure. Capability unit IIe–1.

Durham sandy loam, sloping phase (6 to 10 percent slopes) (DdC).—This soil occurs on the more strongly sloping parts and nearer the middle of slopes than does Durham sandy loam, gently sloping phase, and it is shallower to bedrock. It occurs on smooth uplands in association with Appling soils, which are on the steeper slopes.

This soil is permeable, moderate in available water-holding capacity, and comparatively low in capacity for storing plant food. It responds well to lime and fertilizer.

Use and management.—Much of this soil remains in forest. If it were cleared and cultivated, tobacco would do well. Because of its steeper and longer slopes, this soil needs more exacting management than does Durham sandy loam, gently sloping phase. If high yields are to be continually obtained, this soil should be tilled on the contour and used in rotations that provide small grain and grasses. It needs to be limed and fertilized according to the results of soil tests. Capability unit IIIe–1.

Durham sandy loam, eroded sloping phase (6 to 10 percent slopes) (DdC2).—This soil has a thinner surface soil than Durham sandy loam, gently sloping phase, because most of the plow layer has been lost through erosion. In a few areas the subsoil is mixed with the surface soil.

This soil is permeable and has a moderate available water-holding capacity. Its capacity for storing plant food is fairly low. It responds well to lime and fertilizer.

Use and management.—Under careful management, this soil is suited to corn, tobacco, and other row crops, but they should be planted on the contour. In some places terracing is needed to maintain the soil. Capability unit IIIe–1.

Durham coarse sandy loam, gently sloping phase (2 to 6 percent slopes) (DcB).—This soil occurs on or near the crests of the longer slopes on the smooth uplands. It has a coarser surface soil than Durham sandy loam, gently sloping phase. The sand particles in the surface soil range from fine sand to a fine gravel; most of them are medium and coarse sand. Normally, a few of the larger particles of sand occur in the subsoil and make it more friable.

Included with this soil are small eroded areas. Also included are small areas of gently sloping Durham soil that have a sandy loam surface soil. In these sandy loam inclusions, the 16- to 28-inch surface layer is thicker than that of this soil, and the subsoil is coarser textured (light sandy loam) and more friable. In some places the surface soil is a coarse loamy sand that has loose consistence.

This soil is permeable and fairly low in its capacity to hold available water and to store plant food. It has a more droughty surface soil than Durham sandy loam, gently sloping phase. It responds well to lime and fertilizer but leaches more readily than the sandy loam because of its coarser, thicker surface soil.

Use and management.—This soil is only fairly well suited to corn and soybeans. It should not be used for small grain, pasture, or hay because of its low capacity to hold water and to store plant food. It needs to be tilled on the contour if row crops are grown. Rotations that provide close-growing crops should be used, and the soil should be limed and fertilized according to soil tests.

The sandy loam inclusions that have a thick surface soil need additions of organic matter because they have a lower capacity to hold water and to store plant food than this soil. The content of organic matter can be increased by adding manure and plowing under plant residues and crotalaria. Capability unit IIe–1.

Durham coarse sandy loam, sloping phase (6 to 10 percent slopes) (DcC).—This soil occurs on or near the middle of slopes below Durham coarse sandy loam, gently sloping phase, which is on or near the top of slopes. The two soils are similar in profile characteristics.

Included with this soil are some eroded areas and small areas of sandy loam. In the sandy loam inclusions the 16- to 28-inch plow layer is thicker than that of this soil, and the subsoil is coarser textured (light sandy clay loam) and more friable.

This soil is quite permeable and fairly low in its capacity to hold available water and to store plant food. It responds well to lime and fertilizer.

Use and management.—Much of this soil is in forest. If it were cleared, probably it could be used for tobacco. This soil needs more exacting management than does Durham coarse sandy loam, gently sloping phase. It needs to have longer crop rotations and to be carefully tilled on the contour. Lime and fertilizer should be applied according to the results of soil tests. Capability unit IIIe–1.

Efland series

In this series are light-brown, well-drained, medium acid soils that occur mostly in the southern and eastern parts of the county. These soils contain various amounts of materials from basic rocks. They developed from the products of fine-grained rocks that are called Carolina slates. They resemble the Mecklenburg soils, which occur on mafic igneous rock. The native vegetation was oak, hickory, and a few pines.

These soils are closely associated with the Tirzah, Orange, and Davidson soils. The associated soils also contain basic materials. The Efland soils are browner than the Davidson and Tirzah soils and are more plastic in the subsoil. They are better drained and less yellow than the Orange soils and have a more strongly developed subsoil.

The Efland soils are fairly extensive in the slate belt, but their total acreage is not large. They are not very important to agriculture.

Efland silt loam, gently sloping phase (2 to 6 percent slopes) (EaB).—This well-drained soil normally occurs on the top of slopes on the hilly uplands underlain by volcanic slates. It is described in detail in the subsection, Descriptions of Soil Profiles.

This soil has a dark yellowish-brown to yellowish-red, friable surface layer that has a weak, fine, granular structure. The surface soil ranges from 3 to 12 inches in thickness. The subsoil is yellowish-red, red, or brownish-yellow, firm clay that is plastic when wet. It has moderate to strong, medium and fine, angular blocky structure. The depth of this soil over bedrock ranges from 24 to 38 inches. The deeper parts of the soil resemble the Davidson soils in color.

Included with this soil are areas of very fine sandy loam and loam. Also included are some small areas of Orange soils on slopes of more than 10 percent and some areas that are severely eroded.

This soil has a fairly permeable surface soil and a slowly permeable subsoil. It can store a medium to high amount of available water and plant food. It responds well to lime and fertilizer.

Use and management.—This soil is better suited to pasture and hay than it is to small grain, corn, and soybeans. Small areas of this soil are in forests of white, post, red, and black oaks, hickory, dogwood, and small cedar. These areas probably could be profitably cleared and planted to pasture and hay crops. Because the slopes are gentle and erosion is not a serious hazard, this soil can be protected by tilling on the contour and using a good cropping system. It should be limed and fertilized according to the results of soil tests. Capability unit IIe/s–2.

Efland silt loam, eroded gently sloping phase (2 to 6 percent slopes) (EaB2).—This soil differs from Efland silt loam, gently sloping phase, in having one-fourth to three-fourths of its surface soil removed by erosion.

Included with this soil are a few small severely eroded areas where the subsoil has been mixed with the surface soil and the plow layer is now finer textured than silt loam. These areas are too small to be shown on the soil map. Some of the severely eroded inclusions have a silty clay loam surface soil.

Use and management.—This soil is well suited to pasture and hay. If the weather is favorable, good yields of corn, soybeans, and small grains can be obtained. Erosion can be held to a minimum by planting row crops on the contour and by using good cropping systems. If this soil is to produce maximum yields, it should be limed and fertilized according to the results of soil tests.

The severely eroded silty clay loam inclusions are less well suited to row crops than is this soil. They have poorer water relations and are harder to till. Additions of organic matter in the form of manure, sod crops, or crop residues will improve the structure of these inclusions. Capability unit IIe/s–2.

Efland silt loam, sloping phase (6 to 10 percent slopes) (EaC).—Because this soil occurs on longer and steeper slopes than does Efland silt loam, gently sloping phase, it has more rapid runoff than the gently sloping phase and is more susceptible to erosion. In a few places rock crops out.

Use and management.—Much of this soil remains in forest. It produces good stands of hardwoods that are common to the area. Pasture and hay crops probably would do well if this soil were cleared. Close-growing crops should be grown more of the time on this soil than they are grown on the gently sloping phase. Capability unit IIIe/s–3.

Efland silt loam, eroded sloping phase (6 to 10 percent slopes) (EaC2).—This soil differs from Efland silt loam, sloping phase, in having lost one-fourth to three-fourths of its surface soil through erosion. Because of its slopes and slowly permeable subsoil, it is susceptible to further erosion. Small severely eroded spots are included in this mapping unit.

Use and management.—This soil should be used and managed in about the same way as is Efland silt loam, sloping phase. Close-growing crops should be grown most of the time. Additions of organic matter will improve tilth, fertility, and water relations, especially in the more eroded spots. Capability unit IIIe/s–3.

Efland silt loam, strongly sloping phase (10 to 15 percent slopes) (EaD).—This soil is thinner than Efland silt loam, sloping phase, and it has more outcrops of bedrock. Included are some eroded areas that are not shown on the map. Partly because this soil is permeable and has rapid runoff, it is droughty during the summer.

Use and management.—Much of this soil is in forests of hardwoods and cedars common to the area. If it is cultivated, the crops should be planted in strips and long rotations that provide grass and legumes should be used. Capability unit IVe–3.

Efland silty clay loam, severely eroded sloping phase (6 to 10 percent slopes) (EbC3).—This soil occurs in areas that used to be areas of Efland silt loam, sloping phase. Erosion has removed most of the surface soil, and, in many places, almost one-fourth of the surface is gullied. Because the subsoil has been mixed with the surface soil, the plow layer is finer textured than that of the silt loam. Included are some very severely eroded areas.

This soil contains slightly less organic matter and is slightly less permeable than Efland silt loam, eroded sloping phase. It responds well to lime and fertilizer.

Use and management.—This soil should be kept in permanent pasture or other close-growing crops much of the time. Before it is seeded it should be fertilized according to the results of soil tests. The very severely eroded inclusions should be planted to shortleaf pine. Capability unit IVe–3.

Efland silty clay loam, severely eroded strongly sloping phase (10 to 15 percent slopes) (EbD3).—This soil is shallower to bedrock than Efland silty clay loam, severely eroded sloping phase, and occurs on steeper parts of slopes. Normally, it is on the stream breaks. Because erosion has removed most of the original surface soil and tillage has mixed the subsoil with the remaining surface soil, the plow layer is now finer textured than it was before it was severely eroded. This soil has more stones than the severely eroded sloping phase; rock outcrops are common, especially near stream breaks. Included are some very severely eroded areas.

The available water-holding capacity, fertility, tilth, permeability, and response to lime and fertilizer are about the same as for the severely eroded sloping phase.

Use and management.—If this soil is cultivated, it should be kept in permanent pasture or other close-growing crops almost all of the time. It needs to be limed and fertilized according to the results of soil tests. The very severely eroded inclusions should be planted to shortleaf pine. Capability unit IVe–3.

Enon series

In this series are light-gray to brownish–yellow, moderately well drained, acid soils of the uplands. These soils occur in the northern, central, and south-central parts of the county. They developed from the products of rocks that were mostly mafic but partly felsic. The native vegetation was a mixed growth that consisted mostly of hardwoods.

Enon soils are associated with the Lloyd, Helena, Mecklenburg, Iredell, and Vance soils. They are yellower or browner in the surface soil than are the Helena soils and browner in the subsoil. They are lighter colored in the surface soil than the Mecklenburg soils and less red and less plastic in the subsoil. Their subsoil is thinner than that of the Mecklenburg soils. The Enon soils do not have a tough, sticky, very plastic subsoil like that of the Iredell soils.

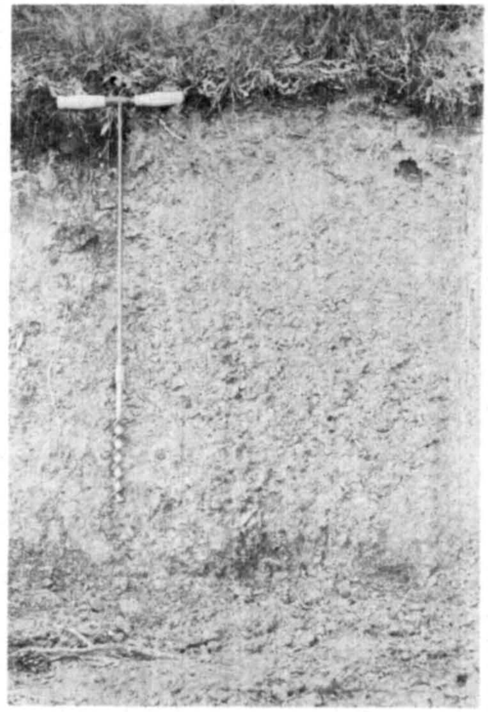

Figure 6.—**Profile of Enon loam west of Timber Ridge Lake.**

Enon soils are widely distributed in the county, but their total acreage is not very large. They are important for the production of corn, small grain, and pasture.

Enon loam, gently sloping phase (2 to 6 percent slopes) (EeB).—This soil occurs on or near the top of slopes on the hilly uplands. It is described in detail in the subsection, Descriptions of Soil Profiles.

The surface soil is light olive-brown, friable loam that has a weak, medium and fine, granular structure. The subsoil is yellowish-brown, firm clay with a moderate, medium, subangular blocky structure. The depth to bedrock normally is about 18 inches but ranges from 14 to 36 inches (fig. 6).

Included with this soil are small areas of sandy loam, fine sandy loam, and very fine sandy loam. Also included are areas of Lloyd and Mecklenburg soils that are so small that they cannot be shown separately on the soil map.

This soil has a moderately permeable surface soil and a slowly permeable subsoil. It has a moderate capacity to hold water that plants can use. It is easy to work and responds well to lime and fertilizer.

Use and management.—Most of this soil is cultivated. It is better suited to small grain, pasture, and hay than it is to corn and soybeans. Although it is one of the more erodible soils of the county, erosion can be controlled by using rotations that keep the soil in close-growing crops much of the time, tilling on the contour, and using lime and fertilizer according to the results of soil tests. Capability unit IIe/s–2.

Enon loam, eroded gently sloping phase (2 to 6 percent slopes) (EeB2).—Because erosion has removed from one-fourth to three-fourths of the original surface soil, this soil now has a thinner surface soil than Enon loam, gently sloping phase. Its slopes are about the same as those of the gently sloping phase, but tilling is more difficult because of the finer textured subsoil. This soil is similar to the gently sloping phase in permeability, capacity to hold available water, and response to lime and fertilizer. Included are some severely eroded areas that are finer textured than loam.

Use and management.—This soil is well suited to close-growing and green-manure crops that are grown in rotations with row crops. The crops should be planted on the contour and limed and fertilized according to the results of soil tests. Capability unit IIe/s–2.

Enon loam, sloping phase (6 to 10 percent slopes) (EeC).—This soil normally is downslope from Enon loam, gently sloping phase. It has more rapid runoff than the gently sloping soil, and is more susceptible to erosion. The two soils are similar, however, in capacity to hold available moisture, workability, and response to lime and fertilizer.

Use and management.—Most of this soil is in forest of shortleaf pine, white, black, post, scarlet, and chestnut oaks, hickory, yellow-poplar, and dogwood. It probably could be profitably cleared and cultivated, particularly to small grain. This soil needs longer rotations than those needed on the gently sloping phase. It should be tilled on the contour and, in some places, terraced. Capability unit IIIe/s–3.

Enon loam, eroded sloping phase (6 to 10 percent slopes) (EeC2).—Except that one-fourth to three-fourths of its original surface soil has been lost through erosion, this soil has a profile similar to that of Enon loam, sloping phase. It is also similar to the sloping phase in permeability, capacity to hold available moisture, workability, response to lime and fertilizer, and in management needs. Additions of organic matter will improve tilth and water relations, especially in the more severely eroded spots. Capability unit IIIe/s–3.

Enon loam, strongly sloping phase (10 to 15 percent slopes) (EeD).—This soil normally occurs downslope from Enon loam, sloping phase, on or near stream breaks. In many places the soil is somewhat shallow to bedrock, and in some of these shallow spots it resembles Wilkes soils. The Wilkes soils are lithosolic and, like the Enon soils, were derived from mixed rocks. Except that it is shallower, more strongly sloping, and more droughty, this soil, in most places, is similar to Enon loam, sloping phase. If it is cultivated, it is very likely to erode. Some areas of sandy loam are included in this mapping unit.

Use and management.—Most of this soil is in forest consisting of trees common to the area. If it is cultivated, the crops should be planted in strips and long rotations that include grass and legumes should be used. Capability unit IVe–3.

Enon loam, eroded strongly sloping phase (10 to 15 percent slopes) (EeD2).—This soil has a thinner surface soil than that of Enon loam, strongly sloping phase, because erosion has removed from one-fourth to three-fourths of the original surface soil. Small areas of sandy loam and small areas that are severely eroded are included with this soil.

Use and management.—This soil should be seeded to permanent pasture or hay crops or kept in other close-growing crops almost all of the time. Except in extremely dry periods, lespedeza does well. To insure getting good stands, organic matter should be added to this soil, especially to the more severely eroded spots, and the soil should be limed and fertilized according to the results of soil tests. Capability unit IVe–3.

Enon fine sandy loam, gently sloping phase (2 to 6 percent slopes) (EdB).—This soil is on or near the top of slopes in the hilly central part of the county. It has a thicker surface soil than Enon loam, gently sloping phase, and is coarser textured. Because the surface soil is friable and low in water-holding capacity and the clayey subsoil is slowly permeable, this soil is highly erodible. Included with this mapping unit are some areas of loam.

Use and management.—Most of this soil is cultivated. It is well suited to small grain, corn, cotton, soybeans, and tobacco and less well suited to pasture or hay crops. It is better suited to tobacco than Enon loam, gently sloping phase. In areas that consist dominantly of basic soils, this soil is in great demand for growing tobacco. Because it has a sandy surface layer that is thicker than that of Enon loam, gently sloping phase, this soil is easier to till than the loam. Erosion can be lessened by tilling on the contour and using rotations that keep close-growing crops on the soil much of the time. The soil should be limed and fertilized according to the results of soil tests. Capability unit IIe/s–1.

Enon fine sandy loam, eroded gently sloping phase (2 to 6 percent slopes) (EdB2).—This soil has a thinner surface soil than Enon fine sandy loam, gently sloping phase, because from one-fourth to three-fourths of the original surface soil has been lost through erosion. It is harder to till than the gently sloping phase because the plow layer consists of a mixture of the finer textured subsoil and the original surface soil. Permeability, capacity to hold available water, and response to fertilizer and lime are about the same as for the gently sloping phase. Included are some small severely eroded areas that have a surface soil finer than fine sandy loam.

Use and management.—Because this soil is moderately eroded, close-growing crops, green manure, and legumes should be used in the cropping system. This soil also needs to be tilled on the contour and limed and fertilized according to the results of soil tests. Capability unit IIe/s–1.

Enon fine sandy loam, sloping phase (6 to 10 percent slopes) (EdC).—This soil normally is downslope from Enon fine sandy loam, gently sloping phase. Because of this position and because of the stronger slopes, it has more rapid runoff than has the gently sloping phase. In some places it has runoff that is more rapid than that of steeper Enon soils that occur on shorter slopes. It is similar to Enon fine sandy loam, gently sloping phase, in permeability, capacity to hold available water, workability, and response to lime and fertilizer.

Use and management.—Most of this soil is in forest that consists of trees common to the area. It probably could be cleared and cultivated. Because it is more susceptible to erosion than Enon fine sandy loam, gently sloping phase, it requires stricter management that includes longer crop rotations, tilling on the contour, and, in some places, terraces. Capability unit IIIe/s–2.

Enon fine sandy loam, eroded sloping phase (6 to 10 percent slopes) (EdC2).—This soil has a thinner surface soil than that of Enon fine sandy loam, sloping phase, because from one-fourth to three-fourths of the original surface soil has been removed by erosion. Both soils occur on slopes of the same gradient. This soil is harder to till than the sloping phase because the plow layer extends into the finer textured subsoil. It is similar to the sloping phase in permeability, capacity to hold available water, response to fertilizer, and workability.

Use and management.—Although this soil is moderately eroded, it should be managed in about the same way as Enon fine sandy loam, sloping phase. Additions of organic matter to the more severely eroded spots will improve their tilth and water relations. Capability unit IIIe/s–2.

Enon clay loam, severely eroded sloping phase (6 to 10 percent slopes) (EcC3).—In many places this soil has lost all of its original surface soil and part of its subsoil through erosion. It is shallower to bedrock and finer textured than Enon loam, sloping phase. The plow layer is more friable than the layer below because some of the original friable surface soil has been mixed with the subsoil through tillage. A few shallow gullies occur, but this soil is not so likely to have deep gullies as are the more strongly sloping Enon soils. Included with this soil are some gently sloping areas that occur near the crests of slopes.

This soil is slowly permeable and low in fertility. Although it takes in a great deal of water, it does not supply the water to plants readily. It is difficult to work but responds well to lime and fertilizer.

Use and management.—This soil should be planted to small grain, pasture, or hay. It needs to be carefully managed to prevent further erosion. If row crops are grown, they should be in long rotations with grasses and legumes. Capability unit IVe–3.

Enon clay loam, severely eroded strongly sloping phase (10 to 15 percent slopes) (EcD3).—This soil occurs nearer the bottom of slopes than Enon clay loam, severely eroded sloping phase, but the two soils have similar profiles. Runoff is rapid and water percolates through the soil slowly. This soil, therefore, is droughty during the hot, dry summer months.

Included with this soil are some small moderately steep areas of Enon and Mecklenburg soils that have a clay loam surface soil. These inclusions normally are shallower than the rest of this mapping unit. The Mecklenburg inclusions are redder than the Enon inclusions and were derived from rocks richer in ferromagnesian minerals.

Use and management.—This soil should be returned to forest unless pasture can be established without further loss through erosion. The moderately steep inclusions are better suited to forest than they are to crops or pasture. Capability unit VIIe–1.

Georgeville series

This series consists of reddish–brown or yellowish–brown, well-drained, strongly acid soils on uplands. These soils occur in the southern and eastern parts of the county. They developed from the products of gray to light-gray, fine-grained volcanic rocks. The rocks consist of various slates but are dominantly rhyolites, quartz schists, and impure quartzites. The native vegetation was white, red, and post oaks, hickory, dogwood, sourwood, sweetgum, blackgum, and some shortleaf pine. Some abandoned areas are in Virginia and shortleaf pines.

Georgeville soils are associated with the Herndon, Alamance, Tirzah, and Goldston soils. They have a redder, finer textured subsoil than that of the Herndon or Alamance soils. They are yellower in the surface soil than the Tirzah soils and not so red in the subsoil. Their profile is more strongly developed than that of the Goldston soils. In color, Georgeville soils are similar to the sandier Cecil soils, which formed from coarser grained gneiss, schist, and granite.

Georgeville soils are more extensive and more important to the agriculture of the county than are the soils in any other series that were derived from volcanic slates.

Georgeville silt loam, gently sloping phase (2 to 6 percent slopes) (GaB).—This well-drained soil normally occurs on the gentle slopes of the hilly upland. It is described in detail in the subsection, Descriptions of Soil Profiles.

This soil has a yellowish-brown, friable surface layer that has a weak fine granular structure. The subsoil is red, firm silty clay with a strong, medium or fine, subangular structure. The depth of this soil over bedrock ranges from 30 to 60 inches. In places where this soil has been cultivated, the upper surface soil and lower surface soil are mixed. Included with this soil are eroded areas that have a reddish-yellow silty clay loam surface soil.

This soil is moderately permeable, high in capacity to hold available water, and low in content of organic matter. It responds well to lime and fertilizer.

Use and management.—Most of this soil is cultivated. It is well suited to small grain, corn, and pasture or hay. Although this soil is likely to erode if row crops are grown, erosion is not a serious problem because most of this soil occurs on dairy farms that produce a large amount of close-growing crops. Row crops should be grown in rotations that keep the soil in close-growing crops much of the time. They should be planted on the contour. This soil needs to be limed and fertilized according to the results of soil tests. Capability unit IIe–3.

Georgeville silt loam, eroded gently sloping phase (2 to 6 percent slopes) (GaB2).—This soil differs from Georgeville silt loam, gently sloping phase, in that one-fourth to three-fourths of its original surface soil has been removed by erosion. In a few small areas, the subsoil has been mixed with the remaining surface soil through tillage and the present plow layer is reddish-yellow silty clay loam. These inclusions are too small to delineate on the soil map.

This soil has about the same water relations, workability, and response to management as has the gently sloping phase.

Use and management.—Because dairying is the chief enterprise in the parts of the county where this soil occurs, corn is about the only row crop grown. The corn should be cultivated on the contour in rotations that keep the soil in close-growing or green-manure crops most of the time. On the long slopes, stripcropping is commonly used to supplement terracing. Lime and fertilizer should be applied according to the results of soil tests. Capability unit IIe–3.

499150—60 4

Georgeville silt loam, sloping phase (6 to 10 percent slopes) (GaC).—This soil differs from Georgeville silt loam, gently sloping phase, in that it normally occurs farther downslope and on steeper, longer slopes in hilly uplands. It has about the same workability, water relations, and response to management as the gently sloping phase.

Use and management.—Some of this soil is still in a forest of virgin hardwoods that consist mainly of white, black, post, red, and chestnut oaks, hickory, yellow-poplar, shortleaf pine, and small redcedar. It possibly could be profitably cleared and planted to small grain, corn, and pasture or hay. Because this soil is susceptible to erosion, it requires strict management. Stripcropping can supplement terracing or, in some areas, replace it entirely. Lime and fertilizers should be used according to the results of soil tests. Capability unit IIIe–2.

Georgeville silt loam, eroded sloping phase (6 to 10 percent slopes) (GaC2).—This soil is thinner than Georgeville silt loam, sloping phase, because one-fourth to three-fourths of its original surface soil has been lost through erosion. It occurs on about the same kind of position as the sloping phase. Included with this soil are spots of redder, finer textured soil that are the result of the mixing of the subsoil with the surface soil through tillage. This soil has about the same workability, water relations, and response to lime and fertilizer as has Georgeville silt loam, gently sloping phase.

Use and management.—Although it is moderately eroded, this soil requires about the same management as the sloping phase. Tilth and water relations can be improved, especially in the more eroded spots, by adding crop residues and planting green-manure crops. Capability unit IIIe–2.

Georgeville silt loam, strongly sloping phase (10 to 15 percent slopes) (GaD).—This soil normally has a thinner profile than that of Georgeville silt loam, sloping phase. Because it has more rapid runoff, it is droughtier than the more gently sloping Georgeville silt loams.

Use and management.—Most of this soil is still in forest, probably its best use. If row crops are grown, they should be planted in strips alternating with close-growing crops, and long rotations that keep the soil in grass or legumes most of the time should be used. This soil could be cleared and seeded to permanent pasture or hay. A good seedbed should be prepared, and the soil ought to be limed and fertilized according to the results of soil tests. Capability unit IVe–2.

Georgeville silt loam, eroded strongly sloping phase (10 to 15 percent slopes) (GaD2).—This soil occurs in about the same positions on slopes as does Georgeville silt loam, strongly sloping phase. Because of erosion, however, it has a thinner surface soil than the strongly sloping phase. Some small included areas have a redder, finer textured plow layer than the rest of this mapping unit because the subsoil has been mixed with the original surface soil through tillage. Water relations and workability are less favorable on this soil than on the uneroded Georgeville silt loams.

Use and management.—This soil is probably best suited to permanent pasture or hay or other close-growing crops. A good seedbed should be prepared, and the soil ought to be limed and fertilized according to the results of soil tests. Capability unit IVe–2.

Georgeville silt loam, moderately steep phase (15 to 25 percent slopes) (GaE).—This soil occurs on the steeper slopes of the county, normally on stream breaks near large streams. It is similar to Georgeville silt loam, strongly sloping phase, in most profile characteristics, but normally it is shallower to bedrock than any other Georgeville soil. Escarpment symbols are used on the soil map to designate small areas steeper than the one described.

Included with this soil are some eroded areas. Also included are small spots of moderately steep Tirzah soil that have a silt loam surface soil. Some of these Tirzah inclusions are eroded. They differ from this soil mainly in having a darker red subsoil. They are similar to the rest of this mapping unit in use and suitability.

Use and management.—Most of this soil is in a forest of trees common to the area. Because it is steep, shallow, and has many outcrops of bedrock, the soil is not suited to cultivation. It does, however, support fair stands of hardwoods and pines. Trees should be carefully selected and planted so that uniform stands will prevent erosion. Under good management, areas that are not very stony can be used for permanent pasture. Capability unit VIe–1.

Georgeville silty clay loam, severely eroded gently sloping phase (2 to 6 percent slopes) (GbB3).—This soil has been eroded gradually and has had its lower layers mixed with its upper layers through tillage. All of the original surface soil is gone, and one-fourth of the subsoil. The present plow layer is redder and finer textured than that of the less severely eroded Georgeville soils. Shallow gullies occur in some places.

Because the firm clay subsoil occurs within plow depth, tillage is more difficult on this soil than on the less severely eroded Georgeville soils. Tilth and water relations are poor. This soil is droughty and susceptible to further erosion.

Use and management.—This soil is better suited to small grain, pasture, and hay than it is to row crops. Because it is susceptible to further erosion, it needs strict management. Row crops should be alternated with close-growing or green-manure crops. Lime and fertilizer should be applied according to the results of soil tests. These measures improve the structure and water relations of the soil. Capability unit IIIe–2.

Georgeville silty clay loam, severely eroded sloping phase (6 to 10 percent slopes) (GbC3).—This soil is similar to Georgeville silty clay loam, severely eroded gently sloping phase, but it occurs on steeper slopes and farther downslope. Included with this soil are some areas that are only moderately eroded. Water relations, workability, and response to lime and fertilizer are about the same on this soil as on the severely eroded gently sloping phase.

Use and management.—Most of this soil is cultivated. A few places have been abandoned and have reseeded to Virginia pine and broomsedge. Because of its long steep slopes and hazard of further erosion, this soil requires more careful management than the severely eroded gently sloping phase (fig. 7). If row crops are grown, this soil should be stripcropped and the row crops should be grown in rotation with sod crops. Capability unit IVe–2.

Georgeville silty clay loam, severely eroded strongly sloping phase (10 to 15 percent slopes) (GbD3).—This soil

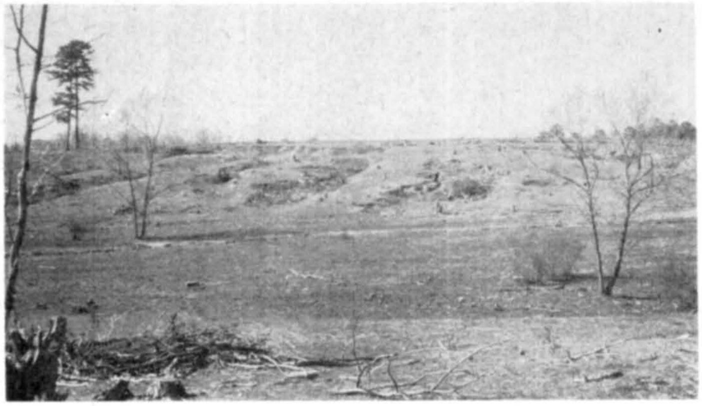

Figure 7.—**Pasture of legumes and grasses on Georgeville silty clay loam, severely eroded sloping phase, after the Virginia pine was removed. This soil has eroded because it has been cultivated too intensively.**

is similar to Georgeville silty clay loam, severely eroded gently sloping phase, but it occurs on steeper slopes. It commonly lies on stream breaks along the smaller streams. Because of the firm clay in the plow layer, this soil has poor water relations and poor workability.

Use and management.—Under good management, fair crops and pasture possibly can be grown. Use strip rotations and keep a minimum of three-fourths of the area under sod at all times. Capability unit IVe–2.

Georgeville silty clay loam, severely eroded moderately steep phase (15 to 25 percent slopes) (GbE3).—In profile characteristics this soil is similar to Georgeville silty clay loam, severely eroded strongly sloping phase. It occurs on stream breaks near the major streams in the southern part of the county. It is the shallowest soil over bedrock in the Georgeville series.

Included with this soil are small areas of severely eroded moderately steep Tirzah soil that have a silty clay loam surface soil. These inclusions have a darker red subsoil than the Georgeville soils.

Use and management.—This soil is suited only to pasture or forest. It needs the same kind of management as the severely eroded strongly sloping phase. Grazing should be controlled, especially during the hot, dry summer. Capability unit VIIe–1.

Goldston series

In this series are grayish-brown, shallow, well–drained, friable soils that occur in the southern and eastern parts of the county. These soils developed from the products of Carolina slates and other fine-grained rocks. They occur on the steepest slopes in the slate belt, normally on the steep breaks near streams. The native vegetation consisted of various kinds of oaks, and small amounts of hickory, dogwood, sourwood, locust, and shortleaf pine.

The Goldston soils are closely associated with the Tirzah, Georgeville, Herndon, Orange, and Alamance soils. These associated soils have parent material similar to that of the Goldston soils. The Goldston soils, however, are shallower to bedrock than the associated soils.

These soils are widely distributed, and their total acreage is fairly large, but they are not important to the agriculture of the county.

Goldston slaty silt loam, sloping phase (6 to 10 percent slopes) (GcC).—This well-drained soil occurs on gentle slopes in the hilly parts of the county in close association with Alamance, Orange, and Herndon soils. It has medium to rapid external and internal drainage.

This soil has a grayish-brown, friable surface layer that has a weak, medium, granular structure. Volcanic slate outcrops in many places, especially on the steeper stream breaks, and slate rock of various sizes occurs in the profile. In many places, there is no subsoil. If a subsoil has formed, it consists of a few inches of brownish silty clay loam or silty clay. In places the subsoil is mixed with the parent material and is more like a BC horizon than a B horizon. Included with this mapping unit are small areas that are gently sloping, eroded gently sloping, and eroded sloping.

