# SOIL SURVEY

## Williamson County Tennessee

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
TENNESSEE AGRICULTURAL EXPERIMENT STATION

Series 1961, No. 5

Issued August 1964

# HOW TO USE THE SOIL SURVEY REPORT

THIS SOIL SURVEY of Williamson County will serve several groups of readers. It will help farmers in planning the kind of management that will protect and improve their soils and provide good yields; assist engineers in selecting sites for roads, buildings, ponds, and other structures; aid foresters in managing woodland; serve as a reference for students and teachers; help county planning or development boards in deciding on future development of the area; and add to our knowledge of soil science.

## Locating the soils

Use the index to map sheets at the back of this report to locate areas on the large map. The index is a small map of the county on which numbered rectangles have been drawn to show where each sheet of the large map is located. When you find the correct sheet of the large map you will see that boundaries of the soils are outlined, and that there is a symbol for each kind of soil. The symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where it belongs. All areas marked with the same symbol are the same kind of soil, wherever they appear on the map. Suppose, for example, an area located on the map has the symbol (DkB). The legend for the detailed soil map shows that this symbol identifies Dickson silt loam, 2 to 5 percent slopes. This soil and all others mapped in the county are described in the section "Descriptions of the Soils."

## Finding information

Some readers will be more interested in one part of the report than another, for the report has special sections for different groups, as well as sections that may be of value to all.

*Farmers and those who work with farmers* can learn about the soils in the section "Descriptions of the Soils" and then turn to the section "Use and Management of Soils." In this way, they first identify the soils on their farm and then learn how these soils can be managed and what yields can be expected. The "Guide to Mapping Units" at the back of the report will simplify use of the map and report. This guide lists, in alphabetic order of map symbol, each soil and land type mapped in the county, and the page where each is described. It also lists, for each soil and land type, the capability unit and woodland suitability group, and the page where each of these is described.

*Foresters and others who manage woodland* can refer to the subsection "Managing Woodland," in which the soils are grouped according to their suitability for trees and in which factors affecting the management of woodland are explained.

*Engineers* will want to refer to the subsection "Use of Soils for Engineering Work," which evaluates the soils in terms of characteristics that affect engineering.

*Scientists* will find information about how the soils were formed and how they are classified in the section "Formation and Classification of Soils."

*Biologists and those interested in wildlife* will find information about game and fish in the subsection "Managing Soils for Wildlife and Fish."

*Students, teachers, and other readers* will find information about soils and their management in various parts of the report, depending on their particular interest. Those not familiar with the county may want to refer to the section "General Soil Map," which describes broad areas of soils. They may also want to refer to "General Nature of the County" for information about climate, physiography, geology, and drainage. That section also summarizes briefly the settlement of the county and gives some statistics on agriculture.

* * * * *

This survey was made as part of the technical assistance furnished by the Soil Conservation Service to the Williamson County Soil Conservation District. The fieldwork was completed in 1961. Unless otherwise indicated, all statements refer to conditions at the time the survey was in progress.

**Cover picture.—Stripcropping on sloping Maury soils.**

U.S. GOVERNMENT PRINTING OFFICE:1964

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402

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Series 1961, No. 5 Issued August 1964

# SOIL SURVEY OF WILLIAMSON COUNTY, TENNESSEE

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

WILLIAMSON COUNTY is in the central part of Tennessee (fig. 1) and has an area of 379,520 acres, or 593 square miles. Franklin, the county seat and principal town, is on the Harpeth River, 15 miles southwest of Nashville.

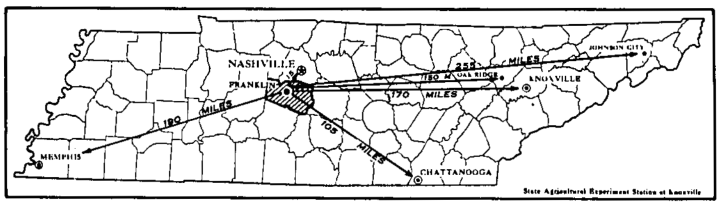


*Figure 1.*—**Location of Williamson County in Tennessee.**

Although the major source of income is agriculture, the population of Williamson County is approximately 28 percent urban, 37 percent rural nonfarm, and 35 percent rural farm, according to the U.S. Census for 1960.

Burley tobacco is the main cash crop, but most of the farm income is from dairy products and livestock. In 1959, 62,772 acres was in crops, 104,902 acres was in pasture, and 82,851 acres was in trees.

## *How Soils Are Named, Mapped, and Classified*

Soil scientists made this survey to learn what kinds of soils are in Williamson County, where they are located, and how they can be used.

They went into the county knowing they likely would find many soils they had already seen, and perhaps some they had not. As they traveled over the county, they observed steepness, length, and shape of slopes; size and speed of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug or bored many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down to the rock material that has not been changed much by leaching or by roots of plants.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to uniform procedures. To use this report efficiently, it is necessary to know the kinds of groupings most used in a local soil classification.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Armour and Ashwood, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in natural characteristics.

Many soil series contain soils that are alike except for texture of their surface layer. According to this difference in texture, separations called soil types are made. Within a series, all the soils having a surface layer of the same texture belong to one soil type. Armour cherty silt loam and Armour cherty silty clay loam are two soil types in the Armour series. The difference in texture of their surface layer is apparent from their names.

Some soil types vary so much in slope, degree of erosion, number and size of stones, or some other feature affecting their use, that practical suggestions about their management could not be made if they were shown on the soil map as one unit. Such soil types are divided into soil phases. The name of a soil phase indicates a feature that affects management. For example, Armour cherty silt loam, 2 to 5 percent slopes, is one phase of Armour cherty silt loam, a soil type that ranges from nearly level to moderately steep.

After a fairly detailed guide for classifying and naming the soils had been worked out, the soil scientists drew soil boundaries on aerial photographs. They used aerial photos for their base map because these show woodlands, buildings, field borders, trees, and similar detail that greatly help in drawing boundaries accurately. The soil map in the back of this report was prepared from the aerial photographs.

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

In preparing some detailed maps, the soil scientists have a problem of delineating areas where different kinds of soils are so intricately mixed, and so small in size, that it is not practical to show them separately on the map. Therefore, this mixture of soils is shown as one mapping unit and is called a soil complex. Ordinarily, a soil complex is named for the major soil series in it, for example, Hampshire-Colbert silt loams.

In many counties there are areas that are so rocky or so severely eroded that they cannot be called soils. These areas are shown on the soil map like other mapping units, but they are given descriptive names, such as Gullied land or Rockland, and are called land types rather than soils.

Only part of the soil survey was done when the soil scientists had named and described the soil series and mapping units, and had shown the location of the mapping units on the soil map. The mass of detailed information then had to be presented in different ways for different groups of people, among them farmers, managers of woodland, and engineers.