Use and management.—Most of this soil is in fair to poor stands of white, black, jack, and post oaks, dogwood, yellow-poplar, and hickory. It is well suited to pasture, hay, and small grain. Because this soil has a low available water-holding capacity, grazing should be controlled during summer. To assure that high yields are obtained, a good seedbed should be prepared and the soil should be limed and fertilized according to the results of soil tests. Capability unit IVe–3.

Goldston slaty silt loam, strongly sloping phase (10 to 15 percent slopes) (GcD).—This soil is similar to Goldston slaty silt loam, sloping phase, in profile characteristics. It differs from the sloping phase, however, in being steeper and in occurring farther downslope on stream breaks in the hilly uplands. Rocks crop out in more places on this soil than they do on Goldston soils with gentler slopes. Some areas of this mapping unit are eroded. This soil is described in detail in the subsection, Descriptions of Soil Profiles.

Use and management.—This soil is best suited to forest. Most of it is under poor stands of hardwoods. If it is cleared, the soil should be kept in sod crops nearly all of the time. Capability unit IVe–3.

Goldston slaty silt loam, moderately steep phase (15 to 25 percent slopes) (GcE).—This soil normally occurs on the steeper stream breaks on the hilly uplands of the slate belt. It is similar to Goldston slaty silt loam, strongly sloping phase, except that it has more and larger outcrops of stones and rock. Some areas of this mapping unit are eroded. Most of the acreage is in forest which should not be disturbed except for cutting the trees that are suitable for harvesting. Capability unit VIIe–1.

Helena series

In this series are gray to grayish–brown, somewhat poorly or moderately well drained, strongly acid soils on the smooth uplands of the Piedmont Plateau. These soils are chiefly in the southwestern, northeastern, and north-central parts of the county. They developed from aplitic granite that was cut by dikes rich in iron and magnesium. The native vegetation consisted of various oaks, and small amounts of hickory, sweetgum, poplar, cedar, dogwood, sourwood, and shortleaf pine.

Helena soils are associated with the Enon, Durham, Appling, Colfax, Iredell, and Wilkes soils. They are more plastic and more sandy, especially in the surface soils, than the Enon soils and are less uniform and more poorly drained. They are more plastic and less well drained than the Durham or Appling soils. Helena soils are less uniform than the Colfax soils and more plastic in the upper subsoil. They have a less massive subsoil than the Iredell soils. They generally occur on smoother slopes than do the Wilkes soils.

These soils occur in large areas that are important agriculturally, especially for growing flue-cured tobacco.

Helena coarse sandy loam, gently sloping phase (2 to 6 percent slopes) (HbB).—This somewhat poorly or moderately well drained, acid soil occurs on the smooth uplands or near the top of slopes. It is described in detail in the subsection, Descriptions of Soil Profiles.

In wooded areas, the surface soil is dark grayish-brown, nearly loose coarse sandy loam that has a weak, medium, crumb structure. Cultivated areas have a much lighter surface soil. The subsoil is mottled brownish-yellow and gray, firm coarse sandy clay that is plastic when wet. It has a moderate, fine and medium, angular blocky structure. The depth of this soil over bedrock varies. The gray mottles in the subsoil are probably caused by the parent material rather than by poor drainage. This soil is closely associated with the Vance soils.

Included with this soil are small areas of Iredell, Enon, Wilkes, Durham, and Appling soils. Also included are a few areas of Helena soil that have a sandy loam surface soil. All these areas are too small to be shown separately on the soil map.

This soil has a friable, very permeable surface soil that has a low capacity to hold available water. It responds well to lime and fertilizer.

Use and management.—Most of this soil is cultivated. It is better suited to tobacco, corn, lespedeza, and soybeans than it is to small grain, pasture, and hay. Erosion can be lessened by cultivating on the contour and growing crops in rotations that keep the soil in close-growing crops part of the time. Lime and fertilizer should be applied according to the results of soil tests. Capability unit IIe/s–1.

Helena coarse sandy loam, eroded gently sloping phase (2 to 6 percent slopes) (HbB2).—This soil has a thinner surface soil than Helena coarse sandy loam, gently sloping phase, because from one-fourth to three-fourths of the original surface soil has been lost through erosion. It is associated with the Wilkes, Vance, and Appling soils. Small severely eroded areas are included with this mapping unit.

This soil has about the same permeability, available water-holding capacity, and response to lime and fertilizer as the gently sloping phase. It is harder to till, however, because the clayey subsoil is within plow depth. The severely eroded inclusions are wet late in spring and are harder to till than the rest of this mapping unit.

Use and management.—This eroded soil should be cultivated on the contour. If this soil is used for row crops, close-growing crops should be planted more of the time than on the gently sloping phase. Because the severely eroded spots are wet late in spring, tilling may be delayed on them. Capability unit IIe/s–1.

Helena coarse sandy loam, sloping phase (6 to 10 percent slopes) (HbC).—This soil is similar to Helena coarse sandy loam, gently sloping phase, in most profile characteristics, but it is more strongly sloping than the gently sloping phase and normally occurs farther downslope. In some of the steeper areas, this soil is shallower than the gently sloping phase.

Included with this soil are some small strongly sloping areas. These inclusions are more susceptible to erosion than the rest of this mapping unit.

This soil has about the same permeability, available water-holding capacity, and response to lime and fertilizer as have the other Helena coarse sandy loams in the county.

Use and management.—Most of this soil is in a forest that consists of white, post, black, chestnut, and southern red oaks, hickory, yellow-poplar, sweetgum, shortleaf and loblolly pines, and dogwood. Some of the areas in forest probably could be profitably cleared and cultivated, especially for tobacco, but these areas would have to be carefully managed.

Because of the risk of erosion, this soil needs more careful management than the gently sloping phase. It should be tilled on the contour, and, in some places, terraced. Close-growing crops should be kept on the soil longer than on the gently sloping phase. The soil needs to be limed and fertilized according to the results of soil tests. If the strongly sloping inclusions are cultivated, they should be planted to only close-growing crops. Capability unit IIIe/s–2.

Helena coarse sandy loam, eroded sloping phase (6 to 10 percent slopes) (HbC2).—This soil has a thinner surface soil than Helena coarse sandy loam, sloping phase, because runoff has washed away one-fourth to three-fourths of the surface layer. Because the clayey subsoil is within plow depth, this soil is harder to till than the sloping phase. It has about the same permeability, capacity to hold available water, workability, and response to lime and fertilizer as have the other Helena coarse sandy loams. Included in this mapping unit are some small, eroded, strongly sloping areas.

Use and management.—Although this soil is moderately eroded, it needs about the same management as does the sloping phase. If organic matter is added to the severely eroded spots, tilth, fertility, and water relations will be improved. Capability unit IIIe/s–2.

Helena sandy loam, gently sloping phase (2 to 6 percent slopes) (HcB).—This soil is similar to Helena coarse sandy loam, gently sloping phase, but contains a smaller percentage of coarse sand and fine gravel, particularly in the surface soil. It has a greater capacity to hold available water than the coarse sandy loam and, therefore, can supply plants with more moisture during the hot, dry summer.

Included with this soil are small areas of very fine sandy loam. These inclusions occur in transitional areas where this soil grades into soil formed from volcanic slate.

This soil has a permeable surface layer and a slowly permeable subsoil. The available water-holding capacity is low in the surface soil and high in the subsoil. The content of organic matter is low. Workability and response to lime and fertilizer are good. Reaction is medium acid to strongly acid. This is one of the most erodible soils in the county.

Use and management.—Most of this soil is cultivated. It is better suited to tobacco, corn, and soybeans than it is to small grain and pasture or hay. It needs to be tilled on the contour, and crops should be grown in rotations that keep the soil in close-growing crops much of the time. Lime and fertilizer should be applied according to the results of soil tests. Capability unit IIe/s–1.

Helena sandy loam, eroded gently sloping phase (2 to 6 percent slopes) (HcB2).—This soil has a thinner surface soil than that of Helena sandy loam, gently sloping phase, because erosion has removed one-fourth to three-fourths of the original surface soil. The two soils have about the same permeability, available water–holding capacity, and response to lime and fertilizer.

Included with this soil are small severely eroded areas that have a clay loam surface soil. These inclusions are too small to be shown separately on the soil map. Erosion has removed all of their original surface soil and about one-fourth of the subsoil. In some places shallow gullies occur.

Use and management.—Because this soil is susceptible to further erosion, it should be planted on the contour. Row crops should be grown in rotations that keep the soil in close-growing or green-manure crops more of the time than they are grown on the gently sloping phase. Lime and fertilizer should be added according to the results of soil tests. Additions of organic matter will improve the structure of the soil, particularly in the severely eroded spots, and, therefore, improve tilth and water relations. Capability unit IIe/s–1.

Helena sandy loam, sloping phase (6 to 10 percent slopes) (HcC).—Because this soil occurs on stronger slopes than Helena sandy loam, gently sloping phase, and generally farther downslope, it has more rapid runoff than the gently sloping phase. It is, therefore, more susceptible to erosion. In most places it has a thinner subsoil than the gently sloping phase. This soil has about the same water relations, workability, and response to lime and fertilizer as the other Helena sandy loams. Included in this mapping unit are some small strongly sloping areas.

Use and management.—Most of this soil is in a forest consisting of trees that are common in the area. Some of these areas in forest probably could be profitably cleared and cultivated, especially for tobacco, but the soil would have to be carefully managed. This soil should be cultivated on the contour and used in rotations that keep the soil in close-growing crops more of the time than Helena sandy loam, gently sloping phase, is kept in these crops. Some places need to be terraced. Lime and fertilizer should be added according to the results of soil tests. Capability unit IIIe/–2.

Helena sandy loam, eroded sloping phase (6 to 10 percent slopes) (HcC2).—This soil has a thinner surface soil than that of Helena sandy loam, sloping phase, and its subsoil has been mixed with the original surface layer through tillage. The plow layer is yellowish brown instead of gray. It is finer textured than the plow layer of the sloping phase and, therefore, is harder to till. This soil has about the same permeability, available water-holding capacity, and response to lime and fertilizer as have the other Helena sandy loams. Included with this soil are some small areas that are severely eroded and some that are strongly sloping.

Use and management.—Although this soil is moderately eroded, it needs about the same management as the sloping phase. Additions of organic matter will improve tilth and water relations, especially in the more severely eroded inclusions. Capability unit IIIe/s–2.

Helena clay loam, severely eroded sloping phase (6 to 10 percent slopes) (HaC3).—In many places this soil has lost all of its original surface soil and part of its subsoil through erosion. In a few places, there are shallow gullies. This soil is shallower to bedrock and finer textured than are Helena coarse sandy loam, sloping phase, and Helena sandy loam, sloping phase. The plow layer is more friable than the layer below because some of the friable original surface soil has been mixed with the subsoil through tillage. This soil is more droughty and harder to till than the other Helena soils. It is susceptible to further erosion. Included in this mapping unit are some strongly sloping areas.

Use and management.—This soil is better suited to small grain and pasture or hay than it is to row crops. It needs additions of organic matter, which can be supplied by turning under crop residues and growing green-manure crops. Capability unit IVe–3.

Herndon series

This series consists of light brownish-gray, very acid, well-drained soils on uplands. These soils occur in the southern and eastern parts of the county in the volcanic slate region. They developed from the products of rhyolitic and other volcanic slates and from quartzite schist. They are less sandy than the Appling soils, which occur on granite, gneiss, and coarse-grained schist, but they are similar to the Appling soils in color. The native vegetation was mixed hardwoods and shortleaf pine. The hardwoods were mainly hickory, sweetgum, sourwood, and dogwood.

The Herndon soils occur in close association with the Georgeville and Alamance soils and, in color, are intermediate between them. Herndon soils are not so extensive as the Georgeville soils and are not so important to the agriculture of the county.

Herndon silt loam, gently sloping phase (2 to 6 percent slopes) (HdB).—This soil occurs near the top of the more gentle slopes on the hilly uplands. It is described in detail in the subsection, Descriptions of Soil Profiles.

In wooded areas, the surface soil is a dark-brown, friable silt loam that has a weak, fine, granular structure. Cultivated areas have a much lighter colored surface soil. The subsoil is mottled yellowish-red and brownish-yellow, firm silty clay or clay with a moderate to strong, medium, subangular blocky structure. This soil is well drained; it has medium external and internal drainage. In cultivated areas the upper and lower parts of the surface soil have been mixed and have lost their identity. The subsoil ranges from almost pure red to yellowish red or yellowish brown. It is almost red near the Georgeville soils and yellowish red or yellowish brown near the Alamance soils. Small areas of very fine sandy loam are included with this mapping unit.

This soil is associated with the Alamance, Georgeville, and Tirzah soils and, in places, occurs on the same slope with those soils.

This soil is moderately permeable and has a medium capacity to hold available water. It contains a small amount of organic matter. Workability and response to lime and fertilizer are good. This soil is moderately susceptible to erosion. Because much of it is used for dairy farms where large amounts of close-growing crops are grown, the hazard of erosion is not so serious as it is on gently sloping soils where more row crops are grown.

Use and management.—Most of this soil is cultivated. It is well suited to small grain, pasture or hay, and corn. Row crops should be planted on the contour and grown in rotations that keep the soil in close-growing crops much of the time. This soil needs to be limed and fertilized according to the results of soil tests. Capability unit IIe–3.

Herndon silt loam, eroded gently sloping phase (2 to 6 percent slopes) (HdB2).—This soil has a thinner surface soil than Herndon silt loam, gently sloping phase, because from one-fourth to three-fourths of its original surface soil has been lost through erosion. It is similar to the gently sloping phase in most profile characteristics, and the two soils occur in similar positions.

Included with this soil are a few areas where the subsoil has been mixed with the original surface soil through tillage and the plow layer is now yellowish-red silty clay loam instead of yellowish-brown silt loam. Also included are areas of very fine sandy loam and severely eroded gently sloping areas of silty clay loam. These inclusions are not shown separately on the soil map.

This soil is similar to Herndon silt loam, gently sloping phase, in water relations, workability, and response to management.

Use and management.—Because this soil is moderately susceptible to erosion, crops should be planted on the contour in rotations that keep the soil in close-growing and green-manure crops much of the time. Lime and fertilizer should be applied according to the results of soil tests. Capability unit IIe–3.

Herndon silt loam, sloping phase (6 to 10 percent slopes) (HdC).—This soil is similar to Herndon silt loam, gently sloping phase, in most profile characteristics. It occurs on the smooth uplands on steeper slopes and farther downslope than the gently sloping phase and has, therefore, more rapid runoff and a greater hazard of erosion. It is similar to the gently sloping phase in workability, water relations, content of organic matter, and response to fertilizer. Included with this soil are small areas of fine sandy loam that are not shown separately on the soil map.

Use and management.—Much of this soil is in a forest that consists of black, post, and red oaks, hickory, yellow-poplar, shortleaf pine, and small cedar. The forested area probably could be profitably cleared and planted to small grain, pasture or hay, and corn.

This soil needs stricter management than the gently sloping phase. It should be planted on the contour. On the steeper slopes it should also be stripcropped and, in some places, terraced and stripcropped. Lime and fertilizer should be applied according to the results of soil tests. Capability unit IIIe–2.

Herndon silt loam, eroded sloping phase (6 to 10 percent slopes) (HdC2).—This soil has a thinner surface layer than Herndon silt loam, sloping phase, but is similar to the sloping phase in most other profile characteristics. The two soils occur in the same kind of positions on slopes and are similar in water relations, workability, content of organic matter, and response to lime and fertilizer. Included with this soil are small areas that have had the subsoil mixed with the original surface soil through tillage. The plow layer of these areas is finer textured than a silt loam. Also included are small spots of very fine sandy loam.

Use and management.—Although it is moderately eroded, this soil needs about the same management as the sloping phase. The tilth and water relationships, especially on the more severely eroded spots, can be improved by plowing under crop residues and using green-manure crops in the cropping system. Capability unit IIIe–2.

Herndon silt loam, strongly sloping phase (10 to 15 percent slopes) (HdD).—This soil is similar to Herndon silt loam, sloping phase, in most profile characteristics, but it occurs on steeper slopes on the hilly uplands. Normally, it is shallower over bedrock and thinner in the subsoil than the less strongly sloping Herndon silt loams; consequently, it is more droughty. Small areas of very fine sandy loam are included with this soil because they are too small to map separately.

Use and management.—Most of this soil is in native forest that consists of good stands of the hardwoods and pines common to the area. Except in those areas that can be profitably cleared and used for pasture or hay, this soil is best suited to forest. If it is cultivated, crops should be grown in strips in a long rotation that keeps the field in grass or legumes nearly all the time. If pasture plants are seeded, management should provide the preparation of a good seedbed and liming and fertilizing according to the results of soil tests. Capability unit IVe–2.

Herndon silt loam, eroded strongly sloping phase (10 to 15 percent slopes) (HdD2).—This soil has a thinner surface soil than Herndon silt loam, strongly sloping phase, but it is similar to the strongly sloping phase in most other profile characteristics. It is in about the same kind of positions on slopes. Included with this soil are some small severely eroded areas and some small areas of very fine sandy loam. Water relations and workability are not so good on this soil as they are on the uneroded strongly sloping phase. This soil probably should be seeded to permanent pasture, hay, or other close-growing crop. Capability unit IVe–2.

Herndon silt loam, moderately steep phase (15 to 25 percent slopes) (HdE).—This soil is in the slate section of the county on the steeper slopes along major streams. It is shallower over bedrock and more susceptible to erosion than any of the other Herndon silt loams. Slate crops out in many places. This soil is, however, similar to Herndon silt loam, strongly sloping phase, in most profile characteristics.

Included in this mapping unit are small areas on stream breaks that have slopes steeper than 25 percent. Also included are small areas of very fine sandy loam and small areas of severely eroded silty clay loam. One-fourth of the subsoil of the severely eroded inclusions has been removed through erosion, and, in some places, there are shallow gullies.

Use and management.—Most of this soil is in a forest that consists of the hardwoods and pines common to the area. Trees should be harvested with care so that stands are kept uniform and erosion is prevented. Under careful management, permanent pasture can be grown on the less stony areas. This soil is not suited to tilled crops, because of its steep slopes, shallowness, many slate outcrops, and susceptibility to erosion. Capability unit VIe–1.

Herndon silty clay loam, severely eroded sloping phase (6 to 10 percent slopes) (HeC3).—Areas of this soil have had all of the surface soil and one-fourth of the subsoil gradually washed away. During this process, the subsoil has been mixed with the surface layer; now the plow layer is finer textured and more yellowish red than it was before the erosion and mixing. Because the firm clay subsoil is within plow depth, tillage is difficult and water relations are poor.

Use and management.—Most of this soil is cultivated. A few abandoned areas have reseeded naturally to Virginia pine. Because it occurs on steep slopes and is eroded and gullied, this soil should be planted to close-growing crops nearly all of the time. If row crops are grown, they should be in strips. Capability unit IVe–2.

Herndon silty clay loam, severely eroded strongly sloping phase (10 to 15 percent slopes) (HeD3).—This soil is similar to Herndon silty clay loam, severely eroded sloping phase, in profile characteristics, but it occurs on steeper slopes. Water relations and workability are poor because of the firm clay subsoil within the plow layer.

Use and management.—Because of its steep slopes, severe erosion, and slight gullying, this soil requires very careful management when it is used for crops. Small grain and lespedeza are fairly well suited. Grass-based rotations with row crops planted in narrow strips furnish adequate protection against erosion. Forest and permanent pasture are well suited. Capability unit IVe–2.

Iredell series

In this series are brownish-gray or very dark brown, moderately well drained, medium acid soils of the Piedmont Plateau. These soils occur wherever the geologic formation contains basic dikes; the largest areas are in the north-central and west-central parts of the county. These soils occur on diabase, gabbro, hornblende schist, diorite, and other dark-colored, ferromagnesian rock.

Iredell soils are associated with the Mecklenburg and Davidson soils. They are lighter colored than these soils and have a finer, more plastic subsoil. At one time, areas of Iredell soils were called Beeswax Land, a name describing the dense, impervious, clay subsoil. Because of this slowly permeable subsoil, the Iredell soils are among the most erodible in the county.

These soils have a fairly large total acreage. Even though the heavy clay subsoil limits the growth of plants, these soils are important to agriculture.

Iredell loam, level phase (0 to 2 percent slopes) (IaA).—This moderately well drained soil normally occurs in flat areas on top of the broad, smooth uplands. During wet periods, water stands on its surface in many places. It is described in detail in the subsection, Descriptions of Soil Profiles.

This soil has a very dark brown, friable surface layer that has a moderate, fine, crumb structure. The subsoil is mottled light olive-brown or light grayish-brown, very firm clay that is plastic when wet. It has a moderate, coarse, angular blocky structure (fig. 8). The depth of this soil over bedrock ranges from 36 to 42 inches. The surface soil varies from 6 to 14 inches in thickness. Included with this soil are areas of very fine sandy loam, fine sandy loam, and sandy loam.

***Figure 8.*—Profile of Iredell loam showing the results of swelling and shrinking in the plastic subsoil.**

The surface layer of this soil is fairly permeable and has a moderate capacity for holding available moisture. The subsoil is very slowly permeable and has a high capacity for holding moisture, but it does not release the moisture to plants readily.

Use and management.—Most of this soil is cultivated, and yields are high in places that are not too wet. The soil is well suited to small grain and pasture or hay and fairly well suited to corn and cotton. Because the slopes are gentle, the erosion hazard is slight. The choice of crops, however, is limited by the fine-textured, plastic subsoil. Forested areas of this soil have fair stands of white, black, post, and chestnut oaks, and dogwood. The understory is redcedar. Rotations should include close-growing crops, and the soil should be limed and fertilized as indicated by soil tests. Capability unit IIIe/s–1.

Iredell loam, gently sloping phase (2 to 6 percent slopes) (IaB).—This soil is similar to Iredell loam, level phase, in profile characteristics, but it occurs near the top of slopes on the smooth uplands. It is underlain by mafic rocks.

The surface layer of this soil is fairly permeable and has a moderate available water-holding capacity. The plastic clay subsoil is very slowly permeable and has a high capacity for holding moisture, but it does not give up water to plants readily. Partly because of this subsoil, this soil is susceptible to erosion.

Use and management.—Most of this soil is cultivated. It is well suited to pasture, hay, and small grain and less well suited to corn. Because slopes are gentle, erosion can be controlled by management that includes tilling on the contour, using rotations that provide close-growing crops, and liming and fertilizing according to the results of soil tests. Capability unit IIIe/s–1.

Iredell loam, eroded gently sloping phase (2 to 6 percent slopes) (IaB2).—This soil has a thinner surface soil than that of Iredell loam, gently sloping phase. It occurs in about the same kind of positions as the gently sloping phase and has about the same permeability, available water-holding capacity, workability, and response to lime and fertilizer. Small included areas have a finer textured plow layer than the rest of the mapping unit because the subsoil has been mixed with the original surface layer through tillage.

Use and management.—Because this soil is moderately eroded and is very susceptible to further erosion, it needs careful management. It should be tilled on the contour. Row crops need to be alternated with close-growing and green-manure crops. Lime and fertilizer should be applied as indicated by soil tests. Capability unit IIIe/s–1.

Iredell loam, eroded sloping phase (6 to 10 percent slopes) (IaC2).—This soil is similar to Iredell loam, eroded gently sloping phase, in most profile characteristics, but it occurs on steeper slopes. It has about the same water relations and response to lime and fertilizer as have the other Iredell loams in the county. In some areas the subsoil has been mixed with the original surface layer and the plow layer is now finer textured than the rest of the mapping unit. Included with this soil are some areas that are not eroded.

Use and management.—Management of this soil should provide tilling on the contour and rotations that keep the soil in close-growing crops much of the time. Lime and fertilizer should be applied according to the results of soil tests. Capability unit IVe–3.

Iredell very stony loam, gently sloping phase (2 to 6 percent slopes) (IcB).—This soil occurs on or near the top of slopes on the smooth uplands. In profile characteristics, water relations, and response to lime and fertilizer, it is similar to Iredell loam, gently sloping phase. The surface layer and upper subsoil, however, contain enough stones to interfere with cultivation. In some places rock crops out. Included with this mapping unit are small eroded areas that are gently sloping and sloping, and small uneroded areas that are sloping.

Use and management.—Much of this soil is in native forest, partly because stoniness makes the use of farm machinery difficult. The slowly permeable, very plastic clay upper subsoil also impedes cultivation. If adequately limed and fertilized, this soil is fairly well suited to pasture, hay, lespedeza, small grain, milo, and corn. The soil needs careful management to protect it against erosion. Row crops should be grown in rotations that keep small grain or grasses on the soil at least half of the time. It should be tilled on the contour and stripcropped on the steeper slopes. Lime and fertilizer should be applied according to the results of soil tests. Capability unit IIIe/s–1.

Iredell sandy loam, level phase (0 to 2 percent slopes) (IbA).—This moderately well drained soil occurs in smooth areas on the crests of broad flat uplands. During wet periods, water stands on or near the surface in many places. This soil has a surface soil that is coarser textured and as much as 4 inches thicker than the surface soil of Iredell loam, level phase.

This soil has a dark-brown sandy loam, friable surface layer that has a moderate, fine, crumb structure. The subsoil is mottled light olive-brown and light grayish-brown, very firm clay that is plastic when wet. It has a moderate, coarse, angular blocky structure. The depth of this soil over bedrock ranges from 24 to 36 inches.

The surface layer of this soil is fairly permeable and has a moderate capacity for holding available moisture. The subsoil is very slowly permeable and has a high capacity for holding moisture, but does not release the moisture to plants readily.

Use and management.—Most of this soil is cultivated. The soil is fairly well suited to small grain and pasture or hay. It is not well suited to corn, cotton, and tobacco. Because the slopes are very gentle, the erosion hazard is slight. The choice of crops is limited by the fine textured, plastic subsoil. Crop sequences should include close-growing crops, and the soil should be limed and fertilized according to soil tests. Capability unit IIIe/s–1.

Iredell sandy loam, gently sloping phase (2 to 6 percent slopes) (IbB).—This soil has a sandier and normally a thicker surface soil than that of Iredell loam, gently sloping phase. It occurs in broad areas near the top of slopes in positions that are similar to those of Iredell loam, gently sloping phase. Because the surface soil is friable and sandy and the subsoil is slowly permeable clay, this soil is very susceptible to erosion. Included in the mapping unit are areas of fine sandy loam and areas of very fine sandy loam.

Use and management.—Most of this soil is cultivated. It is better suited to small grain and pasture or hay than it is to corn and tobacco. It is used in some parts of the county to grow tobacco. Because of its very slowly permeable plastic subsoil, it is not so well suited to tobacco as Enon fine sandy loam, gently sloping phase. Erosion is fairly easy to control on this soil. Row crops should be grown in rotations that keep the soil in close-growing crops much of the time; they should be planted on the contour. This soil needs to be limed and fertilized as indicated by soil tests. Capability unit IIIe/s–1.

Iredell sandy loam, eroded gently sloping phase (2 to 6 percent slopes) (IbB2).—This soil occurs in about the same positions on slopes as Iredell sandy loam, gently sloping phase. Because of erosion, however, its surface soil is thinner than that of the gently sloping phase. Some small included areas have a finer textured plow layer than the rest of this mapping unit because the subsoil has been mixed with the original surface soil through tillage. Water relations, permeability, workability, and response to lime and fertilizer are about the same for this soil as they are for the other Iredell sandy loams in the county.

Use and management.—This soil needs to be cultivated on the contour. Row crops should be grown in rotations that keep the soil in close-growing or green-manure crops most of the time. Lime and fertilizer should be applied according to the results of soil tests. Capability unit IIIe/s–1.

Iredell sandy loam, eroded sloping phase (6 to 10 percent slopes) (IbC2).—This soil is similar to Iredell sandy loam, gently sloping phase, in most profile characteristics, but it is more strongly sloping and has a thinner surface soil. It occurs on longer slopes than the gently sloping phase and generally farther downslope. The two soils are similar in water relations and response to lime and fertilizer. Included with this soil are some areas that are not eroded.

Use and management.—Some of this soil is still in virgin forest that consists of hardwoods common to the area. Probably it can be cleared and used profitably for permanent pasture or hay crops. Because this soil is more susceptible to further erosion than the gently sloping phase, close-growing crops should be grown on it more of the time than they are grown on the gently sloping phase. Capability unit IVe–3.

Lloyd series

In this series are dark reddish-brown to dark grayish-brown, well-drained, medium acid soils. These soils occur in the northern and central parts of the county on the rolling uplands. They developed from the products of mixed felsic and mafic igneous and metamorphic rocks, dominantly greenstone schist. The native vegetation consisted of various oaks, hickory, dogwood, sourwood, and loblolly and shortleaf pines. Some areas that were formerly cultivated are now in Virginia, loblolly, and shortleaf pines.

Lloyd soils are associated with Cecil, Davidson, and Mecklenburg soils. They have characteristics intermediate between those of the lighter red Cecil soils and the darker red Davidson soils. They have a browner surface layer and a darker red subsoil than have the Cecil soils, which were derived from gneiss. They are sandier in the surface soil than the Davidson soils and lighter red in the subsoil. They do not have a claypan subsoil like that of the Mecklenburg soils.

The Lloyd soils are widely distributed and have a large total acreage. They are important to the agriculture of the county, especially for growing small grain, pasture, and hay.

Lloyd loam, level phase (0 to 2 percent slopes) (LbA).—This well-drained soil occurs on broad smooth uplands, normally between stream breaks. It is described in detail in the subsection, Descriptions of Soil Profiles.

The surface soil is dark reddish-brown, friable loam that has a moderate, medium, granular structure. The subsoil is red to dark-red, firm clay with a strong, fine, subangular blocky structure. Near the Cecil soils the subsoil is red; near the Davidson soils it is dark red. This soil has medium external and internal drainage. Its depth over bedrock ranges from 5 to 8 feet. On steep stream breaks, this soil may be more shallow and stony than it is elsewhere and rock may crop out. In some forested areas a distinct lower surface layer is evident, but in cultivated areas this layer has been mixed with the upper surface layer and has lost its identity. The reaction is medium acid to slightly acid. Included with this mapping unit are small spots that have a sandy loam or a fine sandy loam surface soil.

This soil has a fairly permeable surface layer and a moderately permeable subsoil. It has a medium capacity to hold available water and to store plant food.

Use and management.—Most of this soil is cultivated. It is well suited to small grain, pasture or hay, corn, and soybeans. Erosion is no problem, and the soil is easy to till. Only ordinary management is needed. Good cropping systems should be used, and lime and fertilizer should be applied as indicated by soil tests. Capability unit I–2.

Lloyd loam, gently sloping phase (2 to 6 percent slopes) (LbB).—This soil normally occurs on the broad, smooth uplands between stream breaks or in the hilly section of the county on or near the top of slopes. It is underlain by felsic and mafic igneous rocks. This soil is similar to Lloyd loam, nearly level phase, in profile characteristics, but it is more strongly sloping and more susceptible to erosion. It is moderately permeable and has medium available moisture-holding capacity. It contains a medium amount of organic matter and responds well to lime and fertilizer.

Use and management.—Most of this soil is cultivated. It is better suited to small grain and pasture or hay than it is to corn and soybeans. Although susceptible to further erosion, this soil can be maintained by planting row crops on the contour in rotations with close-growing crops, and by liming and fertilizing as indicated by soil tests. Capability unit IIe–4.

Lloyd loam, eroded gently sloping phase (2 to 6 percent slopes) (LbB2).—This soil is similar to Lloyd loam, gently sloping phase, but, because of erosion, it has a thinner surface soil. It occurs in the same kind of positions as the gently sloping phase and has about the same permeability and available water-holding capacity. It responds well to lime and fertilizer. Included with this mapping unit are small severely eroded spots that have a clay loam plow layer. These inclusions have had the subsoil mixed with the original surface layer through tillage.

Use and management.—Because this soil is susceptible to further erosion, crops should be planted on the contour. Close-growing and green-manure crops should be grown more of the time than row crops. Additions of organic matter will improve the structure of the soil, especially in the severely eroded spots, and thereby improve tilth and water relations. Lime and fertilizer should be applied as indicated by soil tests. Capability unit IIe–4.

Lloyd loam, sloping phase (6 to 10 percent slopes) (LbC).—This soil occurs on steeper slopes than Lloyd loam, gently sloping phase, and farther downslope. It has, therefore, more rapid runoff and is more susceptible to erosion. It is similar to the gently sloping phase in most profile characteristics, and in permeability, available water-holding capacity, and response to lime and fertilizer. This soil is associated with the Cecil soils on smooth uplands.

Use and management.—Much of this soil is in a forest of shortleaf pine, white, post, black, southern red, and chestnut oaks, yellow-poplar, and hickory. The understory is eastern redcedar. It is probable that this soil could be cleared and profitably cultivated. Since it is more erodible than the gently sloping phase, this soil needs more careful management. Row crops should be planted in rotations that keep this soil in close-growing crops much of the time. It should be tilled on the contour, terraced, and, in some places, stripcropped. Capability unit IIIe–3.

Lloyd loam, eroded sloping phase (6 to 10 percent slopes) (LbC2).—This soil has a thinner surface soil than that of Lloyd loam, sloping phase, but it is similar to the sloping phase in most other profile characteristics. It occupies the same kind of position on slopes and is similar in water relations and in response to lime and fertilizer. Included with this soil are small severely eroded spots that have had their subsoil mixed with the surface soil. The surface soil of these inclusions is finer textured than the corresponding layer in this soil.

Use and management.—This soil is well suited to small grain and pasture or hay. Row crops should be grown in rotations that keep this soil in close-growing crops much of the time. Terracing and stripcropping are needed. Lime and fertilizer should be applied according to the results of soil tests. Additions of organic matter, crop residues, barnyard or green manure, will improve the structure of this soil, especially in the more eroded areas. Capability unit IIIe–3.

Lloyd loam, strongly sloping phase (10 to 15 percent slopes) (LbD).—This soil generally occurs on the steeper parts of slopes, which are the parts near the middle of the slopes. It also occurs near the steep stream breaks. It is similar to Lloyd loam, sloping phase, in most profile characteristics, but it is shallower and more susceptible to erosion.

Use and management.—Most of this soil is in forest. Because the soil is difficult to till, forestry is one of the better uses. If it is properly limed and fertilized, this soil can be seeded to permanent pasture or hay, which will lessen erosion. Some cultivated crops probably can be grown if the soil is stripcropped and terraced. Because the soil is thin, however, crops may lack moisture during the hot, dry summer. Capability unit IVe–2.

Lloyd loam, eroded strongly sloping phase (10 to 15 percent slopes) (LbD2).—This soil is thinner than Lloyd loam, strongly sloping phase, because erosion has removed from one-fourth to three-fourths of the original surface layer. It occurs in about the same kind of positions as the strongly sloping phase, and is similar to the sloping phase in most profile characteristics. Small included areas have a finer textured plow layer than the rest of the mapping unit, because the subsoil has been mixed with the original surface layer through tillage.

Use and management.—This soil should be seeded to permanent pasture or hay meadow or kept in other close-growing crops nearly all the time. Before it is seeded, it should be limed and fertilized according to the results of soil tests. Additions of organic matter will improve the fertility, tilth, and water relations, especially in the more eroded spots. Capability unit IVe–2.

Lloyd loam, moderately steep phase (15 to 25 percent slopes) (LbE).—This soil has a thinner surface layer than any other Lloyd soil in the county and, in many places, rock crops out. These places are indicated on the soil map by symbols. This soil is similar to Lloyd loam, strongly sloping phase, in most profile characteristics, but it occurs on steeper parts of slopes. Some small areas on stream breaks or on slopes steeper than 25 percent are designated on the soil map by escarpment symbols. Small spots in this mapping unit are eroded.

Included with this mapping unit are areas of the moderately steep phase and the eroded moderately steep phase of Davidson clay loam that are too small to be mapped separately. These inclusions are darker red and more clayey throughout the profile than Lloyd loam, moderately steep phase.

Use and management.—This soil is well suited to both hardwoods and pines, and most of the area is in forest. To prevent erosion and maintain good stands, these trees should be protected from fire and selectively harvested. This soil should not be cultivated. Capability unit VIe–1.

Lloyd clay loam, severely eroded gently sloping phase (2 to 6 percent slopes) (LaB3).—This severely eroded soil has been eroded gradually, and the subsoil has been mixed with the surface soil through tillage. All the surface soil and about one-fourth of the subsoil have been washed away. A few areas are gullied, and the soil is susceptible to further erosion. The plow layer is finer textured than that of Lloyd loam, gently sloping phase.

Because the clayey subsoil is within plow depth, this soil is hard to till. It has, however, good structure. The available water-holding capacity is medium, and permeability is slow. Natural fertility is low, but the soil responds moderately well to lime and fertilizer.

Use and management.—This soil is better suited to small grain and pasture or hay than it is to row crops. Organic matter can be built up by using green manure, winter cover, and crop residues. This soil should be tilled on the contour, and rotations should be used that keep the soil in small grain or grasses at least one-half of the time. It needs to be limed and fertilized as indicated by soil tests. Capability unit IIIe–3.

Lloyd clay loam, severely eroded sloping phase (6 to 10 percent slopes) (LaC3).—This soil is similar to Lloyd clay loam, severely eroded gently sloping phase, in most profile characteristics, and in permeability and available water-holding capacity. It lies, however, on steeper slopes than the severely eroded gently sloping phase and in the more hilly parts of the county. It responds well to lime and fertilizer.

Use and management.—This soil should be kept in small grain, hay, or pasture most of the time. Organic matter should be added in the form of green manure, winter cover, and the residues of well-fertilized crops. The soil should be limed and fertilized as indicated by soil tests. Capability unit IVe–2.

Lloyd clay loam, severely eroded strongly sloping phase (10 to 15 percent slopes) (LaD3).—This soil is on the steeper parts of the smooth uplands or on steep stream breaks. It has a shallower surface soil than that of the Lloyd clay loams on less steep slopes, but it is similar to these soils in most other profile characteristics.

Use and management.—Because this soil is slightly gullied and susceptible to further erosion, the best use is forest or permanent sod. If it is cultivated, crops should be planted in strips in long rotations that keep the field in sod crops most of the time. Capability unit IVe–2.

Lloyd clay loam, severely eroded moderately steep phase (15 to 25 percent slopes) (LaE3).—This soil occurs on steep stream breaks near the larger streams. It is similar to Lloyd clay loam, severely eroded sloping phase, in most profile characteristics. Included in the mapping unit are a few small areas that have a clay surface layer. These inclusions have a darker red, less sandy subsoil than that of this soil.

Use and management.—Because it is difficult to operate farm machinery on the steep slopes, this soil is poorly suited to pasture or hay. It will grow fair stands of hardwoods and Virginia, shortleaf, and loblolly pines. The trees should be protected from fire and disease and should be selectively culled. Capability unit VIIe–1.

Local alluvial land

This land is mapped in poorly drained and well drained units. The poorly drained areas consist of layers of sand, silt, and clay. They have small areas of Worsham soils intermingled with them. The alluvial deposits in the poorly drained areas sloughed or were washed from surrounding upland soils. This land varies greatly from place to place. It is not consistent in sequence, development, or arrangement of layers, and there is no horizonation. The various dissimilar areas are too small to be shown separately on the soil map. Because of its small acreage and its variable condition, this land is not important agriculturally.

The well-drained alluvial land consists of materials that sloughed, fell, or were washed from the Cecil, Appling, Helena, and other sandy soils. It occurs mostly in the southwestern part of the county. It is associated with Starr soils at the bottom of slopes or at the heads of small streams, where it is in positions similar to those of the Starr soils. It is also associated with the Durham Appling, and Cecil soils. Like the Durham and Appling soils, this land is well suited to flue-cured tobacco.

Local alluvial land, poorly drained (Lc).—This land occurs along small streams or in drainways between hills that slope gently toward the main flood plain. It is somewhat poorly drained to poorly drained and strongly acid. It contains a medium amount of organic matter and has a medium to low capacity for storing plant food. It responds well to lime and fertilizer.

Use and management.—This land is better suited to permanent pasture than it is to corn, but, in some places, corn does well. Because it is poorly drained and has a high water table, this land needs artificial drainage in some places. Large applications of lime are needed to insure good yields. Capability unit IVw–2.

Local alluvial land, well drained (Ld).—This land has a surface layer of local alluvial material that varies from a light gray or dark gray to a brown or yellowish brown. The alluvial material extends to depths of 10 to 26 inches or more. In many places a buried B horizon occurs at various depths below the alluvial material. Included with this land are a few areas that have a fine sandy loam surface layer.

This land is moderately permeable and has a moderate available water-holding capacity. The reaction is medium acid. The land is easy to till and responds well to lime and fertilizer.

Use and management.—Most of this land is cultivated. It is well suited to corn, soybeans, pasture or hay, small grain, and tobacco. Flooding and the washing in of residual material are greater problems on the land than is erosion. This land should be tilled on the contour and kept in small grain or grasses one-third to one-half of the time. Lime and fertilizer should be applied as indicated by soil tests. Capability unit IIe–1.

Mecklenburg series

This series consists of grayish-brown to dark-brown, well-drained slightly acid soils that occur mostly in the west-central part of the county. These soils are underlain by diorite, gabbro, hornblende schist, and other dark-colored rocks rich in iron and magnesium. The native vegetation consisted of various oaks, hickory, shortleaf pine, and cedar.

Mecklenburg soils are associated with the Davidson, Enon, and Iredell soils. Particularly in the subsoil, these soils are intermediate in color and consistency between the Davidson and Iredell soils.

Although small in total acreage, Mecklenburg soils are fairly important to the agriculture of the county, especially for growing small grain, pasture plants, and corn.

Mecklenburg loam, eroded gently sloping phase (2 to 6 percent slopes) (MbB2).—This well-drained soil normally occurs on the hilly upland areas or near the top of slopes. It is described in detail in the subsection, Descriptions of Soil Profiles.

The soil has a dark-brown surface layer, 6 to 12 inches thick, that has a weak, fine, granular structure. The subsoil normally is firm, strong-brown clay that is mottled with yellowish red. It is plastic when wet and has a moderate medium subangular blocky structure. The subsoil varies from yellowish red to dark red. Where it is darker red, it has a better structure than where it is yellower. Rocks crop out in places. As this soil grades toward the Davidson soils, the depth of its profile increases.

This soil has a fairly permeable surface layer with a moderate available water-holding capacity. The subsoil is slowly permeable and takes in a large amount of water, but it does not give up this water to plants readily.

Included with this soil are a few areas that are not eroded. Also included are some small severely eroded areas that have a clay loam surface layer. These severely eroded inclusions have lost all of their original surface layer and as much as one-fourth of their subsoil. In some places they have shallow gullies.

Use and management.—Most of this soil is cultivated. It is better suited to small grain and pasture or hay than it is to corn and soybeans. The hazard of further erosion can be lessened by using good cropping systems, tilling on the contour, and liming and fertilizing as indicated by soil tests. Capability unit IIe/s–2.

Mecklenburg loam, eroded sloping phase (6 to 10 percent slopes) (MbC2).—This soil occurs with uneroded inclusions of Mecklenburg soil that have a loam surface soil. It has a thinner surface soil than these inclusions but is similar to them in most other profile characteristics. In some areas the plow layer is finer textured than the rest of the mapping unit because the subsoil has been mixed with the original surface soil through tillage.

This soil has a fairly permeable surface layer. The subsoil is slowly permeable and takes in a large amount of water, but it does not release this water to plants readily. The soil is fairly easy to work and responds well to lime and fertilizer.

Use and management.—This soil is better suited to pasture, hay, and small grain than it is to corn, soybeans, and other row crops. It should be kept in small grain or grasses more than one-half the time. Plowing under crop residues and green-manure crops will improve the structure of this soil, especially in the more eroded spots, and thereby improve tilth and water relations. This soil should be limed and fertilized according to the results of soil tests. Capability unit IIIe/s–3.

Mecklenburg loam, eroded strongly sloping phase (10 to 15 percent slopes) (MbD2).—This soil generally occurs near the middle of slopes in the hilly section of the county or on stream breaks. It is generally thinner than Mecklenburg loam, eroded sloping phase, but it is similar in most other profile characteristics and has about the same permeability, workability, and response to lime and fertilizer. Because it is shallower and has more rapid runoff, it is droughtier than the eroded sloping phase. It is very susceptible to further erosion.

Included with this soil are small areas that are not eroded and small moderately steep areas. Some of the moderately steep inclusions are eroded and some are not. These moderately steep inclusions normally occur on the stream breaks.

Use and management.—Much of this soil is still in forest that consists of good stands of trees common to the area. This soil is well suited to pasture and hay. If it is used for row crops, these crops should be planted in strips in long rotations that keep the field in grass and legumes most of the time. The soil should be limed and fertilized as indicated by soil tests. Because of its shallowness, this eroded soil is more difficult to improve than the less strongly sloping Mecklenburg loams. Capability unit IVe–3.

Mecklenburg clay loam, severely eroded sloping phase (6 to 10 percent slopes) (MaC3).—This soil has lost all of the surface layer and as much as one-fourth of the subsoil through erosion. As the soil was gradually eroded, the subsoil was mixed with the original surface layer, and now the plow layer is finer textured and more yellowish red than it was before erosion and mixing. Some areas are slightly gullied. This soil is very susceptible to further erosion. Because the firm subsoil, which is plastic when wet, is within plow depth, tillage is difficult and water relations are poor. Included with this soil are a few, small, strongly sloping areas.

Use and management.—This soil is better suited to small grain and pasture or hay than it is to row crops. Its management needs are similar to those for Mecklenburg loam, eroded strongly sloping phase. Capability unit IVe–3.

Mixed alluvial land

This land consists of material that has accumulated for many years from sediments washed from the uplands. It is very susceptible to flooding. As in other alluvial areas, the soils do not have genetic horizons, but various combinations of layers of sand, silt, and clay occur at various depths. The material varies so much that almost any texture may occur. The layers are not consistent in sequence of development or in arrangement in the profile.

This land is mapped in poorly drained and well drained areas. The poorly drained areas have little value for farming. The well-drained areas are not very important to farming, but, in favorable seasons, fair crops of corn, pasture, and grain have been grown.

Mixed alluvial land, poorly drained (Mc).—This land occurs on first bottoms that border meandering streams that have shallow banks. In many places the entire area is a maze of old stream channels and natural levees. The land is somewhat poorly drained to poorly drained. Its fertility is fairly high, and its content of organic matter is medium. The reaction is medium acid to strongly acid. This land responds well to lime and fertilizer and needs large applications of lime.

Use and management.—Much of this land is in forest that consists of sweetgum, yellow-poplar, swamp chestnut oak, water and willow oaks, hickory, sycamore, elm, blackgum, and loblolly pine. It is well suited to permanent pasture and may be used for some crops. Except to eliminate surface water, artificial drainage is often impractical on this land because of the high water level in the stream. This land should be limed and fertilized according to the results of soil tests. Capability unit IVw–1.

Mixed alluvial land, well drained (Md).—This land occurs on first bottoms that border meandering streams that have high banks. In many places the entire area is a maze of old stream channels and natural levees. Included with this mapping unit are areas of Congaree and Buncombe soils that are too small to be mapped separately. Permeability, available water-holding capacity, and content of organic matter vary on this land. The land responds well to lime and fertilizer.

Use and management.—Some of this land is still in trees common to the first-bottom soils of the area. It is well suited to pasture, lespedeza, corn, and soybeans. The land ranges from moderately well drained to well drained. In some places artificial drainage may be beneficial. Capability unit IIw–1.

Moderately gullied land

This land type consists of 6 to 25 percent slopes that are moderately gullied—between one-fourth and three-fourths of the area is in gullies. The remnants of the soils of several soil series are mapped together in groups of two or three, according to their similar characteristics and soil materials, to make up the three map units of this land type. These series are: Helena, Enon, and Wilkes; Cecil, Appling, and Lloyd; and Georgeville and Herndon. Areas of this land type are easier to reclaim than are those of the severely gullied land, and they support better stands of Virginia pine that reseeded naturally.

Moderately gullied land, Helena, Enon, and Wilkes materials (6 to 25 percent slopes) (Mg).—This land is sloping to moderately steep and very severely eroded. Its gullies are rather deep and stable. The soil materials were formed on mixed felsic and mafic crystalline rocks. Normally, they have a claypanlike subsoil. The materials range in color from mottled yellowish brown and gray to brownish yellow. They are moderately well drained to well drained.

Use and management.—Much of this land has been abandoned and has reseeded naturally to Virginia pine. It should be disturbed only for culling purposes. This land is not suited to cultivation and, if open, should be planted to loblolly or shortleaf pines. Mulching with hay, straw, or weeds, particularly in the gullies, will reduce evaporation and the rate of runoff and, therefore, improve the moisture content. Control of fire and disease is essential. Capability unit VIIe–2.

Moderately gullied land, Cecil, Appling, and Lloyd materials (6 to 15 percent slopes) (Me).—This miscellaneous land type is very severely eroded and moderately gullied. The Cecil and Appling soil materials were formed on felsic crystalline rock; the Lloyd soil materials were formed on mixed falsic and mafic crystalline rocks. In some characteristics this land is similar to Moderately gullied land, Helena, Enon, and Wilkes materials, but the soil materials have a yellowish-red to dark-red subsoil that is normally more sandy and well drained.

Use and management.—The management needs of this land are the same as those for Moderately gullied land, Helena, Enon, and Wilkes materials. After this land is completely stabilized, some of it, particularly that on the

Figure 9.—**Erosion on Moderately gullied land, Georgeville and Herndon materials; very poor pasture.**

less steep slopes, can be reclaimed for permanent pasture. Capability unit VIIe–2.

Moderately gullied land, Georgeville and Herndon materials (6 to 25 percent slopes) (Mf).—This miscellaneous land differs from the other phases of Moderately gullied land in that its soil materials were formed on volcanic slate and contain more silt (fig. 9). It needs management similar to that of the other phases. After the land has been completely stabilized, some of it, especially that on the lesser slopes, can be reclaimed for permanent pasture. Capability unit VIIe–2.

Orange series

This series consists of light-gray to dark grayish-brown, somewhat poorly drained, acid soils. These soils occur on nearly level to gently rolling relief in the south-central and southeastern parts of the county. They developed from the products of volcanic rock. Because the metamorphosed tuffs and breccias underlying these soils contain some basic minerals, the soils that developed are similar to soils developed on mafic igneous rock. The native vegetation was blackjack, red, white, and post oaks and some shortleaf pine.

Orange soils occur with the Efland, Alamance, Herndon, Georgeville, and Tirzah soils and were developed on parent material similar to that of these associated soils. Orange soils are similar to the Efland soils in texture but are less well drained and have a yellowish-brown rather than a yellowish-red subsoil. They have a more plastic subsoil than that of the Alamance soils. The Orange soils are more poorly drained than the Herndon, Georgeville, and Tirzah soils and are lighter colored and more plastic in the subsoil.

Orange soils are fairly extensive, but they are not very important for agriculture. They are well suited to lespedeza, corn, small grain, and pasture plants.

Orange silt loam, nearly level phase (0 to 2 percent slopes) (OaA).—This somewhat poorly drained soil occurs on large flats on the smooth uplands or in small depressions at the top of gentle slopes. It is described in detail in the subsection, Descriptions of Soil Profiles.

Except for a very thin dark gray layer in wooded areas, the surface soil is pale-yellow friable silt loam that has a moderate, medium, granular structure. The subsoil is yellowish-brown, very firm clay that is plastic when wet. It is massive (structureless) to weak, coarse, angular blocky. External drainage varies from slow to medium, depending on the gradient of the slope. Internal drainage is slow to very slow. In most places, the depth over bedrock is less than 36 inches, but it ranges from 24 to 80 inches. The upper subsoil ranges from friable silty clay loam to firm silty clay. In most places, the upper subsoil contains more and larger gray mottles than does the coarser textured lower subsoil. This soil is more commonly associated with the Efland, Alamance, and Herndon soils than it is associated with the Georgeville and Tirzah soils.

This soil is very slowly permeable and high in available water-holding capacity. It is fairly easy to till and responds well to lime and fertilizer. Erosion is no problem, but water relations are poor because of the nearly level topography and the very firm subsoil.

Use and management.—This soil is well suited to pasture of ladino clover and fescue. In favorable seasons, fair yields of lespedeza, corn, and small grain can be obtained. External drainage should be improved artificially, particularly in the depressions. In other respects, this soil needs only ordinary management. Good cropping systems should be used, and lime and fertilizer added as indicated by soil tests. Capability unit IIIw/s–1.

Orange silt loam, gently sloping phase (2 to 6 percent slopes) (OaB).—This soil normally occurs in the slate belt on the smooth upland near or on the top of slopes. Because of its finer textured subsoil, this soil has more rapid runoff than other soils in the county on comparable slopes. It is similar to Orange silt loam, nearly level phase, in most profile characteristics. As indicated by fewer gray mottles in the lower subsoil, in most places the water table is lower than that of the nearly level phase. This soil is similar to the nearly level phase in content of organic matter, workability, and response to lime and fertilizer. It is not very susceptible to erosion.

Use and management.—If this soil is managed well, it produces good yields of ladino clover and fescue. Because it has more rapid external drainage than the nearly level phase, it is better suited to corn, lespedeza, and small grain. It grows about the same kinds and quality of trees as do the Iredell soils—sparse stands of white, jack, water, and post oaks, and shortleaf pine and cedar. Erosion can be minimized by using suitable cropping systems, planting row crops on the contour, and adding lime and fertilizer as indicated by soil tests. Capability unit IIIe/s–1.

Orange silt loam, eroded gently sloping phase (2 to 6 percent slopes) (OaB2).—This soil occurs on the same kind of position as Orange silt loam, gently sloping phase. It has a thinner surface soil than that of the gently sloping phase and less favorable water relations, workability, and content of organic matter.

Included with this soil are small areas that have a silty clay loam plow layer. These inclusions have had the subsoil mixed with the original surface soil through tillage, and the color of their plow layer now resembles that of the subsoil.

Use and management.—This soil is suited to about the same kinds of crops as the gently sloping phase. It needs about the same kind of management but is harder to till. Capability unit IIIe/s–1.

Orange silt loam, gently sloping moderately well drained variant (2 to 6 percent slopes) (ObB).—This soil is described in detail in the subsection, Descriptions of Soil Profiles. It is similar to Orange silt loam, nearly level phase, and to the Alamance soils in many profile characteristics. The upper subsoil is similar to that of the Alamance soils in color, texture, and structure. The lower subsoil—a massive, very firm, yellowish-brown clay with a few gray mottles—resembles that of Orange silt loam, nearly level phase. In many places concretions of iron similar to those in the Iredell soils have accumulated in the upper subsoil. Outcrops of volcanic slate are fairly common. Included with this soil are a few nearly level spots and a few small areas of Alamance and Herndon soils.

This soil has slow to medium runoff and slow internal drainage. It is moderately acid. It has poor water relations and workability and a low content of organic matter, but it responds well to fertilizer and lime.

Use and management.—If it is managed well and has a favorable content of moisture, this soil produces fair yields of pasture plants, lespedeza, corn, small grain, and tobacco. Except where the soil is very shallow, trees grow better than they do on Orange silt loam, nearly level phase. Various oaks and shortleaf pine are the dominant trees. Because runoff is moderate, this soil needs only simple management. Crops should be planted on the contour and grown in suitable rotations. Lime and fertilizer should be applied as indicated by soil tests. Capability unit IIe–2.

Orange silt loam, eroded gently sloping moderately well drained variant (2 to 6 percent slopes) (ObB2).—This soil has a thinner surface soil than Orange silt loam, gently sloping moderately well drained variant. As the soil was being gradually eroded, the subsoil was mixed into the plow layer through tillage. A result of this mixing is a finer textured plow layer that is similar to the subsoil in color. This soil, however, is more friable and coarser textured in the upper subsoil than is Orange silt loam, eroded gently sloping phase, and it is not changed so much by mixing.

This soil has about the same water relations as has Orange silt loam, gently sloping moderately well drained variant, and it responds to lime and fertilizer in about the same way. Included are small areas that are more severely eroded than is the rest of this mapping unit.

Use and management.—This soil is suited to the same kinds of crops as the gently sloping moderately well drained variant and needs about the same kind of management. Because it is eroded, it is harder to till. Capability unit IIe–2.

Orange silt loam, sloping moderately well drained variant (6 to 10 percent slopes) (ObC).—This soil occurs on volcanic rock on the steeper slopes of the smooth uplands or on the more gentle slopes of the hilly sections. It is thinner than Orange silt loam, gently sloping phase, and has more rapid runoff. It is, therefore, more susceptible to erosion. Included with this soil are small sloping areas of poorly drained Orange silt loam.

Use and management.—Most of this soil is still in a forest that consists of fair stands of various oaks and shortleaf pine. It probably could be cleared and profitably used for crops, pasture, or hay. When cultivated, this soil should be kept in close-growing crops two-thirds of the time. Capability unit IIIe/s–3.

***Figure 10.*—Erosion damage on Severely gullied land.**

Orange silt loam, eroded sloping moderately well drained variant (2 to 6 percent slopes) (ObC2).—This soil occurs in positions similar to those of Orange silt loam, sloping moderately well drained variant. It is similar to the moderately well drained variant in most profile characteristics, but, because of erosion, has a thinner surface soil. Included with this soil are some severely eroded spots and small sloping areas of poorly drained Orange silt loam. Although it is moderately eroded, this soil needs about the same kind of management as the sloping moderately well drained variant. Capability unit IIIe/s–3.

Severely gullied land

This land consists of soil that is so severely eroded and gullied that it would be hard to reclaim. It is suited to forest, however, if it is strictly managed. It differs from the Moderately gullied lands in that the gullies are deeper, less stable, and cover more than three-fourths of the area. On this land, erosion is still quite active and the areas are bare, but the Moderately gullied lands have a dense cover of vegetation in most places.

Severely gullied land (Sa).—Most areas of this land have had all of the surface soil and much of the subsoil washed away. In some places, all of the subsoil and even part of the parent material have been removed (fig. 10). The gullies are so close together that the surface layer of the areas between the gullies has caved in or sloughed off and created a moundlike effect.

Use and management.—Most of this land has a sparse growth of Virginia pine. Except for mulching with hay or straw to reduce evaporation and to increase absorption, it should not be disturbed. In treeless areas, this land should be mulched and planted to loblolly or shortleaf pines. The trees should be harvested carefully so that uniform stands will be maintained. Control of fire and disease is essential for maximum growth. Capability unit VIIe–2.

Starr series

In this series are brown to dark-brown, well-drained acid soils that are in the southern part of the Piedmont Plateau. These soils occur in depressions, near the bottom of slopes, or at the head of small streams. They are developing on local alluvium that was washed or sloughed from the Cecil, Davidson, Lloyd, Georgeville, and Tirzah soils. The native vegetation consisted of elm, beech, sycamore, hackberry, sweetgum, blackgum, dogwood, and other trees common to the area.

Only one Starr soil is mapped in Alamance County. This soil differs from the residual soils with which it occurs in that it has little or no profile development in many places. It occurs in small areas, but the total acreage of this soil is rather large. It is important to the agriculture of the county.

Starr loam (2 to 6 percent slopes) (Sb).—This well drained to moderately well drained soil occurs on the bottom lands along small streams or drainways. It is described in detail in the subsection, Descriptions of Soil Profiles.

The surface soil is dark-red, red, or brown, friable loam that has a weak, fine, granular structure. The subsoil is red or yellowish-red, firm clay with a moderate, medium, or fine subangular blocky structure. Depth to the local alluvial material varies from 10 to more than 26 inches. In many places a buried subsoil layer occurs at various depths below the alluvial material. Included with this soil are small areas of fine sandy loam, fine sandy clay loam, and silt loam.

This soil is permeable and has moderate available water-holding capacity. It contains a medium amount of organic matter. Because it is mainly an accumulation of topsoil that is washed from the surrounding residual soils, this soil is rich in plant nutrients. At times, however, it is likely to be flooded and to receive excessive materials. It is easy to till and responds fairly well to lime and fertilizer.

Use and management.—Most of this soil is cultivated. It is well suited to small grain, corn, cotton, soybeans, pasture, and hay. Good management to decrease erosion on the land above will lessen the amount of materials washed into these areas. This soil should be limed and fertilized as indicated by soil tests. Capability unit IIw–1.

Stony land

This land occurs on slopes that have so many stones and rock outcrops that it is not suited to cultivation. Most of it contains Orange, Herndon, Alamance, Iredell, and Goldston material.

Stony land (6 to 15 percent slopes) (Sc).—Because of the stones and rock outcrops, farm machinery is very difficult to use on this land. The stones may be on the surface or throughout the entire profile. Most of this land has slopes of 6 to 10 percent, but some has slopes of 10 to 15 percent. This land is suited only to growing trees. The growth of the trees and quality of the stands depend on the depth of soil material over bedrock. Capability unit VIIe–2.

Tirzah series

This series consists of dark reddish-brown or brown, well-drained, moderately acid soils. These soils occur in the southern and eastern sections of the county on the smooth or hilly uplands. They were derived from dark-gray or dark-green, very fine grained volcanic slate that contains basic materials. The native vegetation consisted of various oaks, hickory, poplar, dogwood, sourwood, and some pines. Reforested areas are mostly in pine.

Tirzah soils are closely associated with the Georgeville, Herndon, Orange, and Davidson soils. They have a browner surface soil and a darker red subsoil than the Georgeville soils. Their subsoil is not so yellow as the yellowish-red subsoil of the Herndon soils. Their parent material differs from that of the Davidson soils, which were derived from mafic igneous rock. In color, Tirzah soils are similar to the sandier Lloyd soils, which were derived from mixed basic and acid igneous rock.

These soils have a smaller total acreage than the Georgeville soils. They are, however, among the better soils of the slate section. They are important to the agriculture of the county because they are well suited to all crops commonly grown except tobacco.

Tirzah silt loam, gently sloping phase (2 to 6 percent slopes) (TaB).—This well-drained soil occurs on the crest of rounded slopes between streams in the smooth uplands of the slate belt. It is described in detail in the subsection, Descriptions of Soil Profiles.

The surfarce layer is dark reddish-brown friable silt loam that has a weak, fine, granular structure. The subsoil is dark-red, firm silty clay with strong, medium and fine, subangular blocky structure. This soil is fairly uniform in color, but in places its color approaches that of the Davidson soils. Depth over bedrock ranges from 30 to 60 inches. Included with this soil are small areas of silty clay loam and a few spots that are nearly level.

This soil has favorable water relations and is easy to work. It contains a small amount of organic matter and responds fairly well to lime and fertilizer.

Use and management.—Most of this soil is cultivated. It is well suited to small grain, pasture or hay, corn, and soybeans. It is not well suited to tobacco, which grows too fast and is of poor quality. Because it occurs in the dairy-farm area where close-growing crops are dominant, this soil is not very susceptible to erosion. It needs only simple management. Suitable rotations that keep close-growing crops on the soil much of the time should be used. Row crops need to be planted on the contour. Lime and fertilizer should be applied as indicated by soil tests. Capability unit IIe–4.

Tirzah silt loam, eroded gently sloping phase (2 to 6 percent slopes) (TaB2).—This soil has a thinner surface soil than that of Tirzah silt loam, gently sloping phase, because much of the original surface soil has been washed away. It occurs in positions similar to those of the gently sloping phase. It has, however, poorer water relations and workability than the gently sloping phase and a lower content of organic matter. Included with this soil are small severely eroded spots that have a silty clay loam plow layer. These inclusions have had the subsoil mixed with the original surface layer through tillage.

Use and management.—Because this soil is susceptible to further erosion, crops should be planted on the contour. Close-growing and green-manure crops should be grown more of the time than row crops are grown. Lime and fertilizer should be applied as indicated by soil tests. Capability unit IIe–4.

Tirzah silt loam, sloping phase (6 to 10 percent slopes) (TaC).—This soil occurs on the more gentle slopes on the hilly uplands or on the steeper slopes on the smoother uplands. It is more rapid runoff than Tirzah silt loam, gently sloping phase, and is more susceptible to erosion. It is similar to the gently sloping phase in most profile characteristics, and in workability, water relations, content of organic matter, and response to lime and fertilizer.

Use and management.—Much of this soil is in a virgin forest consisting of various oaks, yellow-poplar, hickory, dogwood, and shortleaf pine. The understory is redcedar. Clearing and planting to small grain, pasture, hay, or corn probably would be profitable. Because it is more erodible than the gently sloping phase, this soil needs more careful management. Stripcropping should be used on the more gentle slopes, and terracing and stripcropping are needed on the steeper slopes. This soil should be limed and fertilized as indicated by soil tests. Capability unit IIIe–3.

Tirzah silt loam, eroded sloping phase (6 to 10 percent slopes) (TaC2).—This soil has a thinner surface soil than has Tirzah silt loam, sloping phase. The two soils, however, are similar in most other profile characteristics and occur on similar positions on slopes. Included with this mapping unit are small severely eroded spots that have had their subsoil mixed with the surface soil. These inclusions have a finer textured surface layer than the rest of the mapping unit.

Use and management.—Although it is moderately eroded, this soil is suited to about the same crops as the sloping phase and needs about the same management. Structure, especially that of the severely eroded spots, can be improved by growing green-manure crops in the rotation and by turning under crop residues. Tilth and water relations will thereby be improved. Capability unit IIIe–3.

Tirzah silt loam, strongly sloping phase (10 to 15 percent slopes) (TaD).—This soil generally occurs in the hilly part of the slate belt. It is similar to Tirzah silt loam, sloping phase, in most profile characteristics. Because it is steeper than the sloping phase, it is thinner, more susceptible to erosion, and droughtier.