To do this efficiently, the scientists consulted with persons in other fields of work and with them prepared groupings that would be of practical value to people who manage soil. Such groupings are the capability classes, subclasses, and units, designed to help farmers manage crops and pasture; woodland suitability groups, for those who manage wooded tracts; engineering soil classifications, for engineers who build highways or structures that conserve soil and water; and wildlife suitability groupings, for farmers and others who want to manage soils for hunting, fishing, and other kinds of recreation.

## General Soil Map

After study of the soils in a locality and the way they are arranged, it is possible to make a general map that shows several main patterns of soils, called soil associations. Such a map is the colored general soil map in the back of this report. Each association, as a rule, contains a few major soils and several minor ones in a pattern that is characteristic though not strictly uniform.

The soils within any one association are likely to differ greatly in some properties; for example, slope, depth, stoniness, or natural drainage. Thus, the general map does not show the kind of soil at any particular place, but a pattern that has in it several kinds of soils.

The soil associations are named for the major soil series in them, but as already noted, soils of other series may also be present. Soils of the major series in one soil association may also be present in other associations but in a different pattern.

The general map is useful to people who want a general idea of the soils, who want to compare different parts of the county, or who want to know the possible location of good-sized areas suitable for a certain kind of farming or other land use.

The general soil map of Williamson County shows eight soil associations, which are described in the following pages.

### 1. Mountview-Baxter-Bodine association: Rolling soils underlain by cherty limestone on uplands of the Highland Rim

This soil association is an area of broad, rolling hills (fig. 2). Many hilltops are gently sloping to nearly level and are wide enough for small fields. Some hilltops, however, are narrow and winding, and they are flanked by steep wooded slopes. About 20 to 40 inches of loess, or wind-blown material, mantles the hilltops, and cherty soils are on nearly all of the hillsides. Shallow and deep drains are numerous throughout the area. Except for a few creek bottoms, level strips in the drainageways are generally less than 200 feet wide.

The Mountview are the most extensive soils in this association. They formed in loess on the hilltops and gentle side slopes. These soils are well drained and have a brown silt loam surface layer and a yellowish-brown silty clay loam subsoil.

Baxter and Bodine soils make up about half of the area and are on practically all of the hillsides. They are cherty soils that range from about 2 to more than 10 feet to limestone or to beds of chert. The Baxter soils have a redder subsoil than the Bodine and are not so cherty. In a few small areas on the more nearly level hilltops there are soils with a fragipan that is 20 to 30 inches below the surface. Other minor soils are on narrow strips of bottom lands along the streams, and these are well drained to somewhat poorly drained.

About 65 percent of this association is cleared. Uncleared areas are mostly steep and cherty and are in trees. Corn, tobacco, and lespedeza hay are the main cash crops. Also grown as cash crops are vegetables, chiefly tomatoes. Beef cattle are the main livestock, but a few hogs and sheep are on some farms. Pastures are largely unimproved.

The soils in this area are poor in natural fertility. They respond well to fertilization except in the steep, cherty areas, which make up about 30 percent of the association. The acreage suited to pasture is large, but that suited to crops is small and is largely on hilltops and along streams. Because they are sloping and wash away easily when cultivated, most soils that are cultivated are best suited to long cropping systems. Well suited to this area are dairy farming, raising of beef cattle, and other types of farming if they are supplemented by small acreages of cultivated crops. Fair to good timber grows on the steep, cherty slopes that are not suitable for crops or pasture. The average-size farm in this area is about 90 acres.

### 2. Bodine-Mountview-Greendale association: Soils on the Highland Rim escarpment

This soil association rises abruptly from the rim of the Central Basin to a height of 700 to 800 feet. It is an area of hills and ridges with narrow winding tops, steep side slopes, and narrow hollows or valleys. This association accounts for about one-fifth of the county area.

The soils on the hillsides generally are cherty and range from about 2 to 10 feet or more in depth to limestone or beds of chert. At a depth of 10 to 20 inches, shale bands the upper parts of a few high hills. Chert fragments have drifted down many of the long steep slopes and have accumulated at the bottom of the hillsides.

Bodine soils make up nearly half of this soil association. They are very cherty, droughty soils on long steep slopes. Silty, brown or yellowish-brown Mountview soils formed on the ridgetops mantled with about 10 to 20 inches of loess. The Mountview soils make up about 25 percent of the area. The Greendale soils are on bottom lands in narrow strips along the many streams in this area.

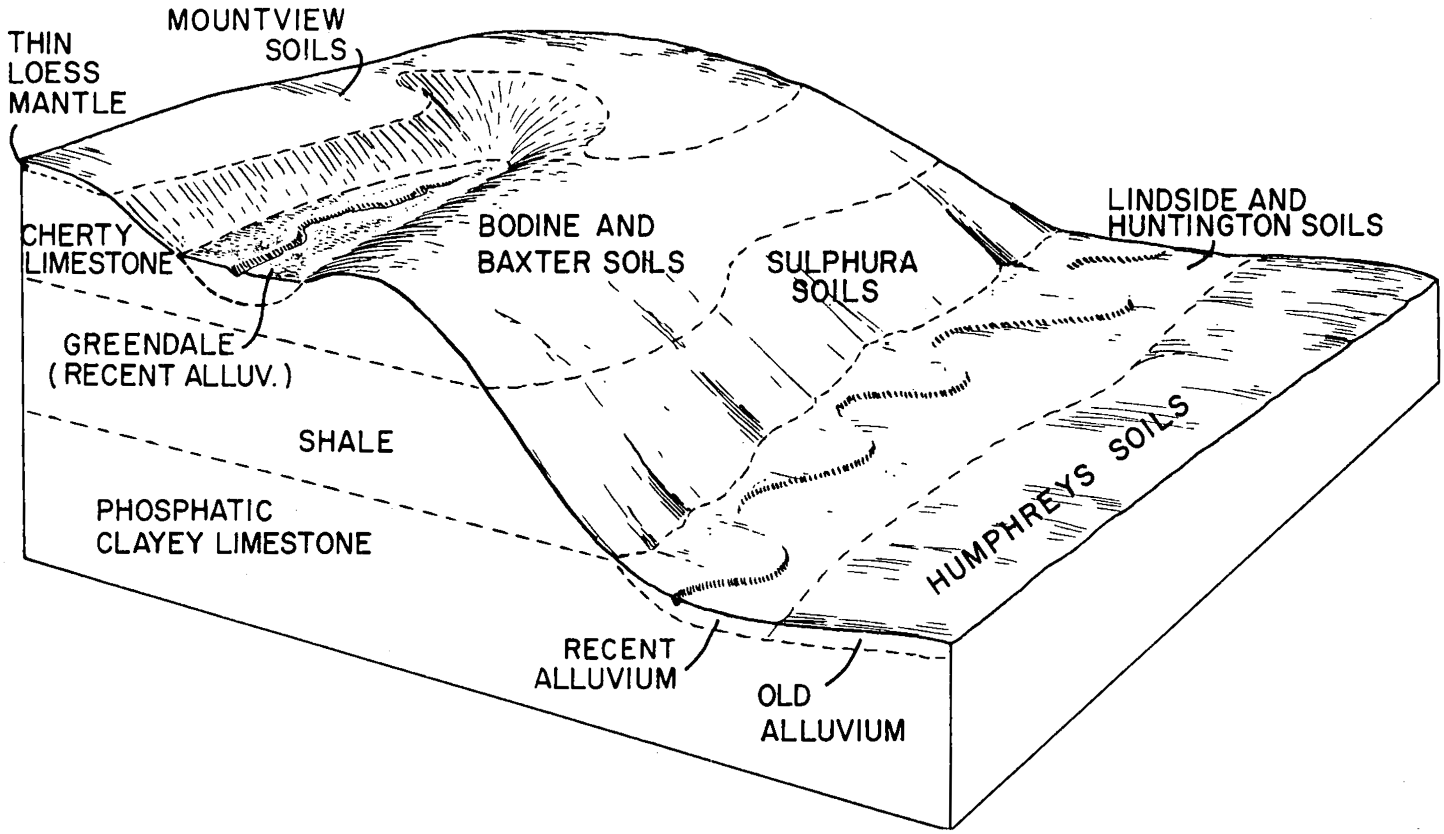


*Figure 2.*—**Major and minor soils and underlying parent materials in Mountview-Baxter-Bodine association.**

Only about 20 percent of this association has been cleared. Nearly all of the cleared land is in small tracts on ridgetops and in narrow strips along drainageways. Lespedeza hay and tobacco are the main crops. Some corn is grown on small fields in the bottom lands. Beef cattle are the main livestock, but hogs are raised on the bottom lands of some farms. Pastures are largely unimproved.

Little of this association is used for agriculture. Except for a few farms with large areas of bottom land, the acreage per farm suitable for crops or pasture is small. Good yields of many crops can be produced on the ridgetops in small fields that lie above steep woodland not suited to crops or pasture. The north- and east-facing slopes of the ridges are productive woodland, but the rather dry, south- and west-facing slopes are only fair.

The average-size farm is about 200 acres. Most farms consist of a few acres on the smooth ridgetops, narrow strips of bottom land, and a large acreage of steep woodland. About 25 percent of the farmers in this area supplement their income by working off the farm 100 days or more a year.

### 3. Sulphura-Dellrose-Bodine association: Shallow and deep soils on steep hills of the Highland Rim

High rounded hills and domes, long steep slopes, and narrow hollows or valleys form the pattern of this soil association (fig. 3). From the top of the hills to the bottom, there are three distinct kinds of soil. On the upper third of the hills, the soils are cherty and droughty and are underlain by beds of chert and cherty limestone. In a band below this cherty cap, the soils are about 10 to 20 inches thick and are underlain by shale at a depth of 2 to 10 feet. The lower third to half of the slope is drift or creep material about 5 to 15 feet thick. Phosphatic limestone and clayey soil crop out in many places at the bottom of the slope.

Bodine soils are on the upper part of the hills and make up about 20 percent of this association. They are cherty and light colored. The Sulphura soils are on the band of shale and amount to 30 percent of the area. They are dark-brown soils that range from 10 to 20 inches in depth to bedrock. The Dellrose soils, which are on the lower part of the slopes, have formed in thick deposits of creep. These soils are dark brown and cherty. They account for about 25 percent of the acreage.

About 70 percent of this association is forest of heavily cutover hardwoods. The Dellrose soils, on the lower part of the hills, are cleared. Many of the hills are cleared from the hollows up to the Sulphura soils. Some corn and lespedeza hay are grown on smooth, narrow strips in the narrow valleys. Most of the cleared slopes are in pasture, but a few are cultivated (fig. 4).

Only a small part of this association is suitable for cultivation. The narrow strips in the valleys and on the foot slopes are highly productive and are suited to many kinds of crops, but these areas are small. The Dellrose soils are fertile and can produce high yields, but they are too steep for cultivation with modern machinery. Productive pasture accounts for much of the area. Good pasture or forest can grow on the lower parts of the hillsides and on the