Use and management.—Most of this soil is still in a forest made up of hardwoods and pines. Unless it is needed for permanent pasture or hay, it probably should be kept in forest. If it is necessary to use this soil for row crops, these crops should be grown in strips in long rotations that keep the areas in grass and legumes nearly all the time. Proper management includes liming and fertilizing as indicated by soil tests. Capability unit IVe–2.

Tirzah silt loam, eroded strongly sloping phase (10 to 15 percent slopes) (TaD2).—This soil has about the same positions on slopes as has Tirzah silt loam, strongly sloping phase, but, because it is moderately eroded, it has a thinner surface soil. In other profile characteristics it is similar to the sloping phase, but it has poorer water relations and is less easy to work. Because the subsoil has been mixed with the original surface soil through tillage, small included areas have a finer textured plow layer than the rest of this mapping unit.

Use and management.—This soil should be seeded to permanent pasture or hay meadow. A grass-legume mixture is suitable. Good stands can be obtained if the soil is limed and fertilized as indicated by soil tests. Row crops should be planted not more than once in 4 years and should be in strips. Capability unit IVe–2.

Tirzah silty clay loam, severely eroded gently sloping phase (2 to 6 percent slopes) (TbB3).—This soil has been eroded gradually, and the subsoil has been mixed with the surface layer through tillage. All the surface soil and about one-fourth of the subsoil have been washed away. A few areas are gullied, and the soil is susceptible to further erosion. The plow layer is finer textured and redder than that of Tirzah silt loam, eroded gently sloping phase, but this soil is similar to the silt loam in most other respects. Because the clayey subsoil is within plow depth, this soil is hard to till and water relations are poor.

Use and management.—Because it is droughty, this soil is better suited to small grain and pasture or hay than it is to row crops. Structure and, therefore, tilth and water relations can be improved by using rotations that include close-growing crops and by turning under crop residues. This soil should be limed and fertilized as indicated by soil tests. Capability unit IIIe–3.

Tirzah silty clay loam, severely eroded sloping phase (6 to 10 percent slopes) (TbC3).—This soil occurs on the hilly uplands in the slate section of the county. It is steeper and lies farther downslope than Tirzah silty clay loam, severely eroded gently sloping phase. Shallow gullies occur in places. This soil is similar to the severely eroded gently sloping phase in most profile characteristics. It has rather poor water relations and workability but responds fairly well to lime and fertilizer.

Use and management.—Most of this soil is cultivated. A few abandoned areas have reseeded naturally to Virginia pine. If row crops are to be grown, this soil should be stripcropped. Structure and, therefore, tilth and water relations can be improved by using rotations that provide green-manure crops and by turning under of crop residues. This soil should be limed and fertilized as indicated by soil tests. Capability unit IVe–2.

Tirzah silty clay loam, severely eroded strongly sloping phase (10 to 15 percent slopes) (TbD3).—This soil occurs on the hilly uplands. It is slightly gullied. It is similar to the other severely eroded phases of Tirzah silty clay loam in most profile characteristics. Because of the firm silty clay that occurs within plow depth, workability and water relations are poor.

Use and management.—If this soil is needed for cultivation, it should be planted to permanent sod crops or used in long rotations. Management should include the preparation of a good seedbed and liming and fertilizing as indicated by soil tests. Capability unit IVe–2.

Vance series

In this series are yellowish-red, well-drained, acid soils that have a firm subsoil that is plastic when wet. This subsoil is easy to recognize in road cuts by the cracks caused by drying and shrinking. Vance soils occur in the northeastern, north-central, and western sections of the county. They were derived from the weathered products of acid crystalline rocks such as gneiss, granite, and schist. The native vegetation consisted of various oaks, hickory, dogwood, sourwood, poplar, and shortleaf pine.

Vance soils are closely associated with the Appling, Durham, Cecil, and Helena soils. Their subsoil is firmer and more plastic than that of the Appling, Durham, and

Cecil soils and better developed than that of the Helena soils. Vance soils are similar to the Appling soils in color and, above the tough plastic subsoil, in other characteristics.

The Vance soils do not have a very large total acreage, but they are important to the agriculture of the county, especially for growing tobacco, corn, small grain, and pasture plants.

Vance sandy loam, gently sloping phase (2 to 6 percent slopes) (VcB).—This well-drained soil occurs on the top of slopes on the smooth uplands. It is described in detail in the subsection, Descriptions of Soil Profiles.

The surface soil is light olive-brown, friable sandy loam that has a weak, fine, crumb structure. The subsoil is mottled yellowish-brown, dark yellowish-brown, or red, firm sandy clay that is plastic when wet. It has a moderate, medium, angular blocky structure. In places, fine gravel occurs in the surface soil and upper subsoil. The subsoil has the same range in color as that of the Appling soils—from the yellow of the Durham soils to the red of the Cecil soils. Where this subsoil is firm, it is yellow. This soil is associated with the Helena and Wilkes soils.

Included in this mapping unit are a few small areas that are similar to the Cataula soils, which are not mapped in this county. Also included are areas of coarse sandy loam and spots of gravelly material. This soil is permeable in the surface soil and slowly permeable in the subsoil. It is medium to high in its capacity to hold available water and to store plant food.

Use and management.—Most of this soil is cultivated. It is well suited to corn, tobacco, pasture plants, and small grain. Because of the friable surface layer and the plastic subsoil, this soil is highly erodible. Management should provide rotations that keep close-growing crops on this soil much of the time. Lime and fertilizer should be applied as indicated by soil tests. Capability unit IIe/s–1.

Vance sandy loam, eroded gently sloping phase (2 to 6 percent slopes) (VcB2).—This soil is similar to Vance sandy loam, gently sloping phase, in most profile characteristics and in permeability, available water-holding capacity, and capacity to store plant food. It responds well to lime and fertilizer. Because it is eroded, it has a thinner surface layer than has the gently sloping phase.

Included in this mapping unit are small areas that are redder and finer textured than are areas of this soil. These spots have had the subsoil mixed with the original surface layer through tillage. Also included are a few severely eroded areas of Vance soil that have a clay loam texture. These spots have had the surface layer and one-fourth of the subsoil washed away, and they are slightly gullied.

Use and management.—This soil should be tilled on the contour and kept in close-growing crops most of the time. Lime and fertilizer need to be applied as indicated by soil tests. If organic matter is added, especially on the severely eroded spots, structure and, therefore, tilth and water relations will be improved. Capability unit IIe/s–1.

Vance sandy loam, eroded sloping phase (6 to 10 percent slopes) (VcC2).—This soil occurs on steeper slopes on the smooth uplands and farther downslope than does Vance sandy loam, eroded gently sloping phase. It is similar to the eroded gently sloping phase in most profile characteristics, and in permeability, available water-holding capacity, and fertility. It responds well to lime and fertilizer. This soil is associated with the Helena soils in fewer places than is the eroded gently sloping phase. In many places, however, it occurs on ridge crests surrounded by large areas of Helena soils. Included with this soil are small spots that are not eroded.

Use and management.—Some of this soil is still in a forest that consists of white, post, black, scarlet, and chestnut oaks, shortleaf pine, sweetgum, yellow-poplar, hickory, and dogwood. This soil can be cleared and planted to tobacco if it is managed well. Because it is susceptible to further erosion, it needs more careful management than does the eroded gently sloping phase. Rotations should be used that keep this soil in close-growing crops much of the time. The soil needs to be tilled on the contour and, on the more gentle slopes, terraced. Lime and fertilizer should be applied as indicated by soil tests. Capability unit IIIe/s–2.

Vance sandy loam, eroded strongly sloping phase (10 to 15 percent slopes) (VcD2).—This soil occurs on steeper parts of slopes than does Vance sandy loam, eroded sloping phase, and farther downslope. It is thinner and more droughty than the eroded sloping phase but is similar in most other profile characteristics.

Included with this soil are small uneroded areas of sandy loam and coarse sandy loam, small eroded areas of coarse sandy loam, and severely eroded areas of clay loam. Shallow gullies occur in some parts of the severely eroded inclusions.

Use and management.—Some of this soil is still in a forest that consists of trees common to the area. The cultivated areas should be seeded to permanent pasture or hay or other close-growing crops. Lime and fertilizer should be applied as indicated by soil tests. Capability unit IVe–3.

Vance coarse sandy loam, gently sloping phase (2 to 6 percent slopes) (VaB).—This soil is near the top of slopes on the smooth uplands. It is similar to Vance sandy loam, gently sloping phase, in most profile characteristics, but it has larger particles of sand in the surface layer. The particles range from fine sand to fine gravel but are mostly medium and coarse sand. A small amount of large particles occurs in the subsoil.

Because the surface soil is friable and quite permeable and the subsoil is heavy and plastic, this soil is highly susceptible to erosion. It is moderate to high in its capacity to hold available water and to store plant food. It is normally associated with the coarse sandy loams of the Appling, Durham, and Helena series.

Use and management.—Most of this soil is cultivated. It is well suited to tobacco, corn, and soybeans. Because of its droughty surface layer, it is less well suited to pasture and small grain than is Vance sandy loam, gently sloping phase. Erosion can be lessened by using suitable crop rotations, tilling on the contour, and liming and fertilizing as indicated by soil tests. Capability unit IIe/s–1.

Vance coarse sandy loam, eroded gently sloping phase (2 to 6 percent slopes) (VaB2).—This soil is similar to Vance coarse sandy loam, gently sloping phase, in most profile characteristics and in permeability, available water-holding capacity, suitability for crops, and response to lime and fertilizer. Because of erosion, it has a thinner surface soil than the gently sloping phase.

Included with this soil are small severely eroded spots that have a redder, finer textured plow layer than that of the rest of the mapping unit. In these spots the subsoil has been mixed with the original surface layer through tillage.

Use and management.—Because this soil is susceptible to further erosion, crops should be planted on the contour. Close-growing crops should be grown on the soil more of the time than row crops are grown. Additions of organic matter will improve the structure of the soil, especially on the severely eroded spots, and thereby improve tilth and water relations. Lime and fertilizer should be applied as indicated by soil tests. Capability unit IIe/s–1.

Vance coarse sandy loam, eroded sloping phase (6 to 10 percent slopes) (VaC2).—This soil occurs on steeper slopes than does Vance coarse sandy loam, eroded gently sloping phase, and farther downslope. It is similar to the eroded gently sloping phase in most profile characteristics, and in permeability and available water-holding capacity. Included with this soil are small areas that are not eroded.

Use and management.—This soil is fairly well suited to small grain, bright tobacco, pasture plants, and lespedeza. Row crops should be grown in rotations that keep the soil in close-growing crops much of the time. The more gentle slopes need to be terraced and the soil limed and fertilized as indicated by soil tests. Organic matter from crop residues, barnyard manure, or green-manure crops should be added to the severely eroded spots. These additions will improve the structure of the soil and, therefore, the tilth and water relations. Capability unit IIIe/s–2.

Vance clay loam, severely eroded sloping phase (6 to 10 percent slopes) (VbC3).—This soil has a finer textured plow layer than have the other soils in the Vance series because, as the soil was gradually eroded, the subsoil was mixed with the original surface soil through tillage. The soil occurs on long, steep slopes and is slightly gullied in some places. Because it is susceptible to further erosion, it needs to be stripcropped. Rotations should be used that keep this soil in close-growing crops and sod crops more of the time than it is kept in row crops. Lime and fertilizer should be applied as indicated by soil tests. Capability unit IVe–3.

Wehadkee series

This series consists of light-gray to dark grayish-brown, poorly drained, acid, loamy soils. These soils are on the first bottoms near the upland soils or in depressions on level flood plains. They developed from sediments washed from the Cecil, Appling, Davidson, Lloyd, and Georgeville soils. The native vegetation was sweetgum, blackgum, water oak, ash, poplar, hickory, beech, elm, and alder.

Wehadkee soils are associated with the Congaree and Chewacla soils and are poorly drained members of the catena that includes these soils. They are also associated with the Buncombe soils, which are coarser textured than the Wehadkee soils and better drained.

Only one Wehadkee soil is mapped in this county. This soil is widely distributed but does not have a large total area. It is moderately important to the agriculture of the county, particularly for pasture.

Wehadkee fine sandy loam (0 to 2 percent slopes) (Wa).—This poorly drained soil is normally farther from streams than the other first-bottom soils with which it is associated. It is described in detail in the subsection, Descriptions of Soil Profiles.

The surface soil is mottled dark grayish-brown to dark-gray, friable fine sandy loam that has a weak, medium, crumb structure. The subsoil is mottled dark-gray, gray, or yellowish-brown layered material that ranges from fine sandy loam to silty clay or clay. The surface layer, normally mottled, ranges, in some places, from light gray to gray or yellowish brown. Included with this soil are small areas of loam and silt loam.

This soil is likely to be flooded about once every 3 years. It has a medium content of organic matter and responds well to lime and fertilizer. The reaction is medium acid to strongly acid.

Use and management.—Some of this soil is in forest consisting of sweetgum, yellow-poplar, swamp chestnut, water and willow oaks, hickory, elm, blackgum, sycamore, and loblolly pine. Its best use is probably for permanent pasture, but it can also be used for crops. It needs to be artificially drained if it is used for crops or pasture. Many areas of this soil are in corn and small grain. Large additions of lime are needed to insure good stands and yields. Capability unit IVw–1.

Wilkes series

In this series are gray or yellowish-gray, excessively drained, medium to strongly acid, shallow soils that occupy the steepest slopes or stream breaks on the hilly uplands. These soils occur mostly in the central, eastern, and northern parts of the county. They were derived from a mixture of weathered felsic and mafic crystalline rock. They normally occur on binary or aplitic granite that is cut by dikes rich in iron and magnesium. In some areas a distinct profile has formed, but in other places the parent rock crops out. The native vegetation was blackjack and post oaks, shortleaf pine, and cedar.

These soils are associated with Cecil, Helena, Iredell, Enon, Appling, and Vance soils. Wilkes soils were formed from parent material similar to that of the Helena soils, but their B horizon, if present, differs from that of the Helena soils in depth and development.

The Wilkes soils have a fairly large total acreage. Because they are shallow, however, they are not very important to the agriculture of the county except for growing tobacco on the more gentle slopes.

Wilkes soils, gently sloping phases (2 to 6 percent slopes) (WbB).—These soils normally occur on or near the top of the smooth uplands that borders stream breaks. The surface layer is generally a thin layer of friable sandy loam that is mixed with gravel in some places. It has a fine, crumb structure. If a B horizon has formed, it is mottled yellowish-brown and light-gray friable sandy clay or sandy clay loam with little structural development.

In some areas no B horizon has formed, but in other areas there is a shallow B or BC horizon. The subsoil varies in texture, depth, color, and consistence. Included with these soils are small eroded areas and small spots of Helena, Vance, Enon, Iredell, and Mecklenburg soils.

These soils warm early in spring, and areas that have no stones are easy to till. They are erodible, however, and have low available water-holding capacity, but they respond well to lime and fertilizer. Plant nutrients are leached rapidly in the more strongly sloping areas.

Use and management.—Most of this soil is still in virgin forest. Because the soil is thin and highly erodible, only small areas are cultivated. Areas that have a thick well-weathered C horizon can grow tobacco and small grain. However, it is not economical to clear this soil for any other use than growing tobacco. Erosion on the more gentle slopes can be controlled by simple management. Capability unit IIIe–4.

Wilkes soils, sloping phases (6 to 10 percent slopes) (WbC).—These soils are similar to Wilkes soils, gently sloping phases, in most profile characteristics. They occur, however, on steeper slopes and farther downslope than the gently sloping phases and are, therefore, more susceptible to erosion. A profile that has a sandy loam surface soil is described in detail in the subsection, Descriptions of Soil Profiles. Included with these soils are small spots of Mecklenburg soils. Most of this mapping unit is still in a forest that consists of shortleaf pine, white, black, post, scarlet, and chestnut oaks, hickory, yellow-poplar, and dogwood. These soils are suited to cultivation if strip rotations are used with grasses and legumes. Capability unit IVe–3.

Wilkes soils, eroded sloping phases (6 to 10 percent slopes) (WbC2).—These soils are similar to Wilkes soils, sloping phases, in most profile characteristics. Because of erosion, however, they have a thinner surface soil. They occur in about the same kind of position on slopes as the sloping phases. Suggested management includes strip rotations and liming and fertilizing as indicated by soil tests and seeding to a grass-legume mixture. Capability unit IVe–3.

Wilkes soils, strongly sloping phases (10 to 15 percent slopes) (WbD).—These soils occur on steeper slopes than Wilkes soils, sloping phases. In many places they are on stream breaks. They are more erodible than the sloping phases and have more outcrops of rock. Small areas of Mecklenburg soils are included in the mapping unit. Most of the acreage is in forest. Fair stands of trees common to the area can be grown. If these soils are used for crops, use strip rotations and perennial grasses and legumes. Capability unit IVe–3.

Wilkes soils, eroded strongly sloping phases (10 to 15 percent slopes) (WbD2).—These soils have a thinner surface soil than has Wilkes soils, strongly sloping phases, because from one-fourth to three-fourths of the plow layer has been lost through erosion. They are similar to the strongly sloping phases in other profile characteristics and occur in similar positions on slopes. Included with this mapping unit are some severely eroded areas that have lost all of their surface layer and are slightly gullied. Small spots of Mecklenburg soils are also included. Wilkes soils, eroded strongly sloping phases, require very careful management if they are cultivated. Plant the crops in narrow strips and use grass-based rotations. Capability unit IVe–3.

Wilkes soils, moderately steep phases (15 to 25 percent slopes) (WbE).—These soils differ from Wilkes soils, strongly sloping phases, in that they occur on the steepest parts of slopes or stream breaks. In some places the mapping unit is eroded, and in other places it is severely eroded. Small areas of Enon soils and Mecklenburg soils are included. Most of the acreage is in forest and should not be cleared for cultivation. Capability unit VIe–1.

Wilkes stony soils, strongly sloping phases (10 to 15 percent slopes) (WcD).—These soils occur on steeper stream breaks than do the Wilkes soils that are dominantly sandy loam in texture. The mapping unit consists mostly of outcrops of parent rock, or it is very shallow and has stones on the surface and in the profile. Included are small strongly sloping areas and small areas of phases of Wilkes soils. These soils are mostly in a forest that consists of poor stands of white, black, post, and southern red oaks, hickory, yellow-poplar, dogwood, and shortleaf pine. They are not suited to any kind of agriculture. Capability unit VIIe–1.

Wilkes stony soils, moderately steep phases (15 to 25 percent slopes) (WcE).—These soils are similar to Wilkes stony soils, strongly sloping phases, in profile characteristics, but they occur on steeper slopes. Because they have little profile development, they are more erodible than the strongly sloping phase. Included in this mapping unit are some steep areas. Most of the acreage is in a forest that consists of trees similar to those on the sloping phase. Capability unit VIIe–1.

Worsham series

This series consists of light-gray and dark-gray, poorly drained, strongly acid soils. These soils occur in small areas throughout the county in low, wet depressions or in small, wet local alluvial drainways. Their parent material is colluvium and local alluvium mixed with the residuum of the underlying granite, gneiss, schist, slate, and other rock. The native vegetation was sweetgum, blackgum, tulip-tree, maple, birch, various oaks, and loblolly and shortleaf pines.

Worsham soils are associated with the Alamance, Appling, Cecil, Durham, Helena, and Herndon soils. They are more poorly drained than the Colfax soils and are lighter colored in the subsoil. These soils are widely distributed, but their total acreage is small. They are not very important to agriculture.

Worsham sandy loam (2 to 6 percent slopes) (Wd).—This poorly drained soil occurs on foot slopes and saddles in low, wet depressions. It is described in detail in the subsection, Descriptions of Soil Profiles.

The surface layer is dark-gray, friable sandy loam. The subsoil is mottled gray, yellow, and brown, firm sandy clay loam to sandy clay. In many places the subsoil is firmer in the lower residual part than it is in the upper part. Some areas have very little horizon development. The local alluvial material varies in depth from 10 inches to more than 30 inches. In many places, a buried residual subsoil occurs at various depths below the alluvial material. Materials that are washed in from adjoining soils range in color from almost white to brownish yellow and in texture from loamy sand to a sandy clay or, more commonly, sandy loam.

Included with this soil are small areas of Warne fine sandy loam. This inclusion is not mapped in this county. It occurs on low stream terraces and is somewhat poorly drained. It has a claypanlike subsoil.

Use and management.—Much of this soil is in forest of beech, river birch, red maple, yellow-poplar, sweetgum, and red and white oaks. Because it contains a medium amount of organic matter and responds fairly well to lime and fertilizer, this soil is well suited to pasture and some crops if it is artificially drained and otherwise managed well. Capability unit IVw–2.

Worsham silt loam (2 to 6 percent slopes) (We).—This strongly acid soil occurs in the slate section in the southeastern and eastern parts of the county. It is similar to Worsham sandy loam in color and in most other profile characteristics. It occurs in the same kind of position as Worsham sandy loam, but it is developing from local alluvial material that was washed from volcanic slate instead of granite, gneiss, and schist. Because it is less permeable than the sandy loam, this soil stays wetter longer. It contains a medium amount of organic matter and responds well to lime and fertilizer.

Use and management.—Much of this soil has good stands of hardwood trees similar to those growing on the sandy loam. Except for producing timber, this soil probably is best used for permanent pasture but may be used for some crops. It needs artificial drainage, large applications of lime, and proper fertilization. Capability unit IVw–2.

Genesis, Classification, and Morphology

Soils are the natural media for the growth of plants. They are mixtures of fragmented and partly or wholly weathered rocks and minerals, organic matter, water, and air that occur in greatly varying proportions. Soils have more or less distinct layers, or horizons, that developed under the effect of the five factors of soil formation. The degree of profile development depends on the intensity of the effect of these factors, which are (1) parent material, (2) climate, (3) plants and animals, (4) relief, and (5) time.

Formation of Soils in Alamance County

In this county, as elsewhere, each of the five factors of soil formation affected the development of soils in different ways and in different degrees of intensity. In the following pages the effect of each of these factors is discussed.

Parent material and parent rock

The differences among most soils formed in Alamance County are more the result of differences in parent material than they are the result of differences in the other factors of soil formation. Partly because of the limited area, the other factors are more constant than parent material.

The soils of the county can be grouped in two broad classes: (1) residual soils, or those formed in place; and (2) alluvial soils, or those formed from material that has been transported by water and gravity.

The residual parent material consists of weathered igneous and metamorphic rocks. The felsic igneous rocks include sheared granite, quartz-mica-feldspar gneiss, and schist that contains a considerable amount of quartz, muscovite, and some biotite and chlorite. These rocks are the parent rock of the Durham, Appling, Cecil, Colfax, and other of the more friable, coarser textured soils in the county. The mafic igneous rocks include diorite, gabbro, and basalt. They are the parent rock of the Davidson, Iredell, Mecklenburg, and other of the more plastic, finer textured soils.

Some of the soils of this county have formed on mixed mafic and felsic rocks. The most extensive of these mixtures is the greenstone schist. This fine-grained, olive-green schist consists of greenish hornblende, quartzite, and epidotic plagioclase with some chlorite. The Lloyd and Enon soils have formed from greenstone schist. Although these soils have some characteristics of soils formed on felsic rocks, they more nearly resemble soils formed on the mafic rocks.

The Helena and Wilkes soils were also formed on a mixture of mafic and felsic rocks. This mixture consists of sheared granite and basic dikes of diorite and gabbro that have been intruded in the granite. These dikes range in width from a few inches to several feet. The granite rocks also contain large amounts of sodium feldspar.

Many of the soils in this county have some characteristics that come from fine-grained metamorphic rocks of volcanic origin that are commonly called Carolina slates. Some of these slates are sedimentary in origin, but none of these occur in Alamance County. In this county the soils that formed on Carolina slates have a friable silt loam surface soil and a smooth silty clay subsoil. They are in the Alamance, Orange, Herndon, Georgeville, Tirzah, Efland, and Goldston series. Some andesite has been found in the metamorphosed tuffs and breccias underlying the Efland, Tirzah, and Orange soils. These soils have characteristics somewhat similar to those of soils developed on mafic igneous rock.

Similar parent material may underlie soils that differ greatly from each other. The differences are the result of some factor or factors of soil formation other than parent material. For example, the Iredell and Davidson soils have developed from the same kind of parent material, but the Iredell soils are Planosols and the Davidson are Reddish-Brown Lateritic soils. Differences in relief were probably the major factor affecting the formation of these soils.

Normally, the characteristics of the alluvial and local alluvial soils are closely related to the soil or rock material from which their parent material was transported. This relationship is true for the Congaree, Buncombe, Wehadkee, Chewacla, and Starr soils. Position, water table, and other factors may also contribute to the soil-forming process. The effects of these factors are indicated in differences among alluvial soils that are known to be developing from materials that were transported from the same kind of parent material.

Climate

The climate of Alamance County is continental. It is relatively uniform and has had little effect in causing differences among the soils. The range in elevation is only a few hundred feet, and the area is not affected by the mountains or ocean. The moderately humid, warm-temperate climate favors chemical reactions and the leaching of soluble materials downward in the soil. Eluviation and illuviation, therefore, are pronounced in most of the soils of this area. Winter is fairly mild with abundant rainfall, and summer is quite warm. Precipitation in summer usually occurs as thundershowers that cover small areas in various parts of the county.

Plant and animal life

Both plants and animals in or on the soil modify the formation of soils to some extent. The kinds of organisms that exist are determined by the climate, parent material, relief, and age of the soil. The micro-organisms in the soil vary with acidity, food supply, and other environmental changes. Generally, bacteria and actinomyces are more active at intermediate or high pH values; fungi flourish at all lower levels of acidity that occur in the soils of the region. Anaerobic bacteria are more active than aerobic bacteria in waterlogged soils or soils that contain little oxygen. Like plants, the micro-organisms in the soil generally function better under ideal conditions of moisture and temperature. Except for autotrophic organisms, a certain amount of organic matter is essential to the growth of bacteria in soil.

Practically all of the soils of the county have formed under a deciduous forest that was mixed with a few Virginia and shortleaf pines. The principal native trees are white, black, southern red, post, and chestnut oaks, hickory, yellow-poplar, and Virginia and shortleaf pines. The understory is cedar and dogwood. The leaves of the deciduous trees generally return a larger amount of bases and phosphorus to the soil than do those of coniferous trees. In this region, however, the replacement of these nutrients in the upper part of the soil and the accumulation of organic matter do not keep pace with leaching. As a result, most of the soils are acid and show pronounced eluviation and illuviation.

Under the native forests of temperate regions, not enough bases are brought to the surface by plants to keep the soil from becoming acid. Where the soil is acid, fungi are important in the decomposition of the organic matter. The products of organic matter decomposed by fungi are relatively more soluble than those decomposed by bacteria. Not nearly so much humus, or partly decomposed and relatively stable organic matter, accumulates in the soils under the forest of the county as accumulates in soils under grass. Few legumes are found in the forest of the county.

Earthworms and burrowing animals increase aeration and percolation of water through the soil, thereby modifying the soil-forming processes.

Relief

Relief is important in soil formation because it may affect the depth of soil, the intake of water, and the drainage. The lithosolic condition of the Wilkes and Goldston soils that occupy the steeper slopes in the county is largely the result of the rapid rate of erosion. Because erosion has kept pace with weathering and soil formation, these soils have developed only thin B horizons, or no B horizon. The effect of relief on the steeper slopes is reflected in the thinness of the solum.

The percolation of water through the profile is important in soil development because it aids chemical reaction and causes leaching. Runoff generally is so great on the steeper slopes that little water percolates through the profile. Relief indirectly modifies the role of organisms in the formation of soils because it affects moisture conditions in the soil. Moisture is necessary for the maximum activity of organisms. The Low-Humic Gley soils formed under poor drainage. The drainage may be affected by a high water table, which is usually related to nearly level relief.

Age

The soils of the county range from young to old, but most of them are old. Soils are considered old if they have been in place long enough for distinct horizons to develop. Most of the Red-Yellow Podzolic soils are considered old.

The young soils of the county are the Lithosols and the Alluvial soils. The Lithosols occupy steep slopes. Their soil material is constantly removed by erosion and never remains in place long enough for distinct horizons to develop. The Alluvial soils are forming from material transported from the surrounding uplands and are constantly acquiring new deposits by the action of water and gravity.

Classification of Soils

Because of the great number of soils that differ from each other in varying degrees, soils are grouped so that they can be more easily studied (*13*). Each category is given a name so that the characteristics of the soils placed in the category can be more easily remembered. The category into which a soil is placed is determined by the genesis, or how the soil was formed, and morphology, or profile characteristics. As in other scientific classifications, soils that have been grouped into higher categories have fewer characteristics in common than those in the lower categories.

The three lowest categories—series, types, and phases—are explained in the section, Soil Survey Methods and Definitions. The series are placed in great soil groups, which are broad groups of soils that have fundamental characteristics in common. The great soil groups of Alamance County are described in the subsection, Morphology of Soils by Great Soil Groups.

The classification of the soil series and great soil groups is based on characteristics that can be observed in the field. It follows the system described in the 1938 Yearbook, Soils and Men (*14*), and in a paper by Thorp and Smith in Soil Science, February 1949 (*10*). As more experimental data from the laboratory and field become available, a revision of the system of classification may be needed.

Although every soil series is placed in a great soil group, the characteristics of the soils of the series may not exactly conform to those of the great soil group. The soils of a series may have some characteristics of another great soil group. In the following list each soil series of the county is placed in its great soil group, and the series that grade toward another great soil group are so designated. Since the miscellaneous land types are not classed as series, they are not included in the list.

Red-Yellow Podzolic soils
- Alamance
- Appling
- Cecil

Durham
Enon (grades toward Planosols)
Georgeville
Herndon
Lloyd (grades toward Reddish-Brown Lateritic soils)
Tirzah (grades toward Reddish-Brown Lateritic soils)
Vance (grades toward Planosols)

Reddish-Brown Lateritic soils
Davidson
Efland (grades toward Planosols)
Mecklenburg (grades toward Planosols)

Planosols
Colfax (grades toward Red-Yellow Podzolic soils)
Helena
Iredell
Orange

Low-Humic Gley soils
Worsham

Lithosols
Goldston (grades toward Red-Yellow Podzolic soils)
Wilkes (grades toward Red-Yellow Podzolic soils)

Alluvial soils
Buncombe
Chewacla
Congaree
Starr (grades toward Red-Yellow Podzolic soils)
Wehadkee

Morphology of Soils by Great Soil Groups

Alamance County is part of the central portion of the Southern Piedmont Plateau—a general area of Red-Yellow Podzolic soils. Small areas of Planosols and Lithosols also occur in nearly every section of the county. The Planosols normally occur on slopes of 0 to 6 percent, most areas being on slopes of less than 4 percent. The Lithosols normally occupy slopes of 15 percent or more. The slopes of most of the county are between 2 and 10 percent. Slopes less than 4 percent and slopes greater than 10 percent are unusual.

In the following pages, the great soil groups of the county are described, and the soil series that make up these groups are discussed. A profile of a soil in each series is described in the subsection, Descriptions of Soil Profiles.

Red-Yellow Podzolic soils

Red-Yellow Podzolic soils are a group of well-developed, well-drained, acid soils that have a thin organic (A_0) horizon, an organic-mineral (A_1) horizon, a light-colored bleached (A_2) horizon, and a red to yellowish-red or yellow clayey (B) horizon. The parent material of these soils is more or less siliceous. The deep horizons that overlie thick parent material have coarse reticulate streaks or mottles of red, yellow, brown, and light gray (*10*).

Red-Yellow Podzolic soils have developed in a warm-temperate, moist climate under a deciduous forest that includes a few conifers. In cultivated areas the A horizons are mixed and form the A_p horizon, or plow layer. In some places erosion has been so severe that the B horizon is exposed. In these places the heavy subsoil becomes the plow layer, and another soil type is formed. The clay fraction is dominated by kaolinite, and in most places it contains vermiculite and varying amounts of gibbsite. In any specific parent material, the reticulate streaks generally occur higher in the profiles that have a yellow B horizon than in those that have red B horizons.

The Red-Yellow Podzolic soils of Alamance County are in the Alamance, Appling, Cecil, Durham, Enon, Georgeville, Herndon, Lloyd, Tirzah, and Vance series. The Alamance soils are yellow members of the Red-Yellow Podzolic great soil group. They have formed on fine-grained volcanic rocks that are commonly called Carolina slates. The A horizon is light olive-gray friable silt loam that has a weak, medium, crumb structure. The B horizon is brownish-yellow friable silty clay loam that has a moderate, medium, subangular structure.

The Herndon soils differ from the Alamance soils in having a redder, more strongly developed B horizon. Herndon soils have a dark-brown, friable silt loam A horizon with weak, fine, granular structure, and a yellowish-red firm silty clay B horizon with a moderate, medium to strong, subangular blocky structure. The Georgeville soils are the reddest, most strongly developed soils of this group. These soils have a yellowish-brown, friable silt loam A horizon with weak, fine, granular structure. The B horizon is a red firm silty clay. It has a strong, medium, subangular blocky structure.