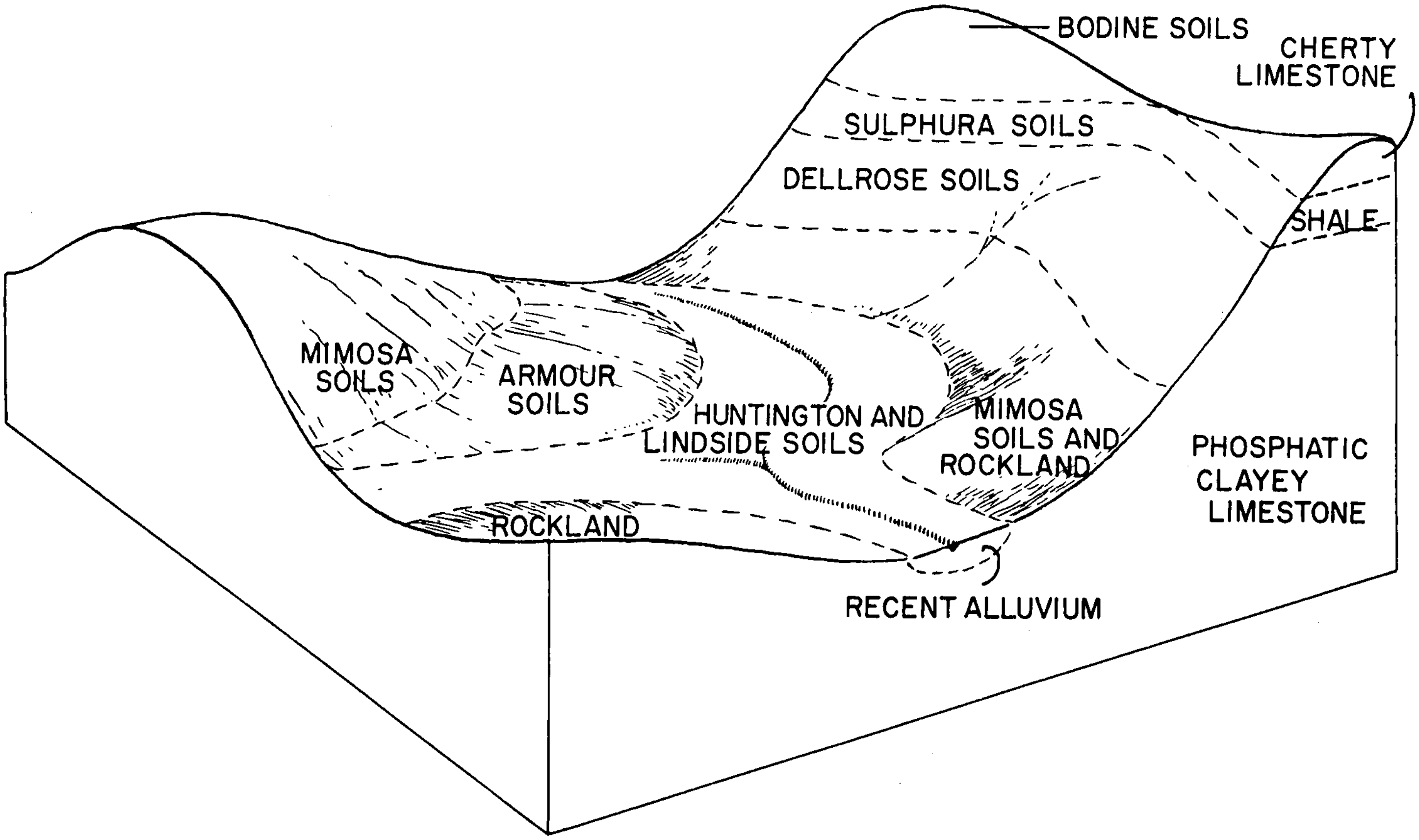


*Figure 3.*—**Major and minor soils and underlying parent materials in Sulphura-Dellrose-Bodine association.**

narrow strips of bottom land. The average-size farm in this area is about 200 acres.

### 4. Maury-Armour-Braxton association: Gently rolling soils underlain by phosphatic limestone on uplands of the outer Central Basin

This soil association is made up of small, irregular, gently rolling areas on uplands in the central part of the county (fig. 5). Most of these areas parallel U.S. Highway No. 31 in a narrow belt between Brentwood and Spring Hill. The total area is about 10 percent of the county.

The soils in this association are underlain by phosphatic limestone and are medium to high in phosphate. They are moderately deep to deep and generally are well drained.

The Maury and Armour soils are on rolling uplands and foot slopes and amount to about 60 percent of the association. These soils have a surface layer of dark-brown silt loam and a subsoil of brown to reddish-brown silty clay loam or silty clay. On the strongly sloping uplands are the Braxton soils. They have a surface layer of brown cherty silt loam and a subsoil of yellowish-brown or reddish-brown cherty silty clay loam or cherty clay. Less extensive in the association are the Hampshire soils, which are much like the Braxton but are not cherty.

About 95 percent of this soil association has been cleared of the original hardwood forest. Erosion is slight to moderate on the gently sloping soils but is moderate to severe on the steeper soils.

The soils in this association are naturally fertile and are medium to strongly acid. They are among the most productive soils on uplands in the county. Small grains, corn, tobacco, and alfalfa cut for hay are the main crops. Livestock is about equally distributed between beef cattle, dairy

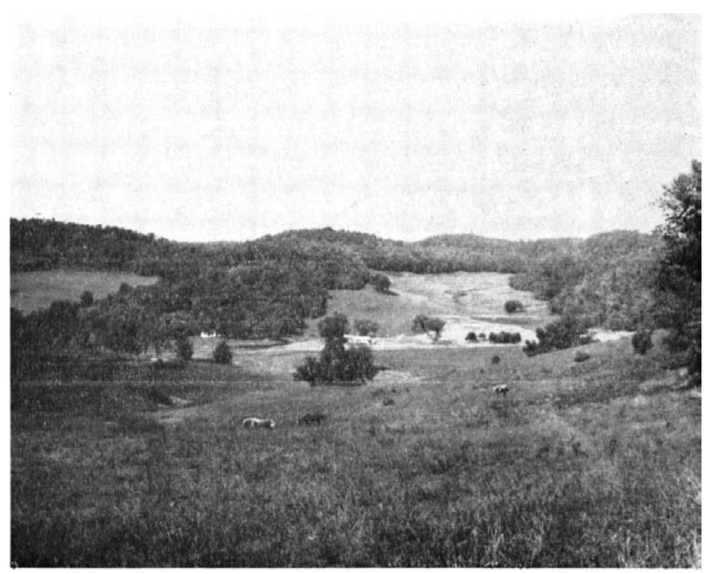

*Figure 4.*—**Sulphura-Dellrose-Bodine association. Trees in background are on cherty, droughty Bodine and Sulphura soils. Pasture in foreground is on Dellrose and Mimosa soils.**

*Figure 5.*—**The cleared, gently rolling areas in foreground are in the Maury-Armour-Braxton association, and the wooded, steeper areas in background are in the Dellrose-Mimosa-Rockland association.**

cattle, and sheep. A few walking horses are raised on some of the farms, especially those in the northern part of the county.

In this soil association farming is diversified, but the emphasis is on general livestock. About 50 percent of the farms are owned by people whose incomes are supplemented by other enterprises. The average-size farm is about 150 acres, but several farms are 500 acres or more in size. The phosphate mined in the county is mostly in this association.

### 5. Stiversville-Culleoka-Inman association: Gently rolling to steep soils underlain by sandy limestone interbedded with shale on uplands of the outer Central Basin

Loamy soils on gently sloping to sloping ridges, on steep sides slopes, and in narrow valleys form the dominant pattern of this soil association (fig. 6). Some of the soils are on narrow strips of bottom lands and terraces along streams, and there are a few areas of cherty soils on uplands. This soil association is in the eastern half of the county and amounts to about 20 percent of the county area.

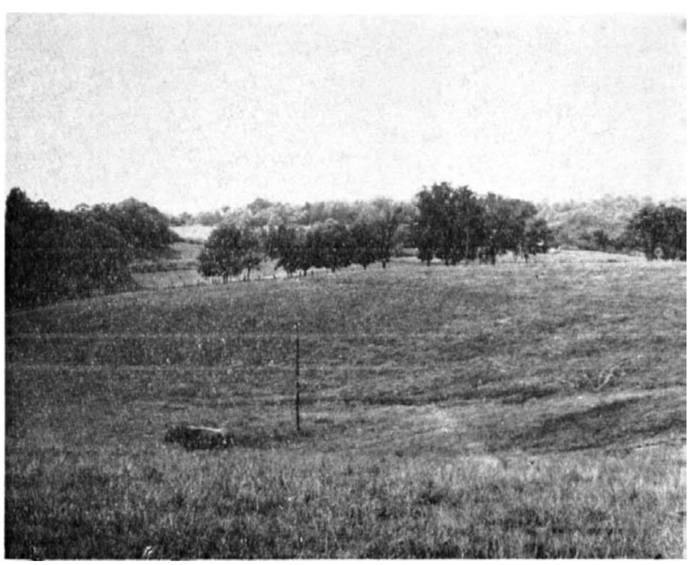

*Figure 6.*—**Stiversville-Culleoka-Inman association.**

These soils are underlain by phosphatic sandy limestone interbedded with shale and are, therefore, medium to high in phosphate. The Stiversville soils are on the gently sloping to moderately steep ridges (fig. 7). They have a surface layer of dark-brown silt loam and a subsoil of yellowish-brown or reddish-brown silty clay loam. Small weathered fragments of siltstone or sandy limestone are commonly scattered throughout the Stiversville soils. The Culleoka soils are in loamy creep on steep side slopes. These soils have a dark-brown silt loam or loam surface layer and a brown loam or clay loam subsoil. The Inman soils generally are on steep slopes below the Stiversville and Culleoka soils. The Inman soils have a brown silt loam surface layer and yellow silty clay or clay subsoil.

About 40 percent of this association is Stiversville soils, about 10 percent is Culleoka soils, and about 10 percent is Inman soils. Several minor soils make up the rest.

About 85 percent of this association has been cleared of the original hardwood forest. The main crops on these soils are small grains, tobacco, corn, alfalfa, and lespedeza. The alfalfa and lespedeza are cut for hay, and much of the corn and other feed crops is cut for silage. Many of the more eroded fields, especially where the soils are steep and shallow to rock, are idle. On most of these idle fields a young growth of black locust trees has volunteered.

Although many beef cattle, sheep, and hogs are raised in this soil association, dairying is the main kind of farming. About 50 percent of the pasture is improved. The soils in this association are fairly good for farming. They produce medium to high yields of pasture, but only a few small areas are suitable for row crops, since the soils are generally steep and, in some places, are shallow.

Farms in this soil association average about 115 acres in size, and most of them are livestock farms. About 80 percent of the farms are operated by full-time farmers. Some phosphate has been mined in this area.

### 6. Dellrose-Mimosa-Rockland association: Steep, cherty soils underlain by phosphatic limestone on uplands of the outer Central Basin

In this soil association are high ranges of cherty and rocky hills, small areas of bottom lands, and a few areas of rolling uplands (fig. 8). The association amounts to about 10 percent of the county and is widely distributed in the northern, central, and eastern parts.

Most of the soils are underlain by clayey phosphatic limestone. On most of the ridgetops, however, the underlying material is cherty limestone or beds of chert. The Dellrose soils have formed in cherty creep on the long steep hillsides. These soils are several feet thick, and they are dark brown and fertile. The Mimosa soils and Rockland are on toe slopes below the Dellrose soils. Except in severely eroded areas, Mimosa soils have a dark-brown silt loam surface layer and a yellowish-brown plastic clay subsoil. They are dominantly cherty because cherty creep has worked down from the higher lying cherty soils and has formed a thin layer. Limestone crops out on the surface of 50 to more than 90 percent of the Rockland.

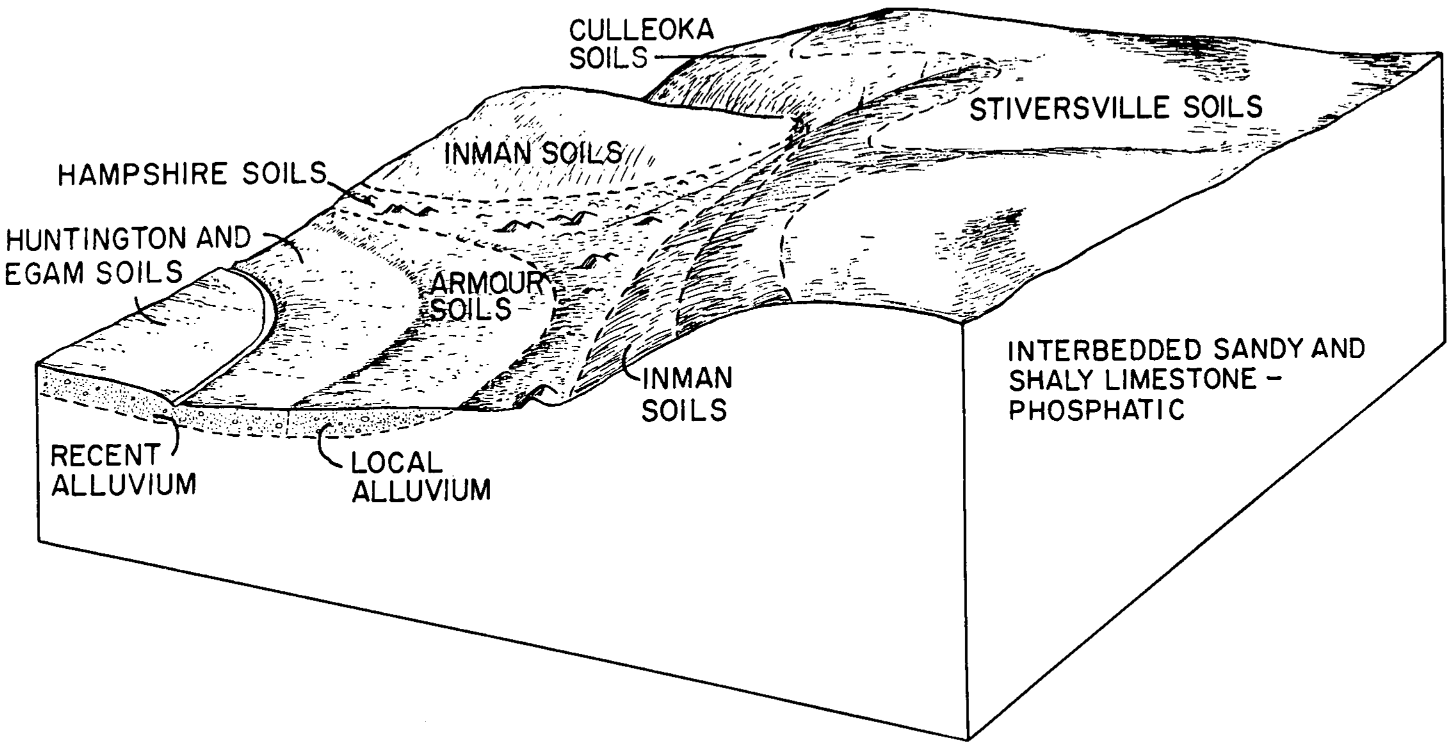


*Figure 7.*—**Major and minor soils and underlying parent materials in the Stiversville-Culleoka-Inman association.**

About 35 percent of this soil association is Dellrose soils, about 25 percent is Mimosa soils, and about 25 percent is Rockland. The rest of the association is made up of several minor soils.

The original hardwoods have been cleared from about three-fourths of the acreage of the deeper soils. Most of the rocky areas are forested with thin stands consisting of redcedar, oak, hickory, elm, and other trees. Black locust has volunteered in many areas of idle land and is at an early stage of growth. Tobacco is the main cash crop. Some corn and crops for silage and hay are grown in small areas on bottom lands, terraces, and more gently rolling uplands. The steep, cleared hillsides are used mostly for pasture, most of which is unimproved (fig. 9).