The Durham soils are yellow members of this great soil group. They have developed on felsic rocks of granite, gneiss, or schist and are more friable and coarser textured than the Alamance soils. The Durham soils have a dark-gray very friable coarse sandy loam or sandy loam A horizon that has weak, medium, crumb structure. The B horizon is sandy clay loam with a moderate, medium to fine, subangular blocky structure.

The Appling soils differ from the Durham soils in having a redder, more strongly developed B horizon. Appling soils have a grayish-brown friable sandy loam A horizon that has a weak, fine, crumb structure. The friable, sandy B horizon is mottled red, yellowish red, and strong brown and has a moderate, fine, subangular blocky structure.

The Cecil soils are the reddest, most strongly developed Red-Yellow Podzolic soils in the county. Under a thin plant residue, they have a yellowish-brown, friable, loamy surface soil. The B horizon is red, friable sandy clay loam in the upper part and red, firm clay in the lower part.

The Vance soils are similar to the Appling soils in color but have a tougher, more plastic clay B horizon. This horizon is more uniform, redder and better developed than the B horizon of the Helena soils. Vance soils developed on felsic rocks that include granite, gneiss, and schist. Field observation, however, indicates that their development may have been influenced by basic material, and that the tough, plastic clay B horizon may be the result of sodium feldspar in the parent material. The Vance soils have a light olive-brown, friable sandy loam A horizon with weak, fine, crumb structure. The B horizon is mottled yellowish-brown, red, and yellowish-red, firm clay that has a moderate, medium, angular blocky structure.

The Red-Yellow Podzolic soils of this area clearly indicate that some modifying influence of laterization has been at work. These soils have originated under a mild climate, abundant rainfall, and mixed forest that is markedly deciduous in many places. As a result, the podzolic influences may have been significant in soil development. Although leaching is quite evident in the A horizons, the drainage water is not very high in organic acids. The movement of iron to lower depths has been checked by the oxidation of the iron, and striking colors have developed.

The Lloyd and Tirzah soils show such a modifying influence of laterization that they could be classified as Red-Yellow Podzolic–Reddish-Brown Lateritic soils. These soils are intergrades that grade toward the Reddish-Brown Lateritic soils. The Tirzah soils developed on the fine-grained volcanic Carolina slates. Field observations indicate that the parent material is a mixture of felsic and mafic volcanic rocks. The Tirzah soils differ from the Georgeville soils in having a browner A horizon and a darker red B horizon. They are intermediate in color between the Georgeville and Davidson soils. Their parent material was entirely volcanic slates, but the Davidson soils were derived from mafic igneous rocks. The A horizon of the Tirzah soils is dark reddish-brown, friable silt loam that has a weak, fine, granular structure. The B horizon is dark-red, friable to firm silty clay that has a strong, medium, subangular blocky structure.

The Lloyd soils developed on mixed felsic and mafic igneous rocks. They resemble the Tirzah soils in color but are more sandy and friable throughout the profile. They are intermediate in color between the Cecil and Davidson soils.

The Enon soils formed on mixed felsic and mafic rocks. These soils have some of the characteristics of Planosols. They are somewhat similar to the Mecklenburg soils, but they are not so well developed and have a lighter colored A horizon and a browner, more uniform, and less plastic B horizon. They differ from the Helena soils in having a darker, less sandy A horizon and a brown, more uniform, and less plastic B horizon. In color the Enon soils are similar to Iredell soils, but they lack the sticky, very plastic B horizon. The A horizon is light olive-brown friable loam that has a weak, medium, granular structure. The B horizon is yellowish-brown clay that has a moderate, medium, angular blocky structure.

Reddish-Brown Lateritic soils

The Reddish-Brown Lateritic soils in this county have features that reflect both laterization and podzolization. These soils differ from the Red-Yellow Podzolic soils in color, structure, pH, kinds and sequence of horizons, and thickness of the solum. The Reddish-Brown Lateric soils of Alamance County are in the Davidson, Efland, and Mecklenburg series. These soils are dark red to reddish brown and have a granular structure; their pH is higher in the A horizons and decreases with increasing depth. The Red-Yellow Podzolic soils are more acid in the A horizon and less acid in the B horizon; also, they have a fairly prominent A_2 horizon which is not evident in the Reddish-Brown Lateritic soils (*9*). The Reddish-Brown Lateritic soils have a thicker solum.

The Davidson soils formed on mafic igneous rocks that consisted of diorite, gabbro, and basalt. Mineralogically the Davidson profile shows almost complete loss of ferromagnesian feldspar minerals, the alteration products being dominantly kaolinite and halloysite. Primary and secondary iron oxide minerals accumulate with maximum concentration in the B_2 horizon. The alteration of biotite through successive stages to kaolinite is suggested as the mechanism of clay synthesis from biotite (*9*).

The redistribution of clay and iron oxide to a textural B horizon appears to be the result of an acid type of soil formation that is caused by the accelerated loss of bases. No morphological A_2 horizon is evident in the field, but detailed laboratory analyses indicate the presence of a weakly developed A_2 horizon. This weak development can be postulated on the basis of eluviation of the silicate clay and free iron oxide from the A_1 horizon.

The Mecklenburg and Efland soils are Reddish-Brown Lateritic soils that grade toward Planosols. They have many characteristics of the Reddish-Brown Lateritic soils, but their heavy plastic clay B_{2t} horizon is common to the Planosols.

The Efland soils developed from fine-grained volcanic Carolina slates. The A horizon is dark yellowish-brown friable silt loam or very fine sandy loam that has a weak, fine, granular structure. The B horizon is mottled yellowish-brown, yellowish-red, and strong-brown, firm clay with strong, angular blocky structure.

The Mecklenburg soils formed on diorite, gabbro, basalt, and other mafic igneous rocks—the same kind of parent material as have the Davidson soils. Under a thin layer of plant residue, their surface soil is dark-brown to reddish-brown friable loam with weak, fine, granular structure. Their B horizon is yellowish-red to strong-brown, firm clay.

Planosols

The formation of Planosols has been influenced by some local factor. These soils have an eluviated surface horizon underlain by a B horizon that is more strongly illuviated, cemented, or compacted than the B horizon of their associated normal soils. They developed on nearly flat uplands under grass or forest in a humid or subhumid climate. They are distinguished by a well-defined layer of clay or cemented material that occurs at various depths (*14*). The Planosols in Alamance County are the Colfax, Helena, Orange, and Iredell soils.

The Colfax soils formed on granite, gneiss, schist, and other felsic igneous rocks or on fine-textured volcanic slates. These soils may occupy saddlelike positions between slopes and have colluvial deposits over the normal A horizon. The A horizon is dark-gray to gray, very friable sandy loam with a weak, medium, crumb structure. The B horizon is mottled gray, red, and yellowish-brown firm clay that is plastic when wet. It has a moderate, medium, angular blocky structure. These soils are somewhat poorly drained.

The Helena soils formed from a mixture of felsic and mafic rocks. The dominant rock is granite that contains large quantities of sodium feldspar. The feldspar has been intruded by dikes of mafic rock. From these parent rocks a soil has formed that is less homogeneous than most soils in the area.

The Iredell soils developed from diorite, gabbro, basalt, and other ferromagnesian rocks. The Iredell series is one of the better examples of Planosols in this area.

The Orange soils formed on fine-grained volcanic Carolina slates. They resemble the Iredell soils, which formed on mafic igneous rocks. Orange soils have a dark grayish-brown friable silt loam A horizon with moderate medium granular structure, and a yellowish-brown very firm plastic clay B horizon with angular blocky to massive structure.

Low-Humic Gley soils

The development of Low-Humic Gley soils has been influenced by relief, lack of drainage, and a high water table. The soils of this group are somewhat poorly drained to poorly drained. They have a very thin surface horizon that is moderately high in organic matter. The surface horizon overlies mottled gray and brown gleylike horizons that have a low degree of textural differentiation. Low-Humic Gley soils range in texture from sand to clay. Their parent materials vary widely in physical and chemical properties. These soils occur largely under a native cover of swamp forest; perhaps marsh plants occur in some areas. Many of these soils range from medium acid to strongly acid (*10*).

The Worsham soils are the only Low-Humic Gley soils in Alamance County. They developed from a mixture of colluvial and local alluvial sediments that were deposited on residual material. These soils are more poorly drained than the Colfax soils. They have an A horizon of gray to dark-gray, friable sandy loam to loamy sand, and the B horizon is gray, firm sandy clay, mottled with yellow. Below the A_1 horizon, which has a weak, fine, crumb structure, these soils are massive.

Lithosols

Lithosols are sometimes called skeletal soils. They have no clearly expressed soil development and consist of freshly and imperfectly weathered rock fragments. These soils occur mostly on steep slopes. Here little soil has developed, either because erosion has kept pace with the weathering of rock or because the weathered rock has slipped down the steep slopes (*14*).

The Wilkes and Goldston soils are the Lithosols mapped in this county. The parent materials of the Wilkes soils weathered from granites that have been intruded by basic crystalline rock dikes. The parent rock is similar to that of the Helena soils. The Wilkes soils often lack a B horizon, which, if present, is poorly developed.

The parent rock of the Goldston soils is fine-grained, volcanic Carolina slates. These soils either have no B horizon or one that is indistinct and poorly developed. Goldston soils have a grayish-brown, friable silt loam A horizon with weak, medium, crumb structure, and a C horizon of partly decomposed slate of various colors, gray predominating.

Alluvial soils

Alluvial soils have developed from alluvium that has been recently transported and deposited. This alluvium has had little or no modification by soil-forming processes. The characteristics of these soils are determined largely by the nature of the materials from which they are derived and the manner in which these materials have been sorted and deposited (*14*).

Many of the Alluvial soils in Alamance County are from acid, fine- to medium-textured alluvium that is more or less sorted. The alluvium has been transported from the upland residual soils that are underlain by mafic and felsic metamorphic or igneous rocks. Most of the sediments in the southern part of the county are from the fine-grained volcanic slates and are normally silt loams in texture. The native vegetation is bottomland hardwoods with a scattering of loblolly pine.

In this county the Alluvial soils of the Buncombe, Congaree, Chewacla, and Wehadkee series are on waterlain material. Those of the Starr series are on colluvial material.

The Buncombe soils occur on well-drained recent levees near streams. They have little or no profile development. The A horizon is dark-brown, loose loamy fine sand that has a weak, fine, crumb structure; no B horizon has developed. The C horizon is dark grayish-brown, loose fine sand. This soil is an accumulation of coarse deposits of alluvium.

The Congaree soils are well to moderately well drained soils on first bottoms that formed from alluvial sediments of metamorphic and igneous origin. These soils have a dark-brown, friable fine sandy loam A horizon of weak, medium, crumb structure. The C horizon is more or less stratified. It is mottled dark brown and grayish brown and has little or no structural development.

The Chewacla soils are similar to the Congaree soils, but they occur in more nearly level areas on the flood plains and are not so well drained.

The Wehadkee soils are developing from alluvial deposits along large streams. They occur in low areas on broad, nearly level flood plains. These soils are more poorly drained than the Chewacla soils, which are developing from the same kind of parent material.

The Starr soils are developing from colluvium and local alluvium that sloughed, rolled, or was washed from the Cecil, Lloyd, Davidson, Georgeville, Tirzah, or any of the red or brown, finer textured soils of the county. They have a dark-brown A horizon that has a weak, fine, and medium granular structure. In many places a buried residual B horizon occurs at various depths below the alluvial material. The B horizon is yellowish-red and red, firm clay that is mottled with strong brown in the lower part.

Miscellaneous Land Types

The miscellaneous land types of this county that formed from alluvium are Mixed alluvial land, poorly drained; Mixed alluvial land, well drained; Local alluvial land, poorly drained; and Local alluvial land, well drained. The Mixed alluvial land, poorly drained, and Mixed alluvial land, well drained, occur on first bottoms and are so highly stratified with material of various textures, color, and other characteristics that it is impossible to detect any common profile characteristics. The Mixed alluvial land, poorly drained, occupies the nearly level areas where the water table is normally higher than that of the Mixed alluvial land, well drained. This land includes small spots of Wehadkee and Chewacla soils. The Mixed alluvial land, well drained, occupies positions similar to those of the Congaree and Buncombe soils. It includes areas of these soils that are too small to delineate on a map of the scale used.

The Local alluvial land, poorly drained, and Local alluvial land, well drained, occupy the low flat areas along small streams. These land types formed from material that sloughed, rolled, or was washed from the surrounding uplands. They are also mixed to the extent that it is impossible to detect definite profile characteristics.

Severely gullied land has been truncated by accelerated erosion. All of the surface soil and most of the subsoil has been removed, and the parent material is exposed. The gullies occupy more than 75 percent of this land, which is essentially a Lithosol that has an intricate pattern of deep gullies.

The Moderately gullied land in this county can be divided into three groups of severely eroded and moderately gullied soils that have similar parent material. One group has Helena, Enon, and Wilkes soil materials, one has Cecil, Lloyd, and Appling materials, and one has Georgeville and Herndon materials. Moderately gullied land differs from Severely gullied land in that the gullies are normally shallower, farther apart, more stable, and occupy less than 75 percent of the land. This land probably can be reclaimed for limited use.

Stony land consists of areas on 6 to 15 percent slopes that are too stony for agricultural use. It may contain any soil material that occurs on slopes of this range. This land is covered with such a large quantity of stones or rock outcrops that it is suited only to forest.

Descriptions of Soil Profiles

The surface soil and subsoil of the soils in each series in the county were briefly described in the subsection, Soil Series, Types, and Phases. In the following pages a soil in each series, at the location given, is described in more detail.

The color of the soil is described in words, such as light olive gray, and in more precise terms. The more precise terms, called Munsell color notations, use symbols for hue, value, and chroma, such as 5Y 6/2. More information on Munsell color notations is given in the Soil Survey Manual (*13*).

ALAMANCE SILT LOAM, GENTLY SLOPING PHASE

Location: 2.1 miles southwest of Sylvan School to hardwood forest; then 0.1 mile west on woods road; 30 feet north of road.
Vegetation: White, post, red, and jack oaks, dogwood, blackgum, hickory, cedar, and shortleaf pine.
Parent material: Volcanic slates.
Slope: 2 to 6 percent.
Erosion: None.
Drainage: Moderately well drained to well drained; medium external and internal drainage.
Stoniness: None.
Root distribution: Fair into B_3 horizon.

Soil profile:

A_1 0 to 1 inch, light olive-gray (5Y 6/2, moist) friable silt loam; weak, medium and coarse, crumb structure; tends toward platiness; clear wavy boundary.

A_2 1 to 5 inches, pale-yellow (5Y 7/3, moist) friable silt loam; weak, medium and coarse, crumb structure; tends toward platiness; clear wavy boundary.

A_3 5 to 8 inches, light olive-brown (2.5Y 5/4, moist) friable silt loam with common, fine, faint light-gray (2.5Y 7/2, moist) mottles; very slightly cemented; weak, medium, subangular blocky structure; gradual smooth boundary.

B_{21} 8 to 15 inches, yellowish-brown (10YR 5/8, moist) friable silty clay loam with common, medium, faint light yellowish-brown (2.5Y 6/4, moist) mottles; weak, medium and fine, angular blocky structure; tends toward platiness; gradual smooth boundary.

B_{22} 15 to 23 inches, brownish-yellow (10YR 6/6, moist) silty clay loam with common, medium, faint pale-yellow (2.5Y 7/4, moist) mottles; friable when broken, firm in place; moderate, fine and medium, subangular blocky structure; thin clay skins on about half the faces of peds; layer of fine and medium quartz gravel in horizon; gradual boundary.

B_3 23 to 32 inches, mottled yellowish-red (5YR 5/6, moist), strong-brown (7.5YR 5/8, moist), and white (10YR 8/1, moist) silty clay loam with common, medium, distinct mottles; friable (firm in place); moderate, fine, angular blocky structure; thin clay skins on about half the faces of peds; contains layer of fine and medium quartz gravel; gradual boundary.

C_1 32 inches +, mottled yellowish-red, strong-brown, and white weathered volcanic slate.

APPLING SANDY LOAM, GENTLY SLOPING PHASE

Location: 200 yards south of Snow Hill Church; then 55 yards west of center of State Highway 119 in woods.
Vegetation: Red, white, and post oaks, shortleaf pine, blackgum, hickory.
Parent material: Granite.
Slope: 2 to 6 percent.
Erosion: None.
Drainage: Well drained; medium external and internal drainage.
Stoniness: None.
Root distribution: Good through B_2 horizon.

Soil profile:

A_1 0 to 3 inches, grayish-brown (2.5Y 5/2, moist) friable sandy loam; weak, medium and fine, crumb structure; clear wavy boundary.

A_2 3 to 6 inches, yellowish-brown (10YR 5/6, moist) friable sandy loam; weak, medium and fine, crumb structure; gradual smooth boundary.

A_3 6 to 8 inches, yellowish-brown (10YR 5/6, moist) friable heavy sandy loam; weak, medium, subangular blocky structure; gradual smooth boundary.

B_1 8 to 12 inches, strong-brown (7.5YR 5/8, moist) friable sandy clay loam; weak to moderate, subangular blocky structure; discontinuous clay films on faces of peds; gradual boundary.

B_{21} 12 to 20 inches, strong-brown (7.5YR 5/6, moist) friable sandy clay loam; moderate, fine, subangular blocky structure; continuous clay skins cover about one-half of the faces of peds; gradual boundary.

B_{22} 20 to 29 inches, strong-brown (7.5YR 5/6, moist) friable sandy clay with common, medium, distinct yellowish-brown (10YR 5/6, moist) and red (2.5YR 4/8, moist) mottles; moderate, fine and very fine, subangular blocky structure; prominent clay skins cover about two-thirds of the faces of peds; gradual boundary.

B_3 29 to 60 inches, mottled red (2.5YR 4/8, moist), strong-brown (7.5YR 5/6, moist), and yellowish-brown (10YR 5/6, moist) firm clay; common, medium, distinct mottles; moderate to strong, medium and fine, subangular blocky structure; prominent clay skins cover most of the faces of peds; gradual wavy boundary.

C_{11} 60 to 80 inches, red, yellowish-brown, and light-gray weathered granite; some discontinuous clay films in upper part of horizon; little structure evident.
C_{12} 80 inches +, light-gray, red, and yellowish-brown weathered granite.

BUNCOMBE LOAMY FINE SAND

Location: 200 yards west of Haw River bridge on State Highway 54; then 50 feet south of south bank.
Vegetation: Pasture.
Parent material: Alluvium.
Slope: 0 to 2 percent.
Erosion: None.
Drainage: Well drained; medium external drainage, rapid internal drainage.
Stoniness: None.
Root distribution: Good into C_{11} horizon.

Soil profile:

A_p 0 to 8 inches, dark-brown (10YR 4/3, moist) very friable loamy fine sand; very weak, fine, crumb structure; gradual smooth boundary.
C_{11} 8 to 22 inches, dark-brown (10YR 4/3, moist) nearly loose loamy fine sand; single grain (structureless); gradual boundary.
C_{12} 22 inches +, dark grayish-brown (10YR 4/2, moist) fine sand; single grain (structureless).

CECIL FINE SANDY LOAM, GENTLY SLOPING PHASE

Location: 2.8 miles west of Burlington on Federal Highway 70A; then 100 yards into woods north of highway.
Vegetation: White and red oak, Virginia pine, blackgum, hickory, sourwood, and dogwood.
Parent material: Gneiss.
Slope: 2 to 6 percent.
Erosion: None.
Drainage: Well drained; medium external and internal drainage.
Stoniness: None.
Root distribution: Good into B_3 horizon.

Soil profile:

A_0 ½ to 0 inch, dark-brown deciduous plant residue.
A_1 0 to 2 inches, yellowish-brown (10YR 5/4, moist) friable fine sandy loam; weak, fine, crumb structure; gradual wavy boundary.
A_2 2 to 6 inches, yellowish-brown (10YR 5/6, moist) friable fine sandy loam; fine and medium, crumb structure; clear smooth boundary.
B_1 6 to 9 inches, red (2.5YR 5/8, moist) friable fine sandy clay loam; weak, medium, subangular blocky structure; thin discontinuous clay films on faces of peds; clear smooth boundary.
B_2 9 to 30 inches, red (2.5YR 4/6, moist) firm clay; strong, medium and fine, subangular blocky structure; continuous clay skins practically cover faces of peds; gradual boundary.
B_3 30 to 56 inches +, red (2.5YR 4/6, moist) firm clay with strong-brown (7.5YR 5/8, moist), common, medium, distinct mottles; strong, fine, subangular blocky structure; prominent clay skins cover most of faces of peds; gradual boundary.

CHEWACLA FINE SANDY LOAM

The Chewacla soil that was sampled and described has a silt loam surface soil. It is an inclusion in the mapping unit that is called Chewacla fine sandy loam and contains the major horizons that are typical of soils in the Chewacla series.

Location: 50 yards north of Chatham County line on paved Sutphin Mill road; 30 yards west in pasture.
Vegetation: Pasture.
Parent materal: Alluvium.
Slope: 0 to 2 percent.
Erosion: None.
Drainage: Somewhat poorly drained; medium external and slow internal drainage.
Stoniness: None.
Root distribution: Good into C_{11} horizon.

Soil profile:

A_p 0 to 5 inches, light olive-brown (2.5Y 5/6, moist) friable silt loam; weak, medium, granular structure; gradual smooth boundary.
A_3 5 to 8 inches, light olive-brown (2.5Y 5/4, moist) friable silt loam; dark-brown and black organic stains; massive (structureless); clear smooth boundary.
C_{11} 8 to 12 inches, yellowish-brown (10YR 5/8, moist) friable silt loam; dark-brown and black organic stains; massive (structureless); gradual boundary.
C_{12} 12 to 18 inches, yellowish-brown (10YR 5/8, moist) friable silt loam with common, fine, faint olive-yellow (2.5Y 6/6, moist) mottles; dark-brown and black organic stains; massive (structureless); gradual boundary.
C_{13} 18 inches +, pale-olive (5Y 6/3, moist) friable silt loam with common, medium, distinct yellowish-brown (10YR 5/4, moist) mottles; dark-brown and black organic stains; massive (structureless).

COLFAX SANDY LOAM

Colfax sandy loam having a slope of less than 2 percent is described as follows:
Location: 0.88 mile southwest of Shady Oak filling station; 300 yards south on dirt road; then 30 yards west into woods.
Vegetation: Jack, white, post oaks, willow, hickory, dogwood, blackgum, cedar, and shortleaf pine.
Parent material: Granite.
Slope: 0 to 2 percent.
Erosion: None.
Drainage: Somewhat poorly drained; slow external and internal drainage.
Stoniness: None.
Root distribution: Fair into upper part of B_2 horizon.

Soil profile:

A_1 0 to 3 inches, gray (10YR 5/1, moist) very friable sandy loam; weak, medium, crumb structure; clear smooth boundary.
A_2 3 to 8 inches, pale-yellow (5Y 7/4, moist) very friable sandy loam with common, fine, very faint pale-olive (5Y 6/4, moist) mottles; weak, medium and coarse, crumb structure; gradual boundary.
A_3 8 to 12 inches, pale-olive (5Y 6/4, moist) friable sandy loam or sandy clay loam with common, fine, faint light olive-brown (2.5Y 5/6, moist) mottles; weak, medium, subangular blocky structure; pockets of medium sand throughout horizon; clear wavy boundary.
B_2 12 to 28 inches, mottled gray (10YR 6/1, moist), yellowish-brown (10 YR 5/8, moist), and yellowish-red (5YR 5/8, moist) sandy clay; firm when moist and plastic when wet; mottles common, medium, prominent; moderate, coarse, angular blocky structure; clay skins vary in thickness from ped to ped and are more prominent on vertical faces; yellow and brown hues on inside of peds, gradual boundary.
B_3 28 to 40 inches, mottled gray (5Y 6/1, moist) and brownish-yellow (10YR 6/8, moist) sandy clay; firm when moist and plastic when wet; common, medium, prominent mottles; weak, coarse, angular blocky structure or massive (structureless); thin clay films on vertical faces; gradual wavy boundary.

C_{11} 40 to 50 inches, mottled gray and brownish-yellow weathered granite; little apparent development.

C_{12} 50 inches +, gray, weathered granite.

CONGAREE FINE SANDY LOAM

Location: 0.4 mile north of Stony Creek Church on gravel road; 600 feet northeast into field; then 100 feet west of west bank of Stony Creek.
Vegetation: Wheat.
Parent material: Alluvium.
Slope: 0 to 2 percent.
Erosion: None.
Drainage: Well drained; medium external and internal drainage.
Stoniness: None.
Root distribution: Good into C horizon.

Soil profile:

A_p 0 to 8 inches, dark-brown (10YR 4/3, moist) friable fine sandy loam; weak, medium, crumb structure; gradual smooth boundary.

C_{11} 8 to 38 inches, dark-brown (10YR 4/3, moist) friable fine sandy loam with grayish-brown (10YR 5/2, moist), common, fine, faint mottles; dark-brown and black organic stains; massive (structureless); gradual boundary.

C_{12} 38 inches +, yellowish-brown (10YR 5/8, moist) friable fine sandy loam with common, fine, faint, grayish-brown (10 YR 5/2, moist) mottles; dark-brown and black organic stains; massive (structureless).

DAVIDSON CLAY LOAM, GENTLY SLOPING PHASE

Davidson clay loam having a slope less than 2 percent was described as follows:

Location: 0.75 mile northwest of Orange County line on State Highway 54; 100 feet northwest into woods.
Vegetation: Red and white oaks, hickory, holly, dogwood, cedar, and shortleaf pine.
Parent material: Gabbro.
Slope: 0 to 2 percent.
Erosion: None.
Drainage: Well drained; medium external and internal drainage.
Stoniness: Quartz rocks on surface and in upper part of profile.
Root distribution: Good into B_3 horizon.

Soil profile:

A_1 0 to 2 inches, dark reddish-brown (5YR 3/4, moist) friable clay loam; moderate, fine, granular structure; clear wavy boundary; few iron concretions no more than 0.1 inch in diameter.

A_3 2 to 7 inches, dark reddish-brown (2.5YR 3/4, moist) friable clay loam; moderate, medium, granular structure; many iron concretions no more than 0.1 inch in diameter; gradual smooth boundary.

B_{21} 7 to 20 inches, dark-red (2.5YR 3/6, moist) friable clay (firm in place); strong, fine and medium, granular structure; many iron concretions no more than 1 inch in diameter; gradual smooth boundary.

B_{22} 20 to 58 inches, dark-red (10R 3/6, moist) firm clay; strong, medium and fine, subangular blocky structure; prominent skins on most faces of the peds; gradual smooth boundary.

B_3 58 inches +, red (2.5YR 4/8, moist) firm clay with strong-brown (7.5YR 5/8, moist) common, fine, prominent mottles; strong, fine, subangular blocky structure; prominent clay skins on most faces of the peds.

DURHAM SANDY LOAM, GENTLY SLOPING PHASE

Durham sandy loam having a slope of less than 2 percent is described as follows:

Location: 1.25 miles north of Altamahaw on gravel road; then 0.2 mile east on dirt road; 0.39 mile south on field road; 20 feet into woods at north end of field.
Vegetation: Red, white, post, and willow oaks, hickory, blackgum, poplar, Virginia and shortleaf pines.
Parent material: Granite.
Slope: 0 to 2 percent.
Erosion: None.
Drainage: Well drained; medium external and medium to rapid internal drainage.
Stoniness: None.
Root distribution: Good into B_3 horizon.

Soil profile:

A_1 0 to 3 inches, dark-gray (10YR 4/1, moist) very friable sandy loam; weak, fine and medium, crumb structure; clear wavy boundary.

A_2 3 to 12 inches, grayish-brown (2.5Y 5/2, moist) very friable sandy loam; weak, fine and medium, crumb structure; gradual boundary.

A_3 12 to 15 inches, light olive-brown (2.5Y 5/4, moist) friable sandy loam; very weak, fine and medium, subangular blocky structure; slightly cemented and brittle; gradual wavy boundary.

B_{21} 15 to 19 inches, yellowish-brown (10YR 5/8, moist) friable light sandy clay loam; moderate, medium and fine, subangular blocky structure; thin clay films on the faces of the peds; gradual boundary.

B_{22} 19 to 26 inches, yellowish-brown (10YR 5/8, moist) friable sandy clay loam; moderate, fine, subangular blocky structure; continuous clay skins cover over half the faces of the peds; root channels filled with light brownish-gray coarser textured material; gradual boundary.

B_3 26 to 64 inches, yellowish-brown (10YR 5/8, moist) friable sandy clay loam with yellowish-red (5YR 4/8, moist) common, medium, distinct mottles; weak, medium, subangular blocky structure; thin discontinuous clay films on faces of the peds; slightly cemented and brittle; gradual boundary.

C 64 inches +, mottled yellowish-brown and yellowish-red weathered granite; little development evident.

EFLAND SILT LOAM, GENTLY SLOPING PHASE

Location: 1.8 mile south of Sutphin Mill on paved road; then 0.1 mile east on field road; 30 feet south into woods.
Vegetation: White, post, red oaks, hickory, maple, and shortleaf pine.
Parent material: Volcanic slates.
Slope: 2 to 6 percent.
Erosion: None.
Drainage: Well drained; medium external and slow internal drainage.
Stoniness: Some quartz rock on surface and in upper part of profile.
Root distribution: Good into upper part of B_2 horizon.

Soil profile:

A_1 0 to 2 inches, dark yellowish-brown (10YR 4/4, moist) friable silt loam; weak, fine, granular structure; clear wavy boundary.

A_2 2 to 7 inches, yellowish-brown (10YR 5/6, moist) friable silt loam; very weak, medium and fine, subangular blocky structure; smooth gradual boundary.

B_1 7 to 10 inches, yellowish-brown (10YR 5/6, moist) friable silty clay loam; weak to moderate, medium and fine, subangular blocky structure; thin clay films on the faces of the peds; some iron concretions in upper part of horizon; gradual boundary.

B_{21} 10 to 13 inches, strong-brown (7.5YR 5/8, moist) friable silty clay; moderate, medium and fine, subangular blocky structure; continuous clay skins on about half the faces of the peds; gradual boundary.

B_{22} 13 to 21 inches, yellowish-red (5YR 5/8, moist) silty clay or clay; friable (firm in place); moderate, medium and fine, subangular blocky structure; prominent clay skins cover over half the faces of the peds; gradual boundary.

B_{23} 21 to 28 inches, yellowish-red (5YR 5/8, moist) clay with common, fine, faint, yellowish-brown (10YR 5/8, moist) and brownish-yellow (10YR 6/8, moist) mottles; firm when moist and plastic when wet; strong medium and fine angular blocky structure; prominent clay skins almost cover the faces of the peds; gradual boundary.

B_3 28 to 36 inches, mottled yellowish-red (5YR 5/8, moist), yellowish-brown (10YR 5/8, moist), and red (2.5YR 5/8, moist) clay; common, fine, distinct mottles; firm when moist and plastic when wet; strong to medium angular blocky structure; prominent clay skins on the faces of the peds; gradual boundary.

C_{11} 36 to 66 inches, mottled red, yellowish-red, and light-gray weathered volcanic slate; common, medium, prominent mottles; some evidence of meager development in upper part of horizon.

C_{12} 66 to 86 inches +, mottled white, red, and yellowish-brown weathered volcanic slate.

ENON LOAM, GENTLY SLOPING PHASE

Location: 5 miles south of Kimesville on gravel road; 1.3 mile east on gravel road; 150 yards north on gravel road; then 100 feet west into hardwood forest.
Vegetation: White, post, and red oaks, hickory, dogwood, sourwood, and cedar.
Parent material: Diorite.
Slope: 2 to 6 percent.
Erosion: None.
Drainage: Well drained; medium external and medium to slow internal drainage.
Stoniness: Few small stones on surface and in A horizon.
Root distribution: Fair into B_2 horizon.

Soil profile:

A_0 ½ to 0 inch, dark grayish-brown, deciduous plant residue.

A_1 0 to 4 inches, light olive-brown (2.5Y 5/4, moist) friable loam; weak, medium and fine, granular structure; many roots; abrupt boundary.

A_2 4 to 9 inches, light yellowish-brown (2.5Y 6/4, moist) friable loam; weak, fine and medium, subangular blocky structure; gradual smooth boundary.

A_3 9 to 13 inches, light yellowish-brown (2.5Y 6/4, moist) friable loam; very weak, medium and fine, subangular blocky structure; slightly cemented and contains many dark-brown iron concretions no more than 1 inch in diameter; clear wavy boundary.

B_{21} 13 to 18 inches, olive-brown (2.5Y 4/4, moist) clay; moderate, medium, subangular blocky structure; continuous clay skins on more than half of the faces of the peds; organic coatings on the vertical faces; tongues of brownish-gray material from A horizon; gradual wavy boundary.

B_{22} 18 to 26 inches, yellowish-brown (10YR 5/6, moist) firm clay; moderate, coarse and medium, angular blocky structure that tends toward prismatic; clay skins more prominent on vertical faces; tongues of brownish-gray material from A horizon; gradual boundary.

B_3 26 to 29 inches, yellowish-brown (10YR 5/6, moist) firm clay with common, fine, faint light-gray (10YR 7/1, moist) mottles; moderate, medium, angular blocky structure; thin clay skins on most faces of the peds; gradual boundary.