*Figure 8.*—**Dellrose-Mimosa-Rockland association. Dellrose soils in pasture just below wooded ridgetop. Hardwoods on left and cedars on right are on Rockland and rocky Mimosa soils. Other Mimosa soils are above the cedars and in the area of scattered trees. Armour soils are in the foreground.**

Most of the livestock are dairy cattle, but many beef cattle, sheep, and hogs are also raised.

The average-size farm in this soil association is about 125 acres. Livestock farms are dominant. About 85 percent of the farmers in this area farm full time.

### 7. Rockland-Talbott-Egam association: Level to hilly soils underlain by limestone in the inner Central Basin

In this soil association are level to nearly level, mostly moderately well drained soils on bottom lands and rocky, clayey, undulating to hilly soils on uplands (fig. 10). The association makes up 10 percent of the county and is in several areas in the eastern part. The three largest areas are along Rutherford, Flat, and Mill Creeks and their tributaries. Smaller areas are along Mayes, Toom, Starnes, Arrington, McClorys, and Nelson Creeks.

The soils in this association are underlain by level-bedded, clayey limestone. Rockland and Talbott soils are on nearly all of the uplands, and together they make up about 70 percent of the area. Limestone crops out on the surface of 50 to more than 90 percent of Rockland. Where they are not severely eroded, the Talbott soils have a brown silt loam surface layer that is underlain by a yellowish-red to reddish-yellow clay subsoil. The Egam soils are on much of the bottom land. In the Egam soils, silt loam extends to a depth of 15 to 30 inches and is underlain by black to very dark gray, firm silty clay loam or silty clay.

*Figure 9.*—Dellrose-Mimosa-Rockland association. Farm pond supplies water for livestock and for recreation.

Most of this soil association has been cleared of the original hardwood forest, but Rockland is in heavily cutover woodland of redcedar and hickory. After years of cultivation and severe sheet erosion, a large acreage of the soils on uplands has been abandoned. Crops cut for silage and some corn harvested for grain are grown, mostly on the bottom lands. Small grains and tobacco are grown on the uplands and terraces. The livestock are mainly dairy cattle, though there are a few beef cattle and sheep. About 50 percent of the pasture is improved.

The average-size farm is about 100 acres. Raising livestock is the main kind of farming. In the Mill Creek area, about 35 percent of the farmers supplement their incomes by working off the farm for 100 or more days a year. In other areas of this soil association, about 90 percent of the farmers work on their farms full time.

### 8. Lindside-Armour-Huntington association: Level to gently sloping soils on bottom lands and level to moderately steep soils on stream terraces

This association extends along Harpeth River and its larger tributaries, and it includes small areas of adjoining upland. Along the river and its tributaries, the soils are on level to gently sloping bottom lands and on level to mod-

*Figure 11.*—Lindside-Armour-Huntington association.

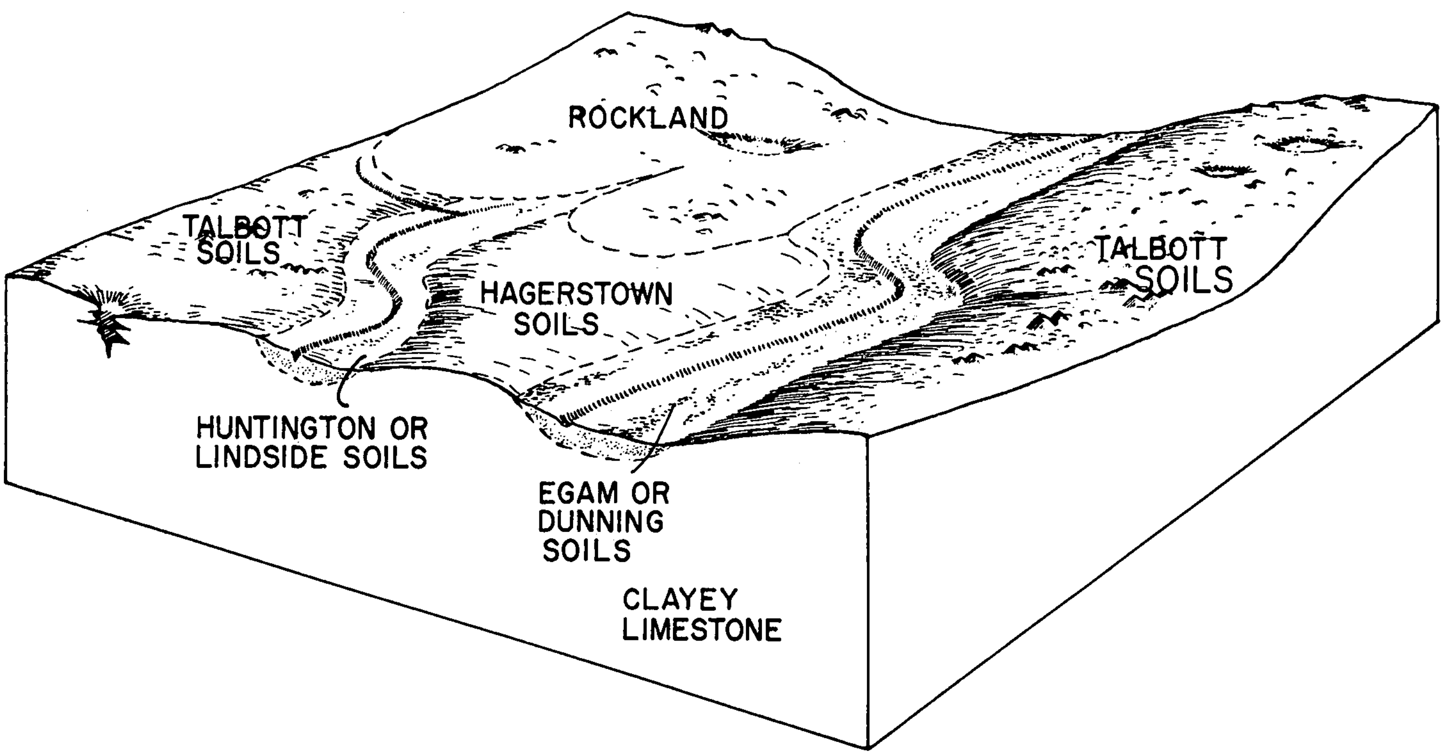


*Figure 10.*—Major and minor soils and underlying parent materials in the Rockland-Talbott-Egam association.

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erately steep stream terraces. Figure 11 shows a typical area. The total area of the association is about 15 percent of the county.

The soils in this association developed in sediments washed from higher soils that were derived largely from phosphatic limestone. The soils range from 2 to 10 feet or more in depth. The well-drained Huntington and moderately well drained Lindside soils are on the first bottoms. The Armour soils are on stream terraces, or second bottoms, a few feet higher than the first bottoms. These soils have a brown silt loam surface layer and a yellowish-brown to reddish-brown silty clay loam subsoil.

About 30 percent of this association is Lindside soils, 25 percent is Armour soils, and about 20 percent is Huntington soils. The remaining 25 percent is made up of minor soils.

Nearly all of this association has been cleared of the original hardwood forest and is cultivated. All of the soils are naturally fertile, are easy to work and to conserve, and are well suited to the locally grown crops and pasture. Overflow on the bottom lands and erosion on the terraces are the main hazards. The principal crops are corn, small grains, tobacco, and feed crops grown for hay and silage. Beef cattle, dairy cattle, and hogs are the main livestock.

The average-size farm in this soil association is about 200 acres. Most of the farms are classified as general. About 30 percent of the farms in this area are owned by people who supplement their incomes by outside enterprises.

## Descriptions of the Soils

This section describes, in nontechnical language, the soil series (groups of soils) and single soils (mapping units) of Williamson County. The acreage and proportionate extent of each mapping unit are given in table 1.

The procedure in this section is first to describe the soil series, and then the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read the description of that unit and also the description of the soil series to which it belongs. As mentioned in the section "How Soils Are Named, Mapped, and Classified," not all mapping units are members of a soil series. Gullied land and Rockland are miscellaneous land types and do not belong to a soil series but, nevertheless, are listed in alphabetic order along with the soil series.

Following the name of each mapping unit, there is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. At the end of each soil description, a number in parentheses identifies the capability unit in which the soil has been placed. The page on which each capability unit is described can be found readily by referring to the "Guide to Mapping Units" at the back of the report.

Soil scientists, engineers, students, and others who want more detailed descriptions of soil series should turn to the section "Formation and Classification of Soils." Many terms used in the soil descriptions and other sections of the report are defined in the Glossary.

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

| Soil name | Area | Extent |
|---|---|---|
| | *Acres* | *Percent* |
| Armour cherty silt loam, 2 to 5 percent slopes | 1, 081 | 0. 3 |
| Armour cherty silt loam, 5 to 12 percent slopes, eroded | 3, 044 | . 8 |
| Armour cherty silt loam, 12 to 20 percent slopes, eroded | 1, 222 | . 3 |
| Armour cherty silty clay loam, 5 to 12 percent slopes, severely eroded | 235 | . 1 |
| Armour silt loam, 0 to 2 percent slopes | 2, 378 | . 6 |
| Armour silt loam, 2 to 5 percent slopes | 7, 263 | 1. 9 |
| Armour silt loam, 2 to 5 percent slopes, eroded | 10, 062 | 2. 6 |
| Armour silt loam, 5 to 12 percent slopes | 477 | . 1 |
| Armour silt loam, 5 to 12 percent slopes, eroded | 5, 591 | 1. 5 |
| Armour silty clay loam, 5 to 12 percent slopes, severely eroded | 572 | . 1 |
| Ashwood silty clay loam, 2 to 5 percent slopes | 252 | . 1 |
| Ashwood silty clay loam, 5 to 12 percent slopes | 801 | . 2 |
| Ashwood silty clay loam, 12 to 20 percent slopes | 498 | . 1 |
| Baxter cherty silt loam, 5 to 12 percent slopes | 4, 885 | 1. 3 |
| Baxter cherty silt loam, 12 to 20 percent slopes | 2, 667 | . 7 |
| Baxter cherty silt loam, 12 to 20 percent slopes, eroded | 4, 566 | 1. 2 |
| Baxter cherty silt loam, 20 to 30 percent slopes | 2, 020 | . 5 |
| Baxter cherty silty clay loam, 5 to 12 percent slopes, severely eroded | 471 | . 1 |
| Baxter cherty silty clay loam, 12 to 20 percent slopes, severely eroded | 1, 539 | . 4 |
| Bodine cherty silt loam, 5 to 12 percent slopes | 7, 116 | 1. 9 |
| Bodine cherty silt loam, 12 to 20 percent slopes | 6, 772 | 1. 8 |
| Bodine cherty silt loam, 20 to 45 percent slopes | 32, 916 | 8. 7 |
| Braxton cherty silt loam, 2 to 5 percent slopes, eroded | 875 | . 2 |
| Braxton cherty silt loam, 5 to 12 percent slopes, eroded | 2, 587 | . 7 |
| Braxton cherty silt loam, 12 to 20 percent slopes, eroded | 728 | 0. 2 |
| Braxton cherty silty clay loam, 5 to 12 percent slopes, severely eroded | 644 | . 2 |
| Braxton cherty silty clay loam, 12 to 20 percent slopes, severely eroded | 352 | . 1 |
| Captina silt loam, phosphatic, 0 to 2 percent slopes | 2, 267 | . 6 |
| Captina silt loam, phosphatic, 2 to 5 percent slopes | 2, 729 | . 7 |
| Captina silt loam, phosphatic, 2 to 5 percent slopes, eroded | 3, 117 | . 8 |
| Captina silt loam, phosphatic, 5 to 12 percent slopes, eroded | 1, 149 | . 3 |
| Culleoka flaggy loam, 12 to 20 percent slopes, eroded | 450 | . 1 |
| Culleoka flaggy loam, 20 to 30 percent slopes, eroded | 617 | . 2 |
| Culleoka silt loam, 5 to 12 percent slopes | 271 | . 1 |
| Culleoka silt loam, 12 to 20 percent slopes | 2, 612 | . 7 |
| Culleoka silt loam, 12 to 20 percent slopes, severely eroded | 1, 013 | . 3 |
| Culleoka silt loam, 20 to 35 percent slopes | 3, 217 | . 8 |
| Culleoka silt loam, 20 to 35 percent slopes, severely eroded | 603 | . 2 |
| Dellrose cherty silt loam, 12 to 20 percent slopes | 4, 532 | 1. 2 |
| Dellrose cherty silt loam, 20 to 30 percent slopes | 6, 082 | 1. 6 |
| Dellrose cherty silt loam, 20 to 30 percent slopes, severely eroded | 548 | . 1 |
| Dellrose cherty silt loam, 30 to 40 percent slopes | 3, 538 | . 9 |
| Dellrose cherty silt loam, 30 to 40 percent slopes, severely eroded | 248 | . 1 |
| Dickson silt loam, 2 to 5 percent slopes | 705 | . 2 |
| Donerail silt loam, 2 to 5 percent slopes | 298 | . 1 |