C 29 inches +, yellow weathered diorite mottled with light gray.

GEORGEVILLE SILT LOAM, GENTLY SLOPING PHASE

Location: 0.9 mile east of Saxapahaw on paved road; then 0.75 mile southeast on dirt road; 0.2 mile south on woods road; in east side of old road cut.
Vegetation: Red, white, and post oaks, maple, sourwood, poplar, and cedar.
Parent material: Volcanic slates.
Slope: 2 to 6 percent.
Erosion: None.
Drainage: Well drained; medium external and internal drainage.
Stoniness: Some small quartz rocks on surface and in profile.
Root distribution: Good into B_3 horizon.

Soil profile:

A_1 0 to 5 inches, yellowish-brown (10YR 5/6, moist) friable silt loam; weak, fine, granular structure; clear smooth boundary.

A_2 5 to 9 inches, reddish-yellow (7.5YR 6/6, moist) friable silt loam; weak, medium and fine, granular structure; some coarse gravel in horizon; gradual boundary.

A_3 9 to 12 inches, reddish-yellow (5YR 6/8, moist) friable silt loam; weak, medium and fine, subangular blocky structure; gradual boundary.

B_1 12 to 14 inches, yellowish-red (5YR 5/8, moist) friable silty clay loam; moderate, medium, subangular blocky structure; thin clay films on the faces of the peds; gradual boundary.

B_{21} 14 to 21 inches, red (2.5YR 5/8, moist) friable silty clay; moderate, medium and fine, subangular blocky structure; clay skins cover more than half the faces of the peds; some small quartz rocks in horizon; gradual boundary.

B_{22} 21 to 34 inches, red (2.5YR 4/8, moist) firm silty clay; strong, medium and fine, subangular blocky structure; prominent clay skins cover most of the faces of the peds; some small quartz rocks; gradual boundary.

B_3 34 to 70 inches, red (2.5YR 4/8, moist) firm silty clay with common, fine, distinct, brownish-yellow (10YR 6/8, moist) mottles; moderate, medium and fine, subangular blocky structure; continuous clay skins on two-thirds of the faces of the peds; gradual boundary.

C 70 inches +, mottled red and brownish-yellow weathered volcanic slate; little evidence of any development.

GOLDSTON SLATY SILT LOAM, STRONGLY SLOPING PHASE

The Goldston soil that was sampled and described has a silt loam surface soil. It is an inclusion in the mapping unit that is called Goldston slaty silt loam, strongly sloping phase, and contains the major horizons that are typical of soils in the Goldston series.
Location: 1.8 miles southwest of Snow Camp.
Vegetation: White, post, and red oaks, blackgum, and shortleaf and Virginia pines.
Parent material: Volcanic slates.
Slope: 10 to 15 percent.
Erosion: None.
Drainage: Excessively drained; rapid external and medium to rapid internal drainage.
Stoniness: Slaty on surface and in profile.
Root distribution: Poor.

Soil profile:

A_1 0 to 4 inches, grayish-brown (2.5Y 5/2, moist) friable silt loam; weak, medium, granular structure; contains volcanic slate rocks; clear wavy boundary.

C 4 inches +, gray and brown partially weathered volcanic slate; tongues of material from A_1 horizon.

HELENA COARSE SANDY LOAM, GENTLY SLOPING PHASE

The Helena soil that was sampled and described has a coarse loamy sand surface soil and a slope of less than 2 percent. It is an inclusion in the mapping unit that is called Helena coarse sandy loam, gently sloping phase, and contains the major horizons that are typical of soils in the Helena series.

Location: 2.0 miles south of Kimesville on gravel road; then 200 yards east to farm road into forest; 30 feet south of farm road.

Vegetation: White oak, hickory, dogwood, elm, and Virginia pine.

Parent material: Mixture of granite and basic crystalline rocks.

Slope: 0 to 2 percent.

Erosion: None.

Drainage: Somewhat poorly drained to moderately well drained; medium external and very slow internal drainage.

Stoniness: None.

Root distribution: Fair through B_{21} horizon.

Soil profile:

A_1 0 to 3 inches, dark grayish-brown (2.5Y 4/2, moist) nearly loose coarse loamy sand; very weak, medium crumb structure; clear wavy boundary.

A_2 3 to 12 inches, light yellowish-brown (2.5Y 6/4, moist) nearly loose coarse loamy sand; very weak, medium and fine, crumb structure; gradual wavy boundary.

A_3 12 to 17 inches, light yellowish-brown (2.5Y 6/4, moist) nearly loose coarse loamy sand; massive (structureless); some fine gravel in horizon; slightly cemented and brittle; clear wavy boundary.

B_{21} 17 to 20 inches, brownish-yellow (10YR 6/6, moist) firm, coarse sandy clay with common, medium, distinct gray (10YR 6/1, moist) and light yellowish-brown (2.5Y 6/4, moist) mottles; weak, fine, angular blocky structure; thin clay films on the faces of the peds; many tongues of coarse sand or fine gravel from A horizon; gradual wavy boundary.

B_{22} 20 to 26 inches, mottled brownish-yellow (10YR 6/6, moist) and gray (10YR 6/1, moist) very firm clay; common, coarse, and prominent mottles; weak to moderate, medium and fine, angular blocky structure that tends toward prismatic; clay skins more pronounced on vertical faces; brownish-yellow material inside of peds is coarser textured than the gray mottles; gradual wavy boundary.

B_3 26 to 32 inches, gray (10YR 6/1, moist) very firm clay with common, coarse, prominent brownish-yellow (10YR 6/6, moist) mottles; massive (structureless); gradual wavy boundary.

C 32 inches +, mottled gray and yellow weathered granite.

HERNDON SILT LOAM, GENTLY SLOPING PHASE

Herndon silt loam having a slope of less than 2 percent is described as follows:

Location: 0.63 mile north of Center Church on gravel road; then 30 feet east into woods.

Vegetation: White, red, and post oaks, dogwood, cedar, and shortleaf pine.

Parent material: Volcanic slates.

Slope: 0 to 2 percent.

Erosion: None.

Drainage: Well drained; medium external and internal drainage.

Stoniness: Few quartz fragments on surface and in upper horizons.

Root distribution: Good into B_3 horizon.

Soil profile:

A_1 0 to 3 inches, dark-brown (10YR 4/3, moist) friable silt loam; weak, fine, granular structure; contains quartz gravel and rocks; clear wavy boundary.

A_2 3 to 6 inches, yellowish-brown (10YR 5/6, moist) friable silt loam; weak, medium, granular structure; contains quartz gravel and rocks; gradual smooth boundary.

B_{21} 6 to 11 inches, yellowish-red (5YR 5/6, moist) friable silty clay; moderate, medium, subangular blocky structure; thin clay films on the faces of the peds, gradual boundary.

B_{22} 11 to 28 inches, yellowish-red (5YR 4/8, moist) firm silty clay; strong, medium and fine, subangular blocky structure; prominent clay skins almost cover the faces of the peds; gradual boundary.

B_3 28 to 40 inches, yellowish-red (5YR 4/8, moist) firm silty clay with common, fine, faint strong-brown (7.5YR 5/8, moist) and yellowish-brown (10YR 5/8, moist) mottles; moderate, medium, subangular blocky structure; prominent clay skins cover two-thirds of the faces of the peds; gradual wavy boundary.

C_{11} 40 to 60 inches, mottled red and light-red weathered volcanic slate; some evidence of slight development in upper part of horizon.

C_{12} 60 inches +, mottled light-gray, yellowish-brown, and reddish-yellow, weathered volcanic slate.

IREDELL LOAM, LEVEL PHASE

Location: 0.5 mile west of Alamance Battleground; then 0.4 mile west on paved road; 100 yards into hardwood forest.

Vegetation: White, post, and black oaks, blackgum, hickory, and cedar.

Parent material: Diorite.

Slope: 0 to 2 percent.

Erosion: None.

Drainage: Moderately well drained; medium to slow external and very slow internal drainage.

Stoniness: None.

Root distribution: Fair through B_1 horizon.

Soil profile:

A_1 0 to 5 inches, very dark brown (10YR 2/2, moist) friable loam; moderate, fine and medium, crumb structure; abrupt boundary.

A_2 5 to 11 inches, very dark grayish-brown (10YR 3/2, moist) friable loam; moderate, fine, granular structure; clear smooth boundary.

B_{1cnir} 11 to 14 inches, olive-brown (2.5Y 4/4, moist) friable loam; moderate, fine, granular structure; contains a discontinuous iron pan, the lower part of which is almost a solid mass of iron concretions less than 1 inch thick; rest of horizon contains loose, dark-brown concretions; clear smooth boundary.

B_2 14 to 22 inches, light olive-brown (2.5Y 5/4, moist) clay; very firm when moist and plastic when wet; moderate, coarse, angular blocky structure; continuous clay skins on most of the faces of the peds; clay skins more pronounced on vertical faces; gradual wavy boundary.

B_3 22 to 25 inches, olive (5Y 4/4, moist) clay with common, fine, faint olive-gray (5Y 4/2, moist) mottles; very firm when moist and plastic when wet; moderate to weak, coarse, angular blocky structure that tends toward prismatic; clay skins more pronounced on the vertical faces; gradual wavy boundary.

C 25 to 27 inches, mottled green, black, gray, and brown, weathered olivine gabbro.

LLOYD LOAM, LEVEL PHASE

Location: 2.0 miles north of Altamahaw on State Highway 87 to Troxler's store; then 0.3 mile east to house north of road; 0.9 mile north on field road to small hardwood forest; 30 feet south of road.

Vegetation: White, red, and chestnut oaks, poplar, dogwood, holly, hickory, and blackgum.
Parent material: Greenstone schist.
Slope: 0 to 2 percent.
Erosion: None.
Drainage: Well drained; medium external and internal drainage.
Stoniness: None.
Root distribution: Good into B_3 horizon.

Soil profile:

A_1 0 to 3 inches, dark reddish-brown (5YR 3/4, moist) friable loam; moderate, medium, granular structure; many roots in horizon; clear wavy boundary.
A_3 3 to 6 inches, dark-red (2.5YR 3/6, moist) friable clay loam; moderate, medium, granular structure; many roots in horizon; clear wavy boundary.
B_{21} 6 to 14 inches, dark-red (10R 3/6, moist) friable clay; strong, fine, subangular blocky structure; prominent clay skins on all the faces of the peds; gradual boundary.
B_{22} 14 to 31 inches, dark-red (2.5YR 3/6, moist) clay; friable (firm in place); strong, fine, subangular blocky structure; prominent clay skins on all the faces of the peds; gradual boundary.
B_3 31 inches +, red (2.5YR 4/8, moist) clay with few, fine, faint, reddish-yellow (5YR 6/8, moist) mottles; mottles are larger with increasing depth; friable (firm in place); strong, medium and coarse, subangular blocky structure; prominent clay skins on most faces of peds.

MECKLENBURG LOAM, ERODED GENTLY SLOPING PHASE

Location: 0.9 mile northeast of Alamance; 0.5 mile west on gravel road to road junction; 50 feet west into woods.
Vegetation: Red and white oaks, hickory, dogwood, cedar, and Virginia pine.
Parent material: Diorite.
Slope: 2 to 6 percent.
Erosion: None.
Drainage: Well drained; medium external and slow internal drainage.
Stoniness: Some stones in A horizon.
Root distribution: Fair through B_2 horizon.

Soil profile:

A_0 ½ to 0 inch, very dark brown (10YR 2/2, moist) deciduous plant residue.
A_{11} 0 to 2 inches, dark-brown (10YR 4/3, moist) friable loam; weak, fine, granular structure; contains stones as much as 4 inches in diameter and some pea-size iron concretions; clear wavy boundary.
A_{12} 2 to 7 inches, reddish-brown (5YR 4/4, moist) friable loam; fine and medium, granular structure; contains stones as much as 4 inches in diameter; gradual smooth boundary.
A_3 7 to 10 inches, dark reddish-brown (5YR 3/4, moist) friable fine sandy clay loam; weak, fine and medium, subangular blocky structure; gradual smooth boundary.
B_{21} 10 to 15 inches, yellowish-red (5YR 4/6, moist) firm clay; moderate, medium, subangular blocky structure; continuous clay skins on more than half the faces of the peds; gradual smooth boundary.
B_{22} 15 to 26 inches, strong-brown (7.5YR 5/8, moist) clay with few, medium, faint, yellowish-red (2.5YR 4/8, moist) mottles; firm when moist and plastic when wet; moderate, fine, subangular blocky structure; prominent clay skins on two-thirds of the faces of the peds; gradual boundary.
B_{3t} 26 to 44 inches, strong-brown (7.5YR 5/8, moist) clay with common, fine, faint, yellowish-red (2.5YR 4/8, moist) mottles; very firm when moist and plastic when wet; moderate, medium to coarse, angular blocky structure; prominent clay skins on more than half of the faces of the peds; gradual boundary.
C 44 inches +, reddish-yellow, red, and white weathered diorite.

ORANGE SILT LOAM, NEARLY LEVEL PHASE

Location: 5.5 miles west of Snow Camp on paved road; then 0.5 mile east on gravel road; 0.5 mile north, crossing branch into hardwood forest.
Vegetation: Jack, willow, and white oaks, and cedar.
Parent material: Volcanic slates.
Slope: 0 to 2 percent.
Erosion: None.
Drainage: Somewhat poorly drained; slow external and very slow internal drainage.
Stoniness: None.
Root distribution: Fair into B_2 horizon.

Soil profile:

A_1 0 to 2 inches, dark grayish-brown (2.5Y 4/2, moist) friable silt loam; weak, medium, granular structure; abrupt boundary.
A_2 2 to 4 inches, light brownish-gray (10YR 6/2, moist) friable silt loam with few, fine, faint, yellowish-brown (10YR 5/8, moist) mottles; weak, medium, granular structure; clear smooth boundary.
B_1 4 to 11 inches, light brownish-gray (10YR 6/2, moist) friable silty clay loam with common, medium, faint, yellowish-brown (10YR 5/8, moist) mottles; weak, fine and medium, subangular blocky structure; more silt in gray mottles; clear smooth boundary.
B_{21} 11 to 17 inches, yellowish-brown (10YR 5/6, moist) firm silty clay with common, coarse, distinct, grayish-brown (2.5Y 5/2, moist) mottles; moderate, coarse, subangular blocky structure; continuous clay skins on about half the faces of the peds; contains some quartz gravel; gradual boundary.
B_{22} 17 to 29 inches, yellowish-brown (10YR 5/6, moist) clay with common, medium, faint, light brownish-gray (2.5Y 6/2, moist) and strong-brown (7.5YR 5/8, moist) mottles; firm when moist and plastic when dry; moderate, coarse, subangular blocky structure; continuous clay skins on most faces of the peds; some gleying in middle half of horizon; gradual boundary.
B_{23} 29 to 47 inches, yellowish-brown (10YR 5/6, moist) clay with many, medium, distinct, light brownish-gray (2.5Y 6/2, moist) and strong-brown (7.5YR 5/8, moist) mottles; very firm when moist and plastic when dry; massive (structureless); lower part has some silt lenses; gradual boundary.
B_3 47 to 77 inches, light olive-gray (5Y 6/2, moist) very firm clay with many, medium, distinct, yellowish-brown (10YR 5/6, moist) mottles; moderate, coarse, angular blocky structure; gradual boundary.
C 77 inches +, gray and yellowish-brown, weathered volcanic slate; no apparent development.

ORANGE SILT LOAM, GENTLY SLOPING MODERATELY WELL DRAINED VARIANT

Location: 5.5 miles southwest of Snow Camp on paved road; then 0.1 mile east on dirt road; 0.1 mile northeast on field road; 200 feet south into woods.
Vegetation: Jack, white, and post oaks, Virginia pine, and small cedars.
Parent material: Volcanic slates.
Slope: 2 to 6 percent.
Erosion: None.
Drainage: Moderately well drained.
Stoniness: Some slate rocks on surface and a few in profile.
Root distribution: Good into B_{22} horizon.

Soil profile:

A_0 ½ to 0 inch, dark-brown residue from deciduous trees.

A_1 0 to 1 inch, very dark gray (7.5YR 3/0, moist) friable slit loam, moderate, fine, crumb structure; abrupt boundary.

A_2 1 to 9 inches, pale-yellow (2.5Y 7/4, moist) friable silt loam; moderate, fine, crumb structure; clear smooth boundary.

B_1 9 to 17 inches, brownish-yellow (10YR 6/6, moist) friable silty clay loam with few, fine, faint, pale-yellow (2.5Y 7/4, moist) mottles; weak, medium and fine, subangular blocky structure; a few concretions, probably of iron and manganese, as much as one-tenth inch in diameter that are more bleached in the upper part; very thin, discontinuous clay skins on some peds; clear smooth boundary.

B_{21} 17 to 22 inches, brownish-yellow (10YR 6/8, moist) friable silty clay loam with few, fine, faint, gray (10YR 6/1, moist) mottles; layer contains more clay than A_3 horizon; moderate, medium, subangular blocky structure; thin continuous clay films on faces of the peds; gradual boundary.

B_{22} 22 to 36 inches, strong-brown (7.5YR 5/6, moist) firm silty clay or clay with few, fine, faint, light brownish-gray (2.5Y 6/2, moist) and pinkish-gray (5YR 6/2, moist) mottles; plastic and sticky when wet; strong brown mottles on inside of peds; moderate, medium and coarse, subangular blocky structure; continuous clay skins on the faces of the peds; clay skins are more prominent on the vertical than on the horizontal faces; tongues of grayer and more silty material from A horizon; clear wavy boundary.

C 36 inches +, weathered volcanic slate with structure of original rock.

STARR LOAM

Location: 1 mile west of Elon College on paved road; then 0.25 mile south on dirt road; 100 yards east into open field.
Vegetation: Wheat.
Parent material: Colluvium.
Slope: 2 to 6 percent.
Erosion: None.
Drainage: Well drained; medium external and internal drainage.
Stoniness: None.
Root distribution: Good into B_{2b} horizon.

Soil profile:

A_p 0 to 8 inches, dark-brown (7.5YR 3/2, moist) friable loam; weak, fine, granular structure; clear smooth boundary.

A_1 8 to 20 inches, dark reddish-brown (5YR 3/4, moist) friable loam; weak, medium, granular structure; abrupt boundary.

B_{2b} 20 to 36 inches, yellowish-red (5YR 4/6, moist) firm clay; moderate, fine, subangular blocky structure; thin clay skins on most of faces of the peds; gradual smooth boundary.

B_{3b} 36 inches +, red (2.5YR 4/8, moist) firm clay with common, medium, distinct strong-brown (7.5YR 4/8, moist) mottles; moderate, fine, subangular blocky structure.

TIRZAH SILT LOAM, GENTLY SLOPING PHASE

Tirzah silt loam that has a slope less than 2 percent is described as follows:

Location: 3.2 miles northeast of Snow Camp on paved road to Bethel Church; then 0.2 mile south on gravel road; 0.2 mile east on gravel road; 50 feet north into hardwood forest.
Vegetation: White, post, and red oaks, hickory, dogwood, cedar, holly, poplar, blackgum, and shortleaf pine.
Parent material: Volcanic slates.
Slope: 0 to 2 percent.
Erosion: None.
Drainage: Well drained; medium external and internal drainage.
Stoniness: Some quartz rocks on surface and in A horizons.
Root distribution: Good into B_3 horizon.

Soil profile:

A_1 0 to 3 inches, dark reddish-brown (5YR 3/4, moist) friable silt loam; weak, fine, granular structure; many roots and some quartz gravel; clear wavy boundary.

A_3 3 to 7 inches, yellowish-red (5YR 4/6, moist) friable silty clay loam; weak, fine and medium, granular structure; many roots and some quartz gravel; clear smooth boundary.

B_{21} 7 to 13 inches, red (2.5YR 4/6, moist) friable silty clay; moderate, fine and medium, subangular blocky structure; thin clay film on most of the faces of the peds; quartz gravel in upper part; gradual smooth boundary.

B_{22} 13 to 28 inches, dark-red (2.5YR 3/6, moist) silty clay; friable (firm in place); strong, medium and fine, subangular blocky structure; prominent clay skins on most faces of the peds; gradual smooth boundary.

B_3 28 to 44 inches, dark-red (2.5YR 3/6, moist) silty clay with few, fine, distinct, yellowish-red (5YR 5/8, moist) mottles in horizontal pattern; friable (firm in place); strong, medium, angular and subangular blocky structure; prominent clay skins on most of the faces of the peds; gradual smooth boundary.

C 44 inches +, red mottled with yellowish-red, weathered, basic volcanic slate; massive (structureless).

VANCE SANDY LOAM, GENTLY SLOPING PHASE

Location: 2.0 miles north of Altamahaw to Troxler's store on State Highway 87; then 2.3 miles east on paved road; 0.75 mile north on gravel road; in east side of road bank.
Vegetation: Corn.
Parent material: Granite (probably some basic influence).
Slope: 2 to 6 percent.
Erosion: None visible.
Drainage: Well drained; medium external and slow internal drainage.
Stoniness: Few small stones on surface.
Root distribution: Good into B_2 horizon.

Soil profile:

A_p 0 to 6 inches, light olive-brown (2.5Y 5/4, moist) friable sandy loam; weak, fine, crumb structure; abrupt smooth boundary.

B_1 6 to 8 inches, dark yellowish-brown (10YR 4/4, moist) friable sandy clay loam; moderate, medium and fine, subangular blocky structure; thin continuous clay skins on two-thirds of the faces of the peds; clear smooth boundary.

B_2 8 to 23 inches, yellowish-brown (10YR 5/6, moist), clay with common, fine, faint, red (2.5YR 4/6, moist), and dark yellowish-brown (10YR 4/4, moist) mottles; firm when moist and plastic when wet; moderate, medium, angular blocky structure; clay skins on most faces of the peds; some root holes containing material from A horizon; gradual boundary.

B_3 23 to 42 inches, mottled brownish-yellow (10YR 6/8, moist), strong-brown (7.5YR 5/6, moist), and red (2.5YR 4/6, moist) clay; firm when moist and plastic when wet; common, medium, distinct mottles; moderate, fine, angular blocky structure; clay skins on most of the faces of the peds; gradual boundary.

C 42 inches +, mottled brownish-yellow, white, and red weathered granite.

WEHADKEE FINE SANDY LOAM

Location: 200 feet west of Haw River bridge on State Highway 54 on south bank of Haw River.
Vegetation: Broomsedge.
Parent material: Alluvium.
Slope: 0 to 2 percent.
Erosion: None.
Drainage: Poorly drained; slow external and internal drainage.
Stoniness: None.
Root distribution: Good into C horizon; organic stains in profile.

Soil profile:

A_p 0 to 10 inches, mottled dark grayish-brown (10YR 4/2, moist) and dark-gray (4/0, moist) friable fine sandy loam; common, fine, faint mottles; weak, medium, crumb structure; gradual boundary.

C_{11g} 10 to 20 inches, dark-gray (4/0, moist) friable fine sandy loam with few, fine, faint, dark grayish-brown (10YR 4/2, moist) mottles; massive (structureless); abrupt boundary.

C_{12g} 20 to 30 inches, mottled gray (5/0, moist), dark-gray (4/0, moist), and yellowish-brown (10YR 5/8, moist) firm sandy clay; common, medium, distinct mottles; massive (structureless); gradual boundary.

C_{13g} 30 inches +, layered alluvial material mottled with various shades of gray.

WILKES SOILS, SLOPING PHASES

The Wilkes soil that was sampled and described has a sandy loam surface soil. It contains the major horizons that are typical of soils in the Wilkes series.

Location: 0.25 mile east of the Guilford County line on United States Highway 70; then 50 feet into forest.
Vegetation: White and red oaks, hickory, dogwood, cedar, and Virginia pine.
Parent material: Mixture of acidic and basic crystalline rocks.
Slope: 6 to 10 percent.
Erosion: None visible.
Drainage: Excessively drained; rapid external and medium internal drainage.
Stoniness: Some small stones on surface and throughout profile.
Root distribution: Fair into C horizon.

Soil profile:

A_1 0 to 3 inches, gray (5/0, moist) friable sandy loam; weak, fine, crumb structure; clear smooth boundary.

A_2 3 to 9 inches, pale-yellow (2.5Y 7/4, moist) friable sandy loam; weak, fine, crumb structure; gradual wavy boundary.

BC 9 to 11 inches, mottled light-gray (7/0, moist) and olive-yellow (2.5Y 6/8, moist) sandy clay loam; friable (firm in place); massive (structureless); gradual boundary.

C 11 to 19 inches +, mottled white (8/0, moist) and yellowish-brown (10YR 5/4, moist) weathered granite.

WORSHAM SANDY LOAM

Worsham sandy loam having a slope less than 2 percent is described as follows:

Location: 0.4 mile south of Shady Oak filling station; then 0.13 mile east to wooded depressional area; 50 yards into woods.
Vegetation: Sweetgum, black and water oaks, cedar, and shortleaf and Virginia pines.
Parent material: Colluvium.
Slope: 0 to 2 percent.
Erosion: None.
Drainage: Poorly drained; slow external and internal drainage.
Stoniness: None.
Root distribution: Fair into B horizon.

Soil profile:

A_1 0 to 8 inches, dark-gray (4/0, moist) friable sandy loam; weak, fine, crumb structure; clear smooth boundary.

A_2 8 to 18 inches, gray (6/0, moist) nearly loose loamy sand; single grain (structurless); clear smooth boundary.

B_{2g} 18 to 26 inches, gray (6/0, moist) firm sandy clay with few, medium, distinct, brownish-yellow (10YR 6/8, moist) mottles; massive (structureless); gradual boundary.

B_{3g} 26 inches +, gray (6/0, moist) firm to very firm sandy clay with few, fine, distinct, brownish-yellow (10YR 6/8, moist) mottles; massive (structureless).

Engineering Applications [2]

This section is included so that the soil survey information in this report can be more readily used for engineering purposes. The information can be used to:

1. Make land use and soil studies that will aid in selecting and developing industrial, business, residential, and recreational sites.
2. Make preliminary estimates of the engineering properties of soils in planning for agricultural drainage systems, farm ponds, irrigation systems, diversions, and terraces.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting highways 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 useful in designing and maintaining the structures can be obtained.
6. Determine the suitability of the soils for cross-country movements of vehicles and construction equipment.
7. Supplement information from other maps and reports and from aerial photographs for the purpose of making maps and reports that can be used readily by engineers.
8. Make preliminary evaluation of the suitability of a particular area for construction purposes.

However, the mapping and the descriptive report are somewhat generalized and should be used only in planning more detailed field investigations to determine the condition of the soil, in place, at the proposed construction site.

In order to make the best use of the map and the descriptive report, the engineer should understand the classification system used by soil scientists. He should

[2] The Soil Conservation Service was assisted by the North Carolina Agricultural Experiment Station, the North Carolina State Highway and Public Works Commission, and the Bureau of Public Roads in the preparation of this section.

also have a knowledge of the physical properties of the soil material and the condition of the soil when in place. Therefore, he should test the soil materials and observe the behavior of the soils when they are used in engineering structures and foundations. Then the engineer can develop design criteria for the soil units delineated on the map.

Engineering Test Data

Soil samples from the principal soil type of 10 extensive series were tested in accordance with standard procedures (*1*) to help evaluate the soils for engineering purposes. The test data are given in table 4. It includes data obtained in moisture-density tests, mechanical analyses, and plasticity tests.

In the moisture-density, or compaction, test, a sample of the soil material is compacted several times with the same compactive effort, each time at a higher moisture content. The dry density (unit weight) of the soil material increases until the "optimum moisture content" is reached. After that, the dry density decreases with increases in moisture content. The highest dry density obtained in the compaction tests is termed "maximum dry density." Moisture-density data are important in earthwork because, as a rule, optimum stability is obtained if the soil is compacted to about maximum dry density when it is at approximately the optimum moisture content.

The result of a mechanical analysis, obtained by combined sieve and hydrometer methods, may be used to determine the relative proportions of the different size particles making up the soil sample. The clay content obtained by the hydrometer method, which is generally used by engineers, should not be used to determine soil textural classes.

The values of the liquid limit and plasticity index indicate the effect of water on the consistence of soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a solid to a semisolid, or 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 solid 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 plastic limit. It indicates the range of moisture content within which soil material is in a plastic condition.

Table 4 also gives the two engineering classifications for each soil sample. These classifications are based on the mechanical analysis, the liquid limit, and the plastic limit.

Engineering Soil Classification

The engineering soil classification of a soil material by either the A.A.S.H.O. (*1*) or the Unified (*16*) classification identifies that soil material with regard to gradation of material passing the 3-inch sieve and to plasticity characteristics. The classification permits the engineer to make a rapid appraisal of the soil material by comparing it with other soils having the same classification.

Most of the highway engineers class soil material in accordance with the A.A.S.H.O. method. In this system, soil materials are classified in seven principal groups. The groups range from A–1, consisting of gravelly soils of high bearing capacity, to A–7, consisting of clayey soils having low strength when wet. Within each group, the relative engineering value of the soil material is indicated by a group index number. These numbers range from 0 for the best material to 20 for the poorest. The group index number is shown in parentheses following the soil group symbol.

The Unified classification was developed at the Vicksburg Waterways Experiment Station of the Corps of Engineers, U.S. Army. In this system, soil material is put into 15 classes that are designated by pairs of letters. These classes range from GW, consisting of well-graded gravel, gravel and sand mixtures, and a little fine material, to Pt, consisting of peat and other highly organic soils.

Engineering Descriptions of Soils

In table 5 soil characteristics that are significant to engineering are given for the soil series, or groups of soils, and the miscellaneous land in the county. The classification and grain size for 10 of these groups of soils were determined from the results of soil tests. (See table 4.) Other values shown in table 5 were estimated from soil characteristics observed in the field and from the results of engineering soil tests made in other counties.

The descriptions of the soil series in table 5 apply only to the uneroded and moderately eroded soils in the series. For the series that have severely eroded soils, normally the second layer of the described profile is the surface layer.

A range in depth is given for the seasonally high water table for depths as great as 8 feet. Depths greater than 8 feet are designated 8+ because they cannot be estimated accurately.

The approximate depth to bedrock has a considerable range for most soils. This is because the resistance of the bedrock to weathering varies from place to place. The ranges in depth to bedrock listed in table 5 generally occur, but in many places the soft, weathered rock extends to depths greater than those given.

Permeability was estimated for the subsoil under compaction. The estimates were based on observed characteristics and were compared with permeability tests made on undisturbed cores of similar material.

The soil material in the main horizons of the soils and miscellaneous land listed in table 5 is classed according to the A.A.S.H.O. and the Unified systems. Also listed for these horizons are the estimated percentages of material passing a No. 4 sieve and a No. 200 sieve and the estimated shrink-swell potential.

The shrink-swell potential is an indication of the volume change that occurs in soil material when its moisture content changes. For some soils that did not have their degree of shrinkage observed, the clay "activity" as well as the percentage of clay was used as a guide in estimating the shrink-swell potential.

TABLE 4.—*Engineering test data* [1] *for soil sample*

Soil type and location	Parent material	Bureau of Public Roads report number	Depth	Horizon	Moisture-density: Maximum dry density	Moisture-density: Optimum moisture
			Inches		*Lb. per cu. ft.*	*Percent*
Alamance silt loam: 2.1 miles southwest of Sylvan School and 0.1 mile west on farm road.	Slate	S 31358	1-5	A_2	105	16
		S 31359	15-23	B_{22}	112	15
		S 31360	32+	C_1	110	16
Davidson clay loam: 0.75 mile northwest of Orange County line on N.C. Highway 54 and 100 feet north into forest.	Diorite	S 31340	0-2	A_1	97	21
		S 31341	20-58	B_{22}	93	27
		S 31342	58+	B_3	87	31
Enon loam: 5.0 miles south and 1.3 miles east of Kimesville, 150 yards north on gravel road, and 100 feet into forest.	Diorite	S 31355	0-4	A_1	103	17
		S 31356	26-29	B_3	102	22
		S 31357	29+	C_1	113	16
Georgeville silt loam: 3.7 miles south of Swepsonville, 200 yards west on dirt road, and 40 feet north into forest.	Andesite	S 31331	1-4	A_2	101	19
		S 31332	18-30	B_{22}	90	29
		S 31333	39-46	B_3	90	29
Helena coarse sandy loam: 2.0 miles south of Kimesville, 200 yards east on farm road, and 300 feet south, on top of hill.	Granite	S 31352	0-3	A_1	117	11
		S 31353	17-20	B_{21}	107	18
		S 31354	32+	C_1	108	17
Iredell loam: 0.5 mile west of Alamance Battleground, 0.4 mile west, and 100 yards into forest.	Olivine gabbro	S 31337	5-11	A_2	115	15
		S 31338	15-22	B_{2t}	102	21
		S 31339	25-27	C_1	110	18
Lloyd loam: 2.0 miles north of Altamahaw on N.C. Highway 87, 0.3 mile east and 0.3 mile north on farm road.	Greenstone schist	S 31343	0-3	A_1	91	24
		S 31344	14-31	B_{22}	90	29
		S 31345	31+	B_3	94	25
Orange silt loam: 5.5 miles west of Snow Camp, 0.5 mile east on gravel road, and 0.5 mile north into forest.	Slate	S 31334	2-4	A_2	112	14
		S 31335	17-29	B_2	111	17
		S 31336	47-77	B_3	87	30
Tirzah silt loam: 3.2 miles northeast of Snow Camp, 0.2 mile south on gravel road, 0.2 mile east on gravel road, and 50 feet north into forest.	Slate	S 31346	0-3	A_1	91	26
		S 31347	13-28	B_{22}	90	30
		S 31348	44+	C_1	99	23
Vance sandy loam: 2.0 miles north of Altamahaw on N.C. Highway 87, 2.3 miles east, 0.75 mile north on gravel road, in east bank of road cut.	Granite	S 31349	0-6	A_p	120	9
		S 31350	8-23	B_{2t}	89	29
		S 31351	42+	C_1	100	22

[1] Tests performed by Bureau of Public Roads in accordance with standard procedures of the American Association of State Highway Officials (A.A.S.H.O.) (*1*).

[2] Mechanical analyses according to the American Association of State Highway Officials Designation: T 88 (*1*). Results by this procedure frequently may differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the A.A.S.H.O. 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 mm. in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 mm. in diameter is excluded from

Engineering Interpretation of Soils

Table 6 is an engineering interpretation for the soils and miscellaneous land in the county. The interpretation was made on the basis of the estimated data in table 5, actual test data, and field observations. In this interpretation are recommendations regarding certain phases of highway work, ratings for the suitability of the soil for specific uses, and a listing of the soil features that affect the construction and use of farm ponds and terraces.

Many soils in the county have only normal obstacles to locating a highway gradeline; the grade can be located in any position on or in the soil. Some soils, however, have a high water table, bedrock, or other obstacles that must be considered before the position of the gradeline is determined. Table 6 lists, for each soil series, a suitable general location for a highway gradeline.

taken from 10 soil profiles, Alamance County, N.C.

Mechanical analysis [2]														Liquid limit	Plasticity index	Classification	
Percentage passing sieve										Percentage smaller than—							
2 in.	1½ in.	1 in.	¾ in.	⅜ in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 60 (0.25 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			A.A.S.H.O.[3]	Unified [4]
		100	97	95	94	93	89	87	81	78	49	18	9	[5] NP	NP	A-4(8)	ML
			100	99	98	96	91	89	84	81	62	30	20	32	10	A-4(8)	ML-CL
						100	88	81	67	64	45	20	13	32	5	A-4(6)	ML
		100	99	99	98	97	89	86	77	72	56	35	25	41	12	A-7-6(9)	ML
			100	99	99	98	95	94	91	89	80	67	60	70	32	A-7-5(20)	MH
								100	98	95	83	73	63	84	40	A-7-5(20)	MH
					100	99	90	87	75	68	40	14	9	NP	NP	A-4(8)	ML
					100	99	95	94	89	86	64	48	44	57	31	A-7-6(19)	CH
						100	99	98	85	79	50	25	21	34	12	A-6(9)	ML-CL
	100	97	95	92	89	86	79	77	66	61	41	23	15	33	7	A-4(6)	ML
						100	99	98	94	92	86	73	65	71	34	A-7-5(20)	MH
						100	99	98	93	91	82	70	61	70	33	A-7-5(20)	MH
					100	99	51	40	27	25	17	10	7	25	2	A-2-4(0)	SM
					100	97	74	71	64	63	58	48	44	65	36	A-7-6(17)	CH
					100	96	73	67	56	54	46	36	33	51	25	A-7-6(11)	CH
				100	99	97	74	69	58	53	39	20	13	27	4	A-4(5)	ML-CL
			100	99	99	98	90	87	78	74	61	48	44	62	38	A-7-6(20)	CH
					100	99	87	83	73	68	53	41	37	52	30	A-7-6(18)	CH
			100	98	98	97	92	89	79	73	51	26	20	47	12	A-7-6(10)	ML
						100	99	98	95	93	85	71	61	80	36	A-7-5(20)	MH
								100	98	96	80	55	42	63	25	A-7-5(18)	MH
					100	98	92	90	83	80	52	20	12	24	4	A-4(8)	ML-CL
					100	99	97	96	90	87	63	43	34	46	28	A-7-6(16)	CL
									100	99	94	78	65	92	54	A-7-5(20)	MH-CH
	100	90	87	83	81	80	76	74	70	68	54	36	25	49	13	A-7-5(10)	ML
						100	99	99	96	94	88	74	64	81	40	A-7-5(20)	MH
								100	90	86	71	45	28	49	14	A-7-5(11)	ML
100	96	96	94	93	92	91	75	63	33	27	18	10	7	NP	NP	A-2-4(0)	SM
						100	92	88	80	78	75	68	63	80	44	A-7-5(20)	MH-CH
						100	84	78	65	62	53	36	31	58	21	A-7-5(13)	MH

calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming texture classes for soils.

[3] The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes, A.A.S.H.O. Designation: M 145-49 (*1*).

[4] The Unified Soil Classification System, Technical Memorandum No. 3-357, Volume 1, Waterways Experiment Station, March 1953 (*16*).

[5] NP—Nonplastic.

Highway cuts in most soils of the county need to be protected against erosion by establishing a vegetative cover on their slopes. Although there are some differences in the amount of this kind of protection needed, it is the practice in the State to establish vegetative cover on all cuts and fills of new roads.

Table 6 also gives ratings for the suitability of the soils as sources for topsoil, borrow material, and cores of dams. No soil in this county is so suitable for borrow materials as are the sandy Coastal Plain soils, which are generally rated good. The best soils for sources of borrow material in Alamance County are rated only fair.

Practices that are generally used in soil conservation require moving large amounts of soil. These practices are normally suited to the conditions in Alamance County, but in most soils there are obstacles that affect the choice of site, design, and installation of conservation structures. Soil features that hinder the construc-

TABLE 5.—*Engineering description of soils in Alamance*

Soils	Range in slope	Depth to seasonally high water table	Depth to bedrock	Permeability of subsoil	Site and soil description
Soils on alluvial plains:	*Percent*	*Feet*	*Feet*		
Buncombe	0 to 3	4 to 8	8 to 20	Rapid	2 to 4 feet of well-drained loamy fine sand on stream flood plains; over stratified, alluvial materials that include beds of gravel in places. Subject to occasional overflow.
Chewacla	0 to 2	2 to 4	8 to 20	Moderate	½ to 1½ feet of somewhat poorly drained fine sandy loam on stream flood plains; over stratified alluvial materials that include beds of sand and gravel in places. Subject to frequent overflow.
Congaree	0 to 2	3 to 8	8 to 20	Rapid	3 to 4 feet of moderately well drained fine sandy loam on stream flood plains; over stratified alluvial materials that include beds of sand and gravel in places; subject to occasional overflow.
Wehadkee	0 to 2	0 to 2	8 to 20	Moderate	½ to 1½ feet of poorly drained fine sandy loam on stream flood plains; over stratified materials. Subject to frequent overflow.
Soils on local alluvium:					
Starr	2 to 6	8+	8 to 20	Moderate	3 to 6 feet of well-drained clay loam or clay at base of slopes; over unconsolidated, weathered, light- or dark-colored granite or slate. Subject to overwash.
Worsham	2 to 6	2 to 5	8 to 20	Slow	Poorly drained sandy loam or sandy clay loam at base of slope; generally 3 to 6 feet thick.
Soils on uplands:					
Alamance [1]	2 to 6	8+	4 to 8	Slow	6 to 24 inches of moderately well drained silt loam over silty clay loam, 1½ to 3 feet thick; residual soil over light-colored, siliceous volcanic slate; on broad flat ridges.
Appling	2 to 25	8+	6 to 15	Slow	3 to 12 inches of sandy loam over sandy clay, 1 to 5 feet thick; soil is well drained and residual, overlying unconsolidated weathered granite, gneiss, or schist; on broad ridges or side slopes.
Cecil	2 to 25	8+	6 to 15	Moderate	3 to 12 inches of sandy loam or sandy clay over clay, 1½ to 5 feet thick; soil is well drained, overlying unconsolidated weathered granite, gneiss, or schist; on ridges or side slopes.
Colfax	2 to 6	3 to 5	6 to 15	Slow	4 to 16 inches of sandy loam over sandy clay or clay, 8 to 14 inches thick; soil is somewhat poorly drained, overlying unconsolidated weathered granite; on broad ridges and in saddles or slight depressions.
Davidson [1]	2 to 15	8+	6 to 25	Moderate	3 to 8 inches of clay loam over clay, 2 to 6 feet thick; soil is well drained and residual, overlying dark-colored rocks; on ridges and side slopes.
Durham	2 to 10	8+	6 to 15	Moderate	4 to 16 inches of loamy sand or sandy loam over clay loam or sandy clay, 1 to 4 feet thick; soil is well drained, overlying unconsolidated weathered granite; on ridges or gentle side slopes.
Efland	2 to 15	8+	4 to 8	Slow	3 to 8 inches of silt loam or silty clay loam over clay, 2 to 4 feet thick; soil is well drained and residual, overlying unconsolidated weathered volcanic slates; on ridges and side slopes.

See footnotes at end of table.

County, N.C., and their estimated physical properties

Classification, grain size, and shrink-swell potential of main horizons						
Horizon	Depth from surface	Classification		Grain size		Shrink-swell potential
		A.A.S.H.O.	Unified	Percentage passing No. 4 sieve	Percentage passing No. 20 sieve	
	Inches					
C_1	0 to 22	A-2-4	SM	100	19	Low.
C_2	22 to 96	A-2-4	SM	100	18	Low.
A	0 to 6	A-4	SM	100	37	Low.
C	6 to 96	A-4	SM	100	37	Low.
A	0 to 8	A-4	SM	100	37	Low.
C	8 to 96	A-4	SM	100	37	Low.
A	0 to 8	A-4	SM-SC	100	60	Low.
C	8 to 96	A-6	SC	100	70	Low.
A	0 to 24	A-4	ML-CL	100	75	Moderate.
B	24 to 48	A-6	ML-CL	100	75	Moderate.
A	0 to 18	A-4	ML-CL	100	65	Low.
B	18 to 30	A-7-6	CH	100	75	Moderate.
C	30 to 72	A-7-6	CH	100	65	Moderate.
A	0 to 8	A-4(8)	ML	94	81	Low.
B	8 to 32	A-4(8)	ML-CL	98	84	Moderate.
C	32 to 72	A-4(6)	ML	100	67	Low.
A	0 to 15	A-2-4 or A-4	SM	100	35	Low.
B	15 to 42	A-7-6	MH-CH	100	64	Moderate.
C	42 to 96	A-7-5	MH	100	55	Low.
A	0 to 10	A-4	SM	100	41	Low.
B	10 to 42	A-7-6	CH	100	74	Moderate.
C	42 to 96	A-7-5	ML	100	55	Low.
A	0 to 18	A-4	SM	100	35	Low.
B	18 to 42	A-6	CL	100	58	Moderate.
C	42 to 96	A-4	CL	100	55	Moderate.
A	0 to 8	A-7-6(9)	ML	98	77	Low.
B	8 to 48	A-7-5(20)	ML	99	91	Moderate.
C[2]	48 to 108	A-7-5(20)	MH	100	98	Low.
A	0 to 15	A-4	SM	100	33	Low.
B	15 to 42	A-6	CL	100	53	Low.
C	42 to 96	A-6	SC	100	45	Low.
A	0 to 6	A-6	ML-CL	98	80	Low.
B	6 to 36	A-7-5	MH	100	90	Moderate.
C	36 to 72	A-7-5	MH	99	85	Moderate.

TABLE 5.—*Engineering description of soils in Alamance County*

Soils	Range in slope	Depth to seasonally high water table	Depth to bedrock	Permeability of subsoil	Site and soil description
Soils on uplands—Con.	*Percent*	*Feet*	*Feet*		
Enon [1]	2 to 15	8+	3 to 8	Slow	3 to 10 inches of loam or fine sandy loam over clay, ½ to 3 feet thick; soil is well drained and residual, overlying mixed dark- and light-colored crystalline rocks; on side slopes and ridges.
Georgeville [1]	2 to 25	8+	4 to 8	Moderate	2 to 10 inches of silt loam over silty clay or clay, 1½ to 4 feet thick; soil is well drained and residual, overlying unconsolidated, weathered, light-colored, siliceous volcanic slates; on ridges and side slopes.
Goldston	6 to 25	8+	1 to 4	Rapid	4 to 18 inches of well-drained slaty silt loam over unconsolidated weathered volcanic slates; chiefly on steep slopes.
Helena [1]	2 to 10	4 to 8	5 to 15	Slow	4 to 24 inches of sandy loam over sandy clay, 1½ to 3 feet thick; soil is moderately well drained to somewhat poorly drained and residual, overlying unconsolidated, weathered, mixed light- and dark-colored crystalline rocks; on slopes and ridges.
Herndon	2 to 25	8+	4 to 8	Slow	4 to 14 inches of silt loam over silty clay or clay, 1½ to 4 feet thick; soil is well drained and residual, overlying unconsolidated, weathered, light-colored, siliceous volcanic slate; on ridges and side slopes.
Iredell [1]	0 to 10	3	2 to 8	Very slow	6 to 20 inches of loam or sandy loam over very plastic clay, ½ to 3 feet thick; soil is somewhat poorly drained and residual, overlying dark-colored rock; on flat ridges and gentle side slopes.
Lloyd [1]	2 to 25	8+	5 to 8	Moderate	3 to 10 inches of loam or clay loam over clay, 1½ to 5 feet thick; soil is well drained and residual, overlying mixed, unconsolidated, dark- and light-colored, weathered rocks; on ridges and slopes.
Mecklenburg	2 to 15	8+	4 to 15	Slow	3 to 15 inches of loam or clay loam over clay, 1½ to 4 feet thick; soil is well drained and residual, overlying unconsolidated, weathered, dark-colored, crystalline rocks; on slopes and ridges.
Orange [1]	0 to 10	3 to 5	2 to 7	Very slow	4 to 16 inches of silt loam over plastic clay or silty clay, 1½ to 4 feet thick; soil is somewhat poorly drained and residual, overlying unconsolidated weathered dark-colored slate, on broad ridges or gentle slopes.
Tirzah [1]	2 to 15	8+	4 to 20	Moderate	4 to 8 inches of silt loam or silty clay loam over silty clay, 2½ to 5½ feet thick; soil is well drained and residual, overlying unconsolidated, weathered, dark-colored slate; on slopes and ridges.
Vance [1]	2 to 15	8+	6 to 15	Slow	4 to 16 inches of sandy loam over sandy clay or clay, 2 to 4 feet thick; soil is well drained and residual, overlying unconsolidated, weathered, mixed light- and dark-colored, crystalline rock; on ridges and slopes.
Wilkes	2 to 25	8+	1 to 10	Variable	4 to 18 inches of well-drained loam or sandy loam, overlying mixed, light- and dark-colored, crystalline rocks; on steep side slopes and some narrow ridges.

See footnotes at end of table.

N.C., and their estimated physical properties—Continued

Horizon	Depth from surface	Classification: A.A.S.H.O.	Classification: Unified	Grain size: Percentage passing No. 4 sieve	Grain size: Percentage passing No. 20 sieve	Shrink-swell potential
	Inches					
A	0 to 10	A-4(8)	ML	100	75	Low.
B	10 to 30	A-7-6(19)	CH	100	89	High.
C	30 to 48	A-6(9)	ML-CL	100	85	Moderate to high.
A	0 to 6	A-4(6)	ML	89	66	Low.
B	6 to 36	A-7-5(20)	MH	100	94	Moderate.
C [2]	36 to 72	A-7-5(20)	MH	100	93	Moderate.
AB	0 to 10	A-4	ML	80	64	Low.
C	10 to 30	Variable slaty material.	[3]	[3]	[3]	Low.
A	0 to 12	A-2-4(0)	SM	100	27	Low.
B	12 to 36	A-7-6(17)	CH	100	64	High.
C	36 to 96	A-7-6(11)	CH	100	56	Moderate to high.
A	0 to 6	A-4	ML	95	81	Low.
B	6 to 36	A-7-5	MH	98	85	Moderate.
C	36 to 72	A-7-5	MH	100	67	Moderate.
A	0 to 8	A-4(5)	ML-CL	99	58	Low.
B	8 to 24	A-7-6(20)	CH	99	78	High.
C [2]	24 to 60	A-4 or A-6	ML-CL	100	55	Moderate to high.
A	0 to 8	A-7-6(10)	ML	98	79	Low.
B	8 to 42	A-7-5(20)	MH	100	95	Moderate.
C [2]	42 to 96	A-7-5	ML	100	55	Low to moderate.
A	0 to 8	A-6	ML-CL	98	75	Low.
B	8 to 36	A-7-5	MH	98	79	Moderate to high.
C	36 to 60	A-2-6	SM-SC	99	35	Low to moderate.
A	0 to 10	A-4(8)	ML-CL	100	83	Low.
B	10 to 36	A-7-6(16)	CL	100	90	High.
C	36 to 60	A-7-5(20)	CL	100	90	Moderate.
A	0 to 8	A-7-5(10)	ML	81	70	Low.
B	8 to 48	A-7-5(20)	MH	100	96	Moderate.
C	48 to 96	A-7-5(11)	ML	100	90	Low.
A	0 to 10	A-2-4(0)	SM	92	33	Low.
B	10 to 42	A-7-5(20)	MH-CH	100	80	Moderate to high.
C	42 to 72	A-7-5(13)	MH	100	65	Moderate.
A	0 to 12	A-4	ML	95	45	Low.
C	12 to 48	[3]	[3]	60	45	Low.

TABLE 5.—*Engineering description of soils in Alamance County*

Soils	Range in slope	Depth to seasonally high water table	Depth to bedrock	Permeability of subsoil	Site and soil description
Miscellaneous land:	*Percent*	*Feet*	*Feet*		
Local alluvial land, well drained.	0 to 5	8+	8 to 20	Rapid	1 to 3 feet of well-drained sandy loam that overlies 1 to 2 feet of clay loam in most places; this overlies unconsolidated weathered light-colored siliceous granite or slate. Subject to overwash.
Local alluvial land, poorly drained.	0 to 5	0 to 5	8 to 20	Variable	1 to 4 feet of poorly drained, stratified or unstratified material adjacent to hillsides; on foot slopes or along small drainways.
Mixed alluvial land, poorly drained.	0 to 2	1 to 3	8 to 20	Variable	Poorly drained alluvial material that is stratified in some places.
Mixed alluvial land, well drained.	0 to 2	3 to 6	8 to 20	Variable	Well-drained alluvial material that is stratified in some places.
Moderately gullied land, Helena, Enon, and Wilkes materials.	6 to 25	8+	1 to 10	Slow	Severely eroded shallow soils with more than 25 percent of surface in gullies; on side slopes.
Moderately gullied land, Cecil, Appling, and Lloyd materials.	6 to 15	8+	3 to 20	Moderate	Severely eroded soils with more than 25 percent of surface in gullies; soils are well drained and residual, overlying light-colored, siliceous slate; on slopes.
Moderately gullied land, Georgeville and Herndon materials.	6 to 25	8+	3 to 8	Moderate	Severely eroded soils with more than 25 percent of surface in gullies; soils are well drained and residual, overlying light-colored, siliceous slate; on slopes.
Stony land	6 to 15	8+	0 to 10	Variable	Land with rock outcrops that in places has surface covered with loose boulders. Too stony for tillage but suitable for trees.
Severely gullied land.	10 to 15	8+	4 to 20	Variable	Severely eroded land with more than 75 percent of the surface occupied by gullies; most surface soil gone.

[1] Engineering test data for a soil in this series are given in table 4. They are used in estimating physical properties of the soils in a series where the horizons sampled represent an average condition in the county.

tion and use of farm ponds and terraces are given in table 6. The construction of both ponds and terraces is hindered by rock outcrops. The effectiveness of ponds is lessened by a permeable subsoil; that of terraces, by a plastic subsoil.

Table 6 also includes an evaluation of the soils for use as septic tank fields. This evaluation may help those who are selecting a homesite and those who are investigating the suitability of an area for real estate development.

Not included in table 6 but important in highway engineering is information on the need of reinforcing the subgrade if flexible pavement is to be laid. In Alamance County, a porous subbase is used for all rigid pavement. For flexible pavement, some soils and miscellaneous land need to have the subbase reinforced. They are the Buncombe, Cecil, and Lloyd soils; Moderately gullied land, Cecil, Appling, and Lloyd materials; and Severely gullied land.

Agriculture

The crops grown in Alamance County by the early settlers were mainly wheat, corn, and oats. The first tobacco had a dark, heavy leaf, which was cured, packed into barrels, and sold at Fayetteville, N. C., or Petersburg, Va. This tobacco was grown on the red, clayey soils in the central part of the county. The large area of sandy soils in the northeastern corner of the county was considered practically worthless until 1852, when Eli

N.C., and their estimated physical properties—Continued

Classification, grain size, and shrink-swell potential of main horizons						
Horizon	Depth from surface	Classification		Grain size		Shrink-swell potential
		A.A.S.H.O.	Unified	Percentage passing No. 4 sieve	Percentage passing No. 20 sieve	
	Inches					
A	0 to 24	A-4	SM-SC	95	30	Low.
B	24 to 36	A-4	SM-SC	98	40	Low.
Variable horizons	(3)	(3)	(3)	95	30	Low.
Variable horizons	(3)	A-4	SM	(3)	(3)	Low.
Variable horizons	(3)	A-4	SM	(3)	(3)	Low.
Variable horizons	(3)	(3)	(3)	(3)	(3)	Moderate.
Variable horizons	(3)	(3)	(3)	(3)	(3)	Low.
Variable horizons	(3)	(3)	(3)	(3)	(3)	Low.
Variable horizons	(3)	(3)	(3)	(3)	(3)	Low.
Variable horizons	(3)	(3)	(3)	(3)	(3)	Low.

[2] Data used in estimating physical properties of this horizon taken from samples representing lower and upper parts of the C horizon. Data may not represent entire C horizon.

[3] Variable.

and Elisha Slade grew a crop of yellow tobacco on the sandy soils. The Slades attributed the yellow color and other peculiarities of this tobacco to special methods of cultivating and curing. Soon, however, it was discovered that the peculiarities resulted from the effects of the sandy soils. After the Civil War, the opening of the western markets created a great demand for fancy leaf tobacco. Because this tobacco could be grown only on light sandy soils, the area that was once considered worthless rapidly increased in value. The prosperity in areas that had light sandy soils was reflected by better barns and houses, not only in Alamance County but throughout the State and elsewhere.

Farming in the county is affected by local industries. Every town and city has at least one large industrial plant, and many industrial workers are part-time farmers in rural areas. They grow small grain, soybeans, pasture, and hay. These crops are used mostly to feed livestock on the farms. Beef cattle and hogs are the main livestock, but a few dairy cows are also raised.

Dairying is the chief type of farming in the southern and eastern parts of the county. The large number of factory workers creates a demand for dairy products.

Tobacco, the main cash crop, is grown mostly by tenants in the northeastern part of the county. A small acreage of cotton is planted in the south-central part. Some pulpwood and lumber are sold. The forests are mainly on steep slopes on the Cane Creek Mountains in the southern part of the county and on the Stonycreek Mountains in the north-central part. They are also on steep escarpments along the Haw River and its tributaries.

TABLE 6.—*Engineering interpretation for the soils of Alamance County, N.C*

Soils	Recommendations for location of highway grade line	Suitability of soil material as a source for—			Soil features affecting—		Suitability for septic tank field
		Topsoil	Borrow material	Core material for earth dams	Farm ponds	Terraces	
Soils on alluvial plains:							
Buncombe	Above high water	Poor	Poor	Not suitable because of sand.	Porous sand; overflow.	(1)	Poor.
Chewacla	Above high water and at least 30 inches above water table.	Good	Poor	Poor because poorly graded in most places.	Overflow	(1)	Poor.
Congaree	Above high water	Good	Poor	Poor because poorly graded in most places.	Overflow	(1)	Poor.
Wehadkee	Above high water and at least 30 inches above water table.	Poor	Poor	Poor because poorly graded in most places.	Overflow	(1)	Poor.
Soils on local alluvium:							
Starr	Anywhere	Good	Fair	Fair	Excessive permeability; may require deep core.	Suitable for sodded waterways.	Fair.
Worsham	At least 30 inches above water table, which should be lowered by ditching.	Poor	Poor	Fair	Seepage areas; may require toe drains.	Suitable for sodded waterways.	Poor.
Soils on uplands:							
Alamance	Anywhere [2]	Fair	Fair	Poor to fair	Occasional rock ledges; permeable substratum in some places.	Shallow to rock in places.	Fair.
Appling	Anywhere [2]	Good	Fair	Good	Occasional rock outcrops.	Occasional rock outcrops and boulders.	Good.
Appling (severely eroded).	Anywhere [2]	Poor	Fair	Fair to good	Occasional rock outcrops.	Occasional rock outcrops and boulders; gullies in some places.	Good.
Cecil	Anywhere [2]	Good	Fair	Fair to good	Occasional rock outcrops.	Occasional rock outcrops and boulders.	Good.
Cecil (severely eroded).	Anywhere [2]	Good	Fair	Fair to good	Occasional rock outcrops.	Occasional rock outcrops and boulders; gullies in some places.	Good.
Colfax	At least 30 inches above water table, which should be lowered by ditching.	Good	Poor	Good	Seepage areas; may require toe drain.	Suitable for sodded waterways.	Poor.
Davidson	Anywhere	Fair	Fair	Fair	Permeable substratum.	Deep soil	Good.
Davidson (severely eroded).	Anywhere	Poor	Fair	Fair	Permeable substratum.	Deep soil; deep gullies in some places.	Good.
Durham	Anywhere [2]	Good	Fair	Good	Occasional rock outcrops.	Occasional rock outcrops.	Good.
Efland	Anywhere [2]	Fair	Fair	Fair but somewhat difficult to work when wet.	Occasional rock outcrops.	Occasional rock outcrops.	Poor.
Efland (severely eroded)	Anywhere [2]	Poor	Fair	Fair; somewhat difficult to work when wet.	Occasional rock outcrops.	Occasional rock outcrops; gullies in places.	Poor.
Enon	Anywhere [2]	Poor to fair.	Fair	Good; somewhat difficult to work when wet.	Frequent rock outcrops.	Plastic subsoil; frequent rock outcrops.	Poor.

Enon (severely eroded)	Anywhere [2]	Not suited.	Fair	Good, somewhat difficult to work when wet.	Frequent rock outcrops.	Plastic subsoil; frequent rock outcrops; gullies in places.	Poor.
Georgeville	Anywhere [2]	Fair	Fair	Fair	Occasional rock outcrops.	Shallow to rock in places.	Good.
Georgeville (severely eroded).	Anywhere [2]	Poor	Fair	Fair	Occasional rock outcrops.	Shallow to rock in places; deep gullies in places.	Fair.
Goldston	May be influenced by bedrock.	Poor	Poor	Poor	Slaty rock at shallow depths; rock permeable in places.	Shallow to rock	Poor.
Helena	Anywhere [2]	Fair to good.	Fair	Good	Occasional rock outcrops and boulders.	Occasional rock outcrops and boulders.	Poor.
Helena (severely eroded).	Anywhere [2]	Not suitable.	Fair	Good	Occasional rock outcrops and boulders.	Occasional rock outcrops and boulders; gullies in places.	Poor.
Herndon	Anywhere [2]	Fair	Fair	Fair	Shallow to rock in places; substratum permeable in places.	Shallow to rock in places.	Fair.
Herndon (severely eroded).	Anywhere [2]	Poor	Fair	Fair	Shallow to rock in places; substratum permeable in places.	Shallow to rock in places; gullies in places.	Fair.
Iredell	Anywhere [2]	Poor	Not suitable	Good; difficult to work when wet; plastic.	Occasional rock ledges and boulders.	Sticky, plastic subsoil; shallow to rock in many places.	Poor.
Iredell (very stony)	Influenced by stones	Not suitable.	Not suitable	Not suitable because of stones and a plastic subsoil.	Stones, boulders, and rock outcrops.	Stones, boulders, and shallow to rock, sticky, plastic subsoil.	Poor.
Lloyd	Anywhere [2]	Good	Fair	Fair	Occasional rock outcrops.	Deep soil; very occasional rock outcrop.	Good.
Lloyd (severely eroded)	Anywhere [2]	Poor	Fair	Fair	Occasional rock outcrops.	Deep soil; gullies in places, very occasional rock outcrop.	Good.
Mecklenburg	Anywhere [2]	Fair	Fair	Fair but somewhat difficult to work when wet.	Occasional rock outcrops.	Occasional rock outcrops.	Poor.
Mecklenburg (severely eroded).	Anywhere [2]	Poor	Fair	Fair but somewhat difficult to work when wet.	Occasional rock outcrops.	Occasional rock outcrops; gullies in places.	Poor.
Orange	At least 30 inches above water table, which in some places may need to be lowered by ditching.	Poor	Fair	Good but plastic and difficult to work when wet.	Shallow to rock in places.	Sticky, plastic subsoil; shallow to rock in places.	Poor.
Tirzah	Anywhere	Fair	Fair	Fair	Permeable substratum.	Deep soil	Good.
Tirzah (severely eroded)	Anywhere	Poor	Fair	Fair	Permeable substratum.	Deep soil; gullies in places.	Good.
Vance	Anywhere [2]	Fair to good.	Fair	Good	Occasional rock outcrops.	Occasional rock outcrops.	Poor.
Vance (severely eroded)	Anywhere [2]	Not suitable.	Fair	Good	Occasional rock outcrops.	Occasional rock outcrops.	Poor.
Wilkes	May be influenced by bedrock.	Fair	Fair	Poor	Rock ledges and outcrops.	Shallow; rocky in places.	Poor.
Wilkes (stony)	Influenced by stones and bedrock.	Not suitable.	Not suitable because of stones and rock ledges.	Poor	Rock ledges, outcrops, and boulders.	Shallow; stony rock outcrops.	Poor.

See footnotes at end of table.

TABLE 6.—*Engineering interpretation for the soils of Alamance County, N.C.*—Continued

Soils	Recommendations for location of highway grade line	Suitability of soil material as a source for—			Soil features affecting—		Suitability for septic tank field
		Topsoil	Borrow material	Core material for earth dams	Farm ponds	Terraces	
Miscellaneous land:							
Mixed alluvial land, poorly drained.	At least 30 inches above water table.	Poor	Poor	Not suitable because of sandy material.	Overflow	(1)	Poor.
Mixed alluvial land, well drained.	Anywhere	Poor to fair.	Poor	Not suitable because of sandy material.	Overflow	(1)	Poor.
Local alluvial land, poorly drained.	At least 30 inches above water table, which should be lowered by ditching.	Fair	Poor	Generally not suitable because of variable texture.	Excessive permeability, may require deep core.	Suitable for sodded waterways.	Poor.
Local alluvial land, well drained.	Anywhere	Good	Fair	Generally unsuitable because of variable texture.	Excessive permeability, may require deep core.	Suitable for sodded waterways.	Fair.
Moderately gullied land, Helena, Enon, and Wilkes materials.	Anywhere	Not suitable.	Poor	Poor	Not suitable	Not suitable	Not suitable.
Moderately gullied land, Cecil, Appling, and Lloyd materials.	Anywhere	Not suitable.	Poor	Poor	Not suitable	Not suitable	Not suitable.
Moderately gullied land, Georgeville and Herndon materials.	Anywhere	Not suitable.	Poor	Poor	Not suitable	Not suitable	Not suitable.
Stony land	Influenced by stones	Not suitable.	Not suitable	Not suitable	Not suitable	Not suitable	Not suitable.
Severely gullied land	Anywhere	Not suitable.	Poor	Poor	Not suitable	Not suitable	Not suitable.

[1] Terraces not needed.

[2] May be influenced by bedrock where slopes are steeper than 8 percent.

Crops

Table 7 gives the acreage of principal crops and the number of fruit trees and grapevines in the county for 1939, 1949, and 1954.

The average acre yields for most crops increased from 1939 to 1949 but declined in 1954. In 1954, hurricane Hazel, floods, and droughts caused severe damage to crops. Fungus disease, particularly on tobacco, also reduced yields.

Corn harvested for grain declined from about 535,000 bushels in 1949 to less than 306,000 bushels in 1954. The average yield per acre for corn declined from 31.4 bushels in 1949 to 20.1 bushels in 1954. The average yield per acre for tobacco declined from 943 pounds in 1949 to 887 pounds in 1954. Soybeans and lespedeza also had smaller yields per acre in 1954 than in 1949.

Wheat and oats, however, had larger yields per acre. The average yield of wheat rose from 14.6 bushels per acre in 1949 to 23.1 bushels per acre in 1954; that of oats rose from 33.5 bushels per acre to 42.2 bushels.

Fruit trees were damaged by storms in 1954. The average yield of grapes rose from 2.7 pounds per vine in 1949 to 6.8 pounds per vine in 1954.

Information on the cost of producing certain crops and other economic information about different aspects of farming can be obtained from Cost of Producing Farm Products in North Carolina (*6*), published by the North Carolina State College.

TABLE 7.—*Acreage of principal crops and number of fruit trees and grapevines of bearing age in Alamance County, N.C., in stated years*

Crop	1939	1949	1954
	Acres	*Acres*	*Acres*
Corn for all purposes:			
Corn harvested for grain	21, 551	17, 035	14, 420
Corn for silage	433	461	1, 321
Small grain:			
Oats threshed or combined	3, 117	6, 985	9, 931
Wheat threshed or combined	8, 847	9, 166	7, 564
Barley threshed or combined	284	888	1, 269
Hay total	11, 904	17, 384	17, 155
Alfalfa cut for hay	169	1, 490	757
Clover, timothy, and mixtures of grasses cut for hay	356	975	1, 302
Small grain cut for hay	393	683	1, 516
Lespedeza cut for hay	9, 565	12, 569	11, 772
Soybeans cut for hay	(1)	1, 146	1, 142
Other hay cut	1, 421	521	666
Lespedeza seed harvested	2, 002	5, 696	3, 182
Soybeans harvested for beans	93	884	606
Tobacco	6, 554	5, 636	5, 864
	Number [2]	*Number* [2]	*Number*
Apple trees	10, 925	9, 561	3, 047
Peach trees	12, 595	7, 549	1, 934
Pear trees	2, 599	2, 125	567
Plum and prune trees	1, 326	660	117
Cherry trees	2, 063	1, 716	212
Grapevines	5, 747	2, 827	848

[1] Not reported.
[2] One year later than year given at head of column.

Corn.—Corn is grown on most soils in the county. In many places, however, yields are low because the soils contain small amounts of plant nutrients, and, at times, not enough moisture is available. Yields of corn are highest on the Davidson, Tirzah, Georgeville, Cecil, Appling, Durham, Congaree, and Chewacla soils. These soils respond well to good management, particularly fertilization. If they receive enough of the right kind of fertilizer and enough moisture is available, they can produce from 70 to 100 bushels of corn per acre. In 1954, 1,702 farms reported using 2,703 tons of commercial fertilizer on corn, an average of 360 pounds an acre. Most of the corn is fed to work animals, swine, and cattle. A little is ground into meal for home use. The corn that is not used on the farm is sold at local markets.

Oats.—In 1954, the second largest acreage of tilled crops was in oats; almost 420,000 bushels were grown on 1,000 farms. Oats are best suited to the Davidson, Georgeville, Cecil, Lloyd, and Tirzah soils. They are grown, to a lesser extent, on the sandy Helena, Enon, Mecklenburg, Iredell, and Appling soils. Yields normally are low, but on properly fertilized, suitable soils as much as 65 bushels per acre can be obtained in favorable years. On many farms, lespedeza is sown with oats early in spring and is harvested for hay or seed in fall. Most of the oat crop is fed to livestock; some is sold locally.

Wheat.—In 1954, wheat was grown on the third largest tilled acreage in the county; about 175,000 bushels were harvested on 934 farms. Although wheat is grown on most soils in the county, most of it is on the Davidson, Tirzah, Cecil, Appling, Enon, and Helena soils. Yields are generally low, but properly fertilized, suitable soils can produce as much as 45 bushels per acre. The wheat should be fertilized lightly when it is sown in fall; in spring, it should be topdressed with nitrogen. Nearly all the wheat is traded for flour at local mills. Waste products from processing are fed to cattle. If there is a surplus of wheat, it is sold at local markets.

Tobacco.—Tobacco is the chief cash crop. Many farmers consider it the most important crop in the county. These farmers give tobacco priority over other crops in the use of land, labor, fertilizer, and buildings. Tobacco grows best on sandy soils; consequently, the Durham, Appling, Helena, Vance, Cecil, Enon, Iredell, and Wilkes soils are used for tobacco. The crop is auctioned at warehouses in the county and in nearby counties.

In 1954, almost 6,000 acres of tobacco were planted in the county. Almost 5,202,000 pounds were produced on 1,233 farms. Average yields per acre increased from 570 pounds in 1910 to 945 pounds in 1949, but adverse weather and plant disease caused a decline in yields per acre in 1954. If high-yielding, disease-resistant tobacco is planted, 2,000 pounds per acre can be harvested. Even higher yields can be expected if supplemental irrigation is used in dry weather. In 1954, 1,180 farms reported using 2,836 tons of commercial fertilizer on 5,450 acres in tobacco, an average of 1,040 pounds per acre.

Barley.—Barley was grown on 1,269 acres in 1954. It grows best on the Davidson, Lloyd, Cecil, Tirzah, Georgeville, and Herndon soils. Some barley is grown on the Helena, Enon, and Iredell soils. If the barley is sown on suitable soils that receive enough water and fertilizer, as much as 60 bushels per acre can be harvested. On most farms, lespedeza is sown with the barley and harvested in fall. Most of the barley is fed to livestock; the surplus is sold locally.

Soybeans.—Soybeans are grown on most of the soils in the county. They are grown on practically the same kinds of soils as is corn. Most of the acreage in soybeans, however, is on the Cecil, Georgeville, Lloyd, Davidson, Tirzah, Appling, Enon, and Herndon soils. About two-thirds of the acreage in soybeans is cut for hay; the rest is harvested for seed that is planted the following year.

In 1954, soybeans cut for hay were grown on 1,142 acres in the county. The average yield of soybean hay is about 1.5 tons per acre. In favorable years, suitable soils can produce about 30 to 35 bushels of soybeans per acre. Most of the hay is fed to livestock; some of the seed is sold at local markets.

Pasture.—Because lime and fertilizer have been scientifically used and better plants have been seeded, the pasture in the county has improved greatly since 1925. In 1954, the county had a total of 47,671 acres in improved and native pasture. Almost all the soils in the county can be used for pasture, but the deeper, finer textured soils of the upland and the alluvial soils are best suited. In 1954, 642 farms reported using 1,577 tons of commercial fertilizer on 9,180 acres in hay meadows and cropland used for pasture, an average of 340 pounds per acre.

Hay and forage crops.—The acreage in hay and forage increased from 5,209 acres in 1910 to 17,155 acres in 1954. The average yield in 1954 was about 1.2 tons per acre. The yield of alfalfa per acre is higher than yields of other hay crops, but the total acreage in alfalfa is small. Lespedeza can be grown on a wider variety of soils than other hay crops, but it is best suited to the deeper upland soils or the fertile bottom-land soils. In most places, lespedeza is sown with a small grain early in spring; it normally lasts for 3 years. One crop is harvested each year for seed or hay. The average yields are about 200 pounds per acre for seed and 1.1 tons per acre for hay.

Minor crops.—Irish potatoes, sweetpotatoes, rye, and cowpeas are grown in small amounts. The Irish potatoes and sweetpotatoes grow best on the Appling, Durham, Cecil, Herndon, Helena, and Enon soils. Most of the potatoes are grown for home use.

The acreage used to grow rye has decreased since 1925. In 1954, only 157 acres of rye was grown to be harvested. Some of the rye is planted for cover on soil that is to be used for tobacco. Enough of this rye is harvested so that the seed can be used for future planting.

The acreage in cowpeas has declined since 1935. Most of the cowpeas are plowed under to supply green manure, but some are harvested for seed, home use, and hay. Cowpeas grow on about the same kinds of soils as do soybeans.

A few acres of cotton are grown in the south-central part of the county on Davidson, Lloyd, and Tirzah soils. The acreage planted to cotton has declined since 1920. This decline is the result of damage by the boll weevil and the large amount of labor that is required to produce cotton. All cotton grown in the county is sold to local buyers at gins or warehouses.

Livestock and Livestock Products

Table 8 gives the number of livestock and beehives on the farms in the county in 1940, 1950, and 1954.

A few hogs, several milk cows, and small flocks of chickens are kept on most farms. Hogs are raised chiefly to provide lard and meat for home use. A few are sold at local markets. The milk, poultry, and eggs are used mainly at home; the surplus is sold. In 1954, 265 farms, mainly in the dairy section of the county, sold about 2,580,000 gallons of milk; 85 farms sold 18,694 pounds of butterfat, or cream; and 617 farms sold 633,738 dozens of eggs.

TABLE 8.—*Number of livestock and beehives on farms in stated years*

Livestock	1940	1950	1954
Horses and colts	[1] 1, 499	1, 321	744
Mules and mule colts	[1] 2, 618	2, 269	1, 507
Cattle and calves	[1] 7, 439	11, 322	15, 995
Hogs and pigs	[2] 4, 018	8, 014	8, 524
Sheep and lambs	[3] 316	619	606
Chickens	[2] 97, 958	[2] 110, 304	[2] 130, 325
Beehives	1, 183	1, 464	(4)

[1] Over 3 months old.
[2] Over 4 months old.
[3] Over 6 months old.
[4] Not reported.

Types and Sizes of Farms

Of the 2,749 farms in Alamance County reported in the 1955 census, 1,282 were miscellaneous and unclassified. The remaining farms were listed by type of farms as follows:

Field crop other than vegetable and fruit and nut	1,080
Cash grain	95
Other field crop	985
Dairy	127
Poultry	60
Livestock other than dairy and poultry	105
General	95
Primarily crop	30
Primarily livestock	15
Crop and livestock	50

In 1954, the 2,749 farms in the county ranged in size from less than 10 to more than 1,000 acres. Of this total number, 413 farms were less than 10 acres in size; 940 were from 10 to 49 acres; 707 from 50 to 99 acres; 466 from 100 to 179 acres; 131 from 180 to 259 acres; and 90 from 260 to 999 acres. Two farms were more than 1000 acres in size. The average size farm was 73.3 acres.

Farm Power and Other Equipment

The use of farm machinery is increasing in Alamance County. The 1954 census reported a total of 1,851 work animals in the county, of which 744 were horses and colts and 1,507 were mules. This is slightly more than half the number of work animals in the county in 1940.

The work animals have been replaced, to a large degree, by tractors and other mechanical equipment. Wheel tractors have increased from 281 in 1940 to 1,724 in 1954. Between 1950 and 1954, grain combines have increased from 337 to 397, and cornpickers from 66 to 152.

In 1954, there were 2,396 automobiles on 2,052 farms, an increase from 1,824 automobiles on 1,582 farms in 1940. Motortrucks also increased between 1940 and 1954.

In 1954, there were 1,023 motortrucks on 962 farms, an increase from 194 on 184 farms in 1940.

In 1954, of the total 2,749 farms in the county, 2,697 had electricity and 1,247 had telephones.

Land Use and Farm Tenure

Alamance County has a total of 277,760 acres. According to the 1954 census, the 2,748 farms in the county occupied 201,595 acres, or 72.6 percent of the county. Harvested cropland covered 56,144 acres, or 27.8 percent of the area in farms. Cropland used for pasture totaled 12,507 acres, and cropland that was not harvested and not pastured totaled 16,214 acres. Pasture that was not cropland and not woodland covered 18,130 acres. There were 87,984 acres in woodland, some of which was pastured. All other land, including barnyards, feedlots, lanes, roads, and wasteland, covered a total of 10,616 acres. The bulletin, Inventory of Land Use in North Carolina (*7*), published by the North Carolina Agricultural Experiment Station, gives other information on the use of land in the State.

In 1954, full owners operated 1,644 farms, or 59.8 percent of the farms in the county; part owners 503, or 18.3 percent; managers 6, or 0.2 percent; and tenants 596, or 21.7 percent.

The number of cash tenants was 23; share-cash tenants, 6; share tenants, 232; croppers, 273; and unspecified tenants, 62. Operators living on farms numbered 2,569, and those not living on their farms numbered 107. Operators who worked away from their farms 100 days or more during 1954 numbered 1,185.

The largest percentage of tenants are croppers. The croppers and their landlords have an agreement under which the landlord furnishes all the work animals or tractors. The landlord or his agent supervises the cropper, who works a unit of land that is part of a large enterprise.

General Nature of the Area

This section was prepared for those who are not familiar with the county. It contains sections on geology, climate, forests, transportation, and other subjects of general interest.

Physiography, Relief, and Drainage

Alamance County is in the central part of the Piedmont Plateau. Most of the county is relatively flat or gently rolling; average elevation is about 650 feet. Near the larger creeks and rivers, however, the terrain is more rugged. A few rounded hills, or monadnocks, rise above the upland. The most prominent monadnocks are the Cane Creek Mountains in the southern part of the county. These mountains rise to an elevation of 1,033 feet a few miles north of Snow Camp. The nearly level bottom land that lies along the rivers and larger creeks varies from a few feet to about one-fourth mile in width. It has a fairly small total acreage.

The extremes of elevation are 350 feet and 1,033 feet above sea level. Differences in elevation are greater in north-south directions than they are in east-west directions. Mebane has an elevation of 677 feet; Graham, 656 feet; Burlington, 663 feet; Elon College, 716 feet (*15*).

Mainly because of the rolling and hilly relief, the soils of the county generally have moderate to rapid natural drainage. Some of the first bottoms and colluvial areas, however, are poorly drained.

All of the county is drained by the Haw River and its tributaries except for an area of 6 or 8 square miles in the southwestern corner that is drained by the Rocky River. The main tributaries of the Haw River are Reedy Branch, Stony Creek, Back Creek, Haw Creek, Big Stinking Quarter Creek, and Cane Creek. All of these streams run into the Haw River within the county (*8*).

Geology [3]

Alamance County is entirely within the upland section of the Piedmont physiographic province. This section is an uplifted plain that has been dissected to various degrees. Fairly resistant rock underlies the area, which slopes generally to the east and southeast. Monadnocks, or hills of resistant rock, rise above the general area. Some of these monadnocks are several hundred feet higher than the surrounding area.

Figure 11 shows the distribution of the different rock formations in Alamance County. Both igneous and metamorphic rocks occur in this area. The metamorphic rocks are mainly gneisses, schists, slates, and quartzites. The igneous rocks are mainly granite and diorites. The quartzites and many of the gneisses and schists have formed from sediments. Their beds strike generally northeast-southwest, which is also the direction of strike of elongated igneous intrusions in the metamorphic rocks. Where these igneous intrusions have been metamorphosed, their structural elements also strike northeast-southwest.

Except for a few monadnocks, the area was eroded to a low-lying plain that had little relief. This geologic erosion possibly occurred between the latter part of the Triassic period and the first part of the Cretaceous period.

Later the area was uplifted. It was probably tilted slightly, and the southeastward slope increased. After the uplift, streams cut down rapidly and formed narrow, steep-walled valleys. The main streams probably flowed in about the same channels that the former streams flowed; but, in many places, old meanders were cut off, and the courses of the streams were generally straightened and shortened. Smaller streams formed between the main streams and flowed parallel to them.

Greenstone schist, slates, sheared granite, and diorite are found in Alamance County. The greenstone schist crops out in two large irregular areas and a number of smaller ones. The largest area extends generally northeastward, almost across the county. It passes through Alamance, Bellemont, Graham, and Haw River. The other large area of greenstone schist lies to the northwest, roughly parallel to the first. It extends from Gibsonville and passes through Elon College, Ossipee, Altamahaw, and Pleasant Grove. Greenstone schist under-

[3] The information in this section was taken from GEOLOGY AND GROUND WATER IN THE GREENSBORO AREA (*8*).

lies the surface in the northwestern corner of the county. It crops out in a number of small areas near Union Ridge and Pleasant Grove.

Some of the greenstone schist is made up of varieties of schistose and gneissic rocks. These are green rocks of igneous origin. Before they were metamorphosed, apparently they were mostly mafic extrusives, including flows, tuffs, and breccias. The principal minerals are plagioclase, hornblende, and chlorite. These rocks have

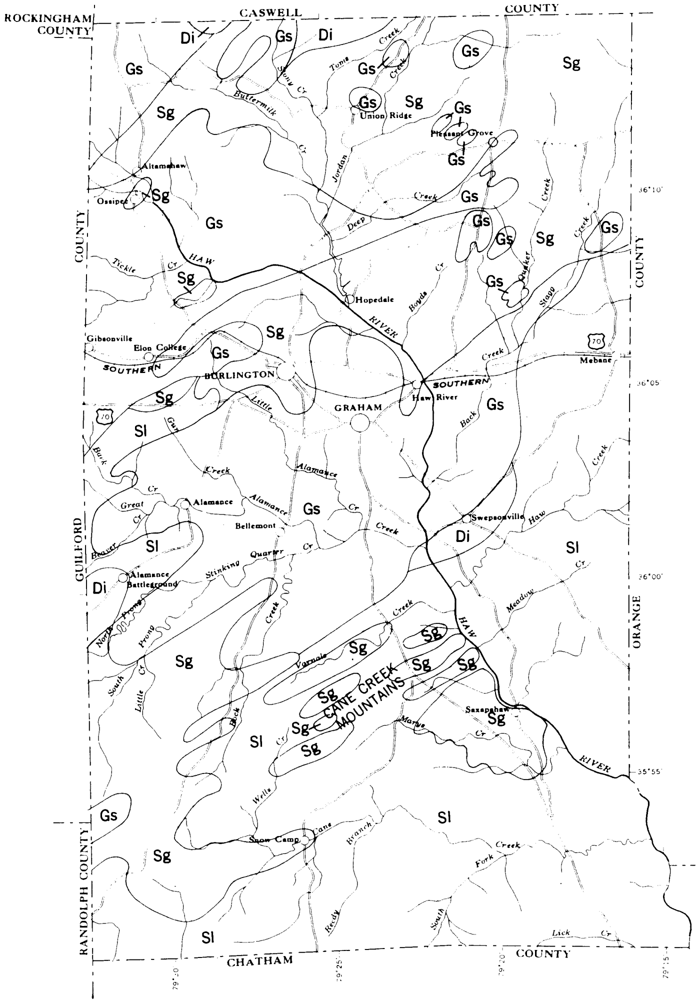

Figure 11.—**Rock formations in Alamance County: Gs-greenstone schist, chiefly volcanic; Sg-sheared granite, mostly coarse grained; Di-diorite, chiefly hornblende and plagioclase; Sl-slate, chiefly gneissic, schistose, or slaty tuffaceous.**

been greatly deformed and sheared. In most places, they are highly schistose; in a few places, they are fairly massive. The coarse-grained rocks appear to be less schistose than the finer grained ones. In most places, the greenstone schist is deeply weathered; but, in some places, particularly south of Elon College and Gibsonville, the unweathered schist is almost at the surface.

Except for a few relatively small areas near Snow Camp and Saxapahaw, tuffaceous slate underlies the surface of the southeastern third of the county. These slates were mainly felsic tuffs and breccias, but they have been metamorphosed and have become slaty and schistose and, in a few places, gneissic. Clay slates occur in a few places. In areas near Mebane and between Mebane and Swepsonville, there are schists and slates that probably formed from mixtures of volcanic ash and land waste. Farther south the slates are mostly metamorphosed tuffs and breccias. Many outcrops of coarse tuffs and breccias occur in the southwestern corner of the county.

The sheared granite crops out in a number of irregularly shaped areas separated from each other by the areas of greenstone schists. Most of the granite areas extend northeastward. The largest area extends from Elon College and Burlington through Hopedale and then northeast and west of Pleasant Grove. Another large area of granite crops out north and west of Snow Camp and extends into Guilford County. A number of small areas crop out in the Cane Creek Mountains and near Saxapahaw.

In most places, the granite is coarse-grained, pinkish-gray gneissic biotite granite; in a few places, it is light gray and somewhat finer grained. The biotite occurs in large tubular crystals that were smeared around the feldspar crystals while the rock was being deformed. The granite has been metamorphosed, probably as much as the greenstone schist and slates.

Many green, slaty, schistose mafic dikes have intruded into the granite. In places, the areas covered by the outcrops of the mafic dikes are larger than the areas covered by the outcrops of granite into which the dikes have intruded. The dikes are so much like the greenstone schist that many specimens of one cannot be distinguished from those of the other.

The areas of diorite are relatively small. The largest area, which is north of Union Ridge, extends northeastward into Caswell County. In the southwestern end of this area, diorite underlies Stonycreek Mountains. An area of diorite that crops out to the west is mostly in Caswell County. A third area, southwest of Alamance on the north side of Big Stinking Quarter Creek, extends southwest into Guilford County. Another area extends southwestward and northeastward from Swepsonville. A very small area is between Graham and Haw River and south of Burlington.

The diorite ranges from moderately fine to coarse in texture and from medium gray to dark greenish gray or dark gray in color. The minerals are chiefly plagioclase and hornblende. In most places, the diorite is massive and appears to have been metamorphosed only slightly or not at all. In a few places, it is quite schistose. Possibly diorite of two ages occurs in the county.

Climate

Although no high mountains are near enough to affect the climate, the climate of the county is influenced by the Atlantic Ocean (*11*). The long summer is moderately hot, and winter generally is not very cold. Rainfall is plentiful and well distributed throughout the year. Snowfall is generally light, and the snow does not remain on the ground for long periods. The length of the average growing season at Chapel Hill, in Orange

County, is 209 days. Frost has occurred at Chapel Hill as late in spring as May 10 and as early in fall as October 1. Table 9, compiled from the records of the United States Weather Bureau, gives temperature data from the Chapel Hill station, in Orange County, and precipitation data from the Graham station, in Alamance County.

The following data on risk of having a freeze were compiled from United States Weather Bureau records that have been kept for 50 years at Moncure, in Chatham County, (*4*):

Average last freeze in spring: April 18.
Average first freeze in fall: October 22.
Average growing season: 187 days.
Earliest date of last freeze in spring: March 30, 1948.
Latest date of last freeze in spring: May 10, 1923.
Earliest date of first freeze in fall: October 2, 1947.
Latest date of first freeze in fall: November 13, 1946.
Longest growing season: 227 days in 1948.
Shortest growing season: 158 days in 1940.

TABLE 9.—*Temperature at Chapel Hill Station, Orange County (elevation 500 feet) and precipitation at Graham Station, Alamance County, N.C. (elevation 656 feet)*

Month	Temperature [1] (Chapel Hill)			Precipitation [2] (Graham)			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1925)	Wettest year (1929)	Average snowfall
	° F.	° F.	° F.	Inches	Inches	Inches	Inches
December	42. 8	84	6	4. 20	2. 10	3. 41	1. 6
January	41. 2	80	−1	3. 70	8. 03	1. 68	2. 9
February	43. 5	85	−6	3. 80	1. 24	7. 49	1. 9
Winter	42. 5	85	−6	11. 70	11. 37	12. 58	6. 4
March	50. 2	92	10	4. 20	2. 02	5. 87	1. 9
April	59. 1	97	20	4. 00	2. 65	4. 50	. 1
May	68. 2	100	29	3. 60	2. 47	4. 06	(3)
Spring	59. 2	100	10	11. 80	7. 14	14. 43	2. 0
June	75. 9	104	41	4. 20	. 42	5. 65	(3)
July	78. 8	107	50	5. 40	. 43	7. 39	0
August	77. 2	105	47	5. 00	2. 23	3. 65	0
Summer	77. 3	107	41	14. 60	3. 08	16. 69	(3)
September	72. 2	104	35	3. 20	1. 69	3. 10	0
October	60. 6	97	25	2. 90	2. 94	7. 21	0
November	50. 5	88	12	2. 40	2. 17	4. 43	. 2
Fall	61. 1	104	12	8. 50	6. 80	14. 74	. 2
Year	60. 0	107	−6	46. 60	28. 39	58. 44	8. 6

[1] Average temperature based on a 97-year record, through 1955; highest temperature on a 68-year record and lowest temperature on a 67-year record, through 1952.
[2] Average precipitation based on a 52-year record, through 1955; wettest and driest years based on a 53-year record, in the period 1902–55; snowfall based on a 46-year record, through 1952.
[3] Trace.

In addition to the preceding data, the chances of having a freeze at Moncure, in Chatham County, after specified dates were computed as follows:

Date	*Chances*
April 5	9 out of 10
April 9	3 out of 4
April 17	1 out of 2
April 25	1 out of 4
May 3	1 out of 10

The chances of having a freeze in fall before specified dates were computed as follows:

Date	*Chances*
October 10	1 out of 10
October 13	1 out of 4
October 22	1 out of 2
October 29	3 out of 4
November 6	9 out of 10

Water Supply

Wells supply most of the water used in rural homes and in industrial plants. They also supply one of the four largest municipal areas. In the county, there are about 1,000 farm ponds, which are used to water livestock and to irrigate.

Many farmers dig their own wells, but in some places they cannot reach the water table, because the underlying rock is too near the surface. If the water table is below the rock, the well gives very little water and goes completely dry during droughts. After the 1941–42 drought several wells near Burlington and Graham had to be deepened by blasting.

Bored wells are used chiefly in surburban areas, just beyond the limits of the public water supplies. Many of these wells went dry during the 1941–42 drought and were deepened by drilling. Because of this drought and the consequent drying of bored wells, there has been a recent trend toward drilling wells.

Burlington, the largest city in the county, obtains its water supply from Stony Creek. Since 1950, Graham has obtained its water from Back Creek. The six wells that formerly supplied Graham with water are kept ready for use in emergencies. Alamance is supplied by Great Alamance Creek, and Swepsonville is supplied by wells. Many rural homes and several villages are supplied with water from wells or streams through distribution systems owned by nearby mills.

Forest

In Alamance County, about 45 percent of the wooded area is covered by the shortleaf pine-hardwoods forest type. This forest type occurs in the southern third of the county and along the eastern boundary. The rest of the wooded area of the county is in the Virginia pine-hardwoods forest type. About one-half of the acreage in the shortleaf pine-hardwoods type is in stands of shortleaf pines, generally those that revegetated in old fields. The rest of the acreage is mostly in stands of shortleaf pine, white, black, southern red and scarlet oaks, yellow-poplar, hickory, and various other hardwoods. In many places, the stands of pine and mixed hardwoods have a thin understory of eastern redcedar. Virginia pine intrudes into many stands of the shortleaf pine-hardwoods type.

The Virginia pine-hardwoods forest type covers about 55 percent of the wooded area. It occurs mainly in the northern two-thirds of the county. Most of this forest type consists of pine that revegetated in old fields. This pine is not mixed with other trees. Some areas of the Virginia pine-hardwoods forest type also have forest-grown stands of mixed white, post, black, scarlet, and chestnut oaks, yellow-poplar, hickories, sweetgum, sourwood, dogwood, and other hardwoods. Shortleaf pine grows with the Virginia pine in both old-field and forest-grown stands.

Stands of the bottom-land hardwoods type grow on the narrow bottom land and on a few broad flats along some of the larger streams. This forest type covers a very small part of the county. Along the larger streams are sweetgum, yellow-poplar, swamp chestnut oak, water and willow oaks, hickory, sycamore, elm, and blackgum. These trees grow well in the silt loam or sandy loam alluvium. On the loamy sands and light sandy loams along the small streams are beech, river birch, red maple, yellow-poplar, sweetgum, willow, and scatterings of red and white oaks. Loblolly pine grows in many places along the large and small streams, and a few shortleaf pines are on the smaller bottoms (*3*).

Transportation and Markets

The Southern Railroad crosses the central part of the county from east to west. It runs southeastward to Raleigh and westward to Greensboro. U.S. Highway 70A follows practically the same route as this railroad. State Highway 87 runs from Reidsville, in Rockingham County, through Burlington, and leaves the county at the southeastern corner. State Highway 54 connects Chapel Hill, in Orange County, with Burlington. There are three other State highways in the county.

State or county roads reach all sections of the county. These are paved or gravel roads, and they provide routes to markets in all kinds of weather. In 1950, the average distance from farm to market was 9 miles. In this year, 732 farms were reported being on hard-surfaced roads; 260 on gravel, shell, or shale roads; and 1,810 on dirt or unimproved roads. About 130 farm homes were less than 1 mile from a market; 630, from 1 to 4 miles; 861, from 5 to 9 miles; and 1,221 farms were more than 10 miles from a market.

Industries

Alamance County has many industries. Hosiery or textile mills, or both, operate in Burlington, Graham, Bellemont, Alamance, Swepsonville, Saxapahaw, Altamahaw, Ossipee, and Haw River. There are large furniture and mattress factories and several tobacco warehouses in Mebane. Burlington has tobacco warehouses and a large plant manufacturing electrical parts. Also in the county are a few small sawmills and a cooperage. One small pyrophyllite mine is in the southern part of the county.

Early History and Recent Population

In 1700, Lawson, an English explorer, crossed the area that is now Alamance County. He reported that the area was heavily forested except for a few savannas covered with wild pea vines. The Saxapahaw Indians, a scattered, unimportant tribe, occupied the territory. These Indians farmed little, if any (*12*).

The year that the first white settlers came to Alamance County is unknown. Probably they arrived as early as 1730. By 1744, the Scotch-Irish, Germans, and Quakers were arriving steadily. These early settlers came mainly from Pennsylvania. The Scotch-Irish Presbyterians settled around Haw Field Church, east of the Haw River. The Germans settled along Great Alamance Creek, and the Quakers settled north of Cane Creek.

Alamance County was formed from part of Orange County in 1849. It was named for Alamance Creek, where, in 1771, a battle was fought to resist taxes. In 1851, a courthouse was built at Graham, which is now the county seat (*2*).

According to the 1950 census, the population of the county was 71,220. Of this total, about 40 percent was classed as rural, nonfarm; 18 percent, rural; and the rest, urban. Except for the concentration of people in Burlington and Graham Townships, the population was evenly distributed throughout the county. In 1950, the city of Burlington had 24,560 people, and the town of Graham had 5,026 people. Newlin and Patterson are the most sparsely populated townships.

Community Facilities

The schools in Alamance County are located on hard-surfaced roads. School buses run to all parts of the county. Elon College is in the west-central part of the county at the town of Elon College. All rural communities have conveniently located churches. The rural mail service is adequate, and most sections of the county have telephone service and electricity. Because most farm families have one or more members working in one of the many factories in the county, the farm homes are more modern than those in most counties in the State.

Literature Cited

(1) American Association of State Highway Officials.
1955. standard specifications for highway materials and methods of sampling and testing. Ed. 7, pts. 1 and 2, 771 pp., illus.

(2) Corbitt, D. L.
1950. formation of north carolina counties, 1663–1943. North Carolina Department of Archives and History. 323 pp., illus.

(3) Cruikshank, J. W.
1940. forest resources of the piedmont region of north carolina. U. S. Dept. Agr., Forest Service, Forest Survey Release 6, 55 pp., illus.

(4) DeMots, Garrett and Swanson, Dwight.
1951. should the farmer gamble with frost. N. C. Agr. Exper. Sta., Spec. Circ. 13. (n. p.), illus.

(5) Nusbaum, C. J., Stevens, W. W., McPherson, W. W., and Fitts, J. W.
(n. d.) some guides to cropping systems in north carolina. North Carolina Experiment Station, 45 pp.

(6) North Carolina State College, Department of Agricultural Economics.
1956. cost of producing farm crops in north carolina. Agr. Econ. Inform. Ser. No. 52, 108 pp.

(7) North Carolina Agricultural Experiment Station.
1950. inventory of land use in north carolina. Tech. Bul. 93, 42 pp., illus.

(8) NORTH CAROLINA DEPARTMENT OF CONSERVATION AND DEVELOPMENT.
1949. GEOLOGY AND GROUND WATER IN THE GREENSBORO AREA. Bul. 55, 108 pp., illus.

(9) NYUM, M. A. and MCCALEB, S. B.
1955. THE REDDISH BROWN LATERITIC SOILS OF THE NORTH CAROLINA PIEDMONT REGION: DAVIDSON AND HIWASSEE SERIES. Soil Sci. 80: 27–41, illus.

(10) THORP, JAMES and SMITH, GUY D.
1949. HIGHER CATEGORIES OF SOIL CLASSIFICATION: ORDER, SUBORDER, AND GREAT SOL GROUP. Soil Sci., 67: 117–126.

(11) UNITED STATES DEPARTMENT OF AGRICULTURE.
1941. CLIMATE AND MAN. U. S. Dept. Agr. Yearbook 1941, 1248 pp., illus.

(12) ———
1902. SOIL SURVEY OF ALAMANCE COUNTY, NORTH CAROLINA. Field Operations of the Bureau of Soils, 1901, pp. 297–310, illus.

(13) ———
1951. SOIL SURVEY MANUAL. U. S. Dept. Agr. Handbook 18, 503 pp., illus. [Replaces U. S. Dept. Agr., Misc. Pub. 271, THE SOIL SURVEY MANUAL, published 1937.]

(14) ———
1938. SOILS AND MEN. U. S. Dept. Agr. Yearbook 1938, 1232 pp., illus.

(15) UNITED STATES DEPARTMENT OF COMMERCE.
1938. LEVELING IN NORTH CAROLINA. U. S. Coast and Geodetic Survey, Spec. Pub. 210, 414 pp., illus.

(16) WATERWAYS EXPERIMENT STATION, CORPS OF ENGINEERS.
1953. UNIFIED SOIL CLASSIFICATION SYSTEM. Tech. Memo. 3-357, vol. 1, 30 pp., Vicksburg, Miss.

NRCS Accessibility Statement

The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.