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

| Soil name | Area | Extent |
|---|---|---|
| | *Acres* | *Percent* |
| Donerail silt loam, 2 to 5 percent slopes, eroded | 417 | 0. 1 |
| Donerail silt loam, 5 to 12 percent slopes, eroded | 264 | . 1 |
| Donerail silt loam, concretionary, 2 to 5 percent slopes, eroded | 237 | . 1 |
| Donerail silt loam, concretionary, 5 to 12 percent slopes, eroded | 569 | . 1 |
| Dowellton silt loam, 2 to 5 percent slopes | 224 | . 1 |
| Dunning silt loam, phosphatic | 1, 930 | . 5 |
| Egam silt loam, phosphatic | 10, 639 | 2. 8 |
| Etowah silt loam, 2 to 5 percent slopes | 485 | . 1 |
| Etowah silt loam, 5 to 12 percent slopes, eroded | 367 | . 1 |
| Fairmount silty clay loam, 2 to 10 percent slopes | 600 | . 2 |
| Frankstown cherty silt loam, 5 to 12 percent slopes | 731 | . 2 |
| Frankstown cherty silt loam, 12 to 20 percent slopes | 692 | . 2 |
| Greendale cherty silt loam, 2 to 12 percent slopes | 5, 675 | 1. 5 |
| Greendale silt loam, 2 to 5 percent slopes | 1, 095 | . 3 |
| Gullied land | 4, 634 | 1. 2 |
| Hagerstown silt loam, 2 to 5 percent slopes, eroded | 773 | . 2 |
| Hagerstown silt loam, 5 to 12 percent slopes, eroded | 329 | . 1 |
| Hampshire silt loam, 2 to 5 percent slopes | 261 | . 1 |
| Hampshire silt loam, 2 to 5 percent slopes, eroded | 1, 186 | . 3 |
| Hampshire silt loam, 5 to 12 percent slopes, eroded | 2, 652 | . 7 |
| Hampshire silt loam, 12 to 20 percent slopes, eroded | 549 | . 1 |
| Hampshire silty clay loam, 5 to 12 percent slopes, severely eroded | 884 | . 2 |
| Hampshire silty clay loam, 12 to 20 percent slopes, severely eroded | 314 | . 1 |
| Hampshire-Colbert silt loams, 2 to 5 percent slopes, eroded | 760 | . 2 |
| Hampshire-Colbert silt loams, 5 to 12 percent slopes, eroded | 2, 480 | . 7 |
| Hampshire-Colbert silt loams, 12 to 20 percent slopes, eroded | 273 | . 1 |
| Hampshire-Colbert silty clay loams, 5 to 12 percent slopes, severely eroded | 979 | . 3 |
| Hampshire-Colbert silty clay loams, 12 to 20 percent slopes, severely eroded | 196 | . 1 |
| Hermitage silt loam, 2 to 5 percent slopes | 235 | . 1 |
| Hermitage silt loam, 2 to 5 percent slopes, eroded | 543 | . 1 |
| Hicks silt loam, 2 to 5 percent slopes, eroded | 248 | . 1 |
| Hicks silt loam, 5 to 12 percent slopes, eroded | 932 | . 2 |
| Hicks silty clay loam, 5 to 12 percent slopes, severely eroded | 229 | . 1 |
| Humphreys cherty silt loam, 2 to 5 percent slopes | 226 | . 1 |
| Humphreys cherty silt loam, 5 to 12 percent slopes, eroded | 1, 113 | . 3 |
| Humphreys cherty silt loam, 12 to 20 percent slopes, eroded | 814 | . 2 |
| Humphreys silt loam, 2 to 5 percent slopes | 449 | . 1 |
| Humphreys silt loam, 5 to 12 percent slopes, eroded | 349 | . 1 |
| Huntington cherty silt loam, phosphatic | 5, 378 | 1. 4 |
| Huntington silt loam, local alluvium | 304 | . 1 |
| Huntington silt loam, phosphatic | 16, 311 | 4. 3 |
| Inman silt loam, 5 to 12 percent slopes | 1, 001 | . 3 |
| Inman silt loam, 12 to 20 percent slopes | 1, 839 | . 5 |
| Inman silt loam, 20 to 30 percent slopes | 891 | . 2 |
| Inman silty clay loam, 5 to 12 percent slopes, severely eroded | 805 | . 2 |
| Inman silty clay loam, 12 to 20 percent slopes, severely eroded | 1, 496 | . 4 |

| Soil name | Area | Extent |
|---|---|---|
| | *Acres* | *Percent* |
| Inman silty clay loam, 20 to 30 percent slopes, severely eroded | 564 | 0. 1 |
| Lanton silt loam, phosphatic | 3, 784 | 1. 0 |
| Lindside cherty silt loam | 2, 577 | . 7 |
| Lindside cherty silt loam, phosphatic | 2, 378 | . 6 |
| Lindside silt loam | 948 | . 2 |
| Lindside silt loam, phosphatic | 13, 162 | 3. 5 |
| Made land | 218 | . 1 |
| Maury silt loam, 0 to 2 percent slopes | 672 | . 2 |
| Maury silt loam, 2 to 5 percent slopes | 1, 685 | . 4 |
| Maury silt loam, 2 to 5 percent slopes, eroded | 8, 762 | 2. 3 |
| Maury silt loam, 5 to 12 percent slopes, eroded | 5, 530 | 1. 5 |
| Maury silty clay loam, 5 to 12 percent slopes, severely eroded | 960 | . 3 |
| Melvin silt loam, phosphatic | 2, 233 | . 6 |
| Mercer silt loam, 2 to 5 percent slopes, eroded | 494 | . 1 |
| Mimosa cherty silt loam, 5 to 12 percent slopes, eroded | 1, 613 | . 4 |
| Mimosa cherty silt loam, 12 to 20 percent slopes, eroded | 2, 391 | . 6 |
| Mimosa cherty silt loam, 20 to 30 percent slopes, eroded | 2, 726 | . 7 |
| Mimosa cherty silty clay, 10 to 20 percent slopes, severely eroded | 729 | . 2 |
| Mimosa cherty silty clay, 20 to 30 percent slopes, severely eroded | 988 | . 3 |
| Mimosa silt loam, 2 to 5 percent slopes, eroded | 1, 104 | . 3 |
| Mimosa silt loam, 5 to 12 percent slopes, eroded | 2, 327 | . 6 |
| Mimosa silt loam, 12 to 20 percent slopes, eroded | 772 | . 2 |
| Mimosa silty clay, 10 to 20 percent slopes, severely eroded | 1, 036 | . 3 |
| Mimosa very rocky soils, 20 to 40 percent slopes | 4, 062 | 1. 1 |
| Mimosa and Ashwood very rocky soils, 5 to 20 percent slopes | 6, 467 | 1. 7 |
| Mine pits and dumps | 298 | . 1 |
| Mine land, reclaimed | 311 | . 1 |
| Mountview silt loam, 2 to 5 percent slopes | 4, 655 | 1. 2 |
| Mountview silt loam, 5 to 12 percent slopes, eroded | 967 | . 3 |
| Mountview silt loam, shallow, 2 to 5 percent slopes | 843 | . 2 |
| Mountview silt loam, shallow, 2 to 5 percent slopes, eroded | 2, 954 | . 8 |
| Mountview silt loam, shallow, 5 to 12 percent slopes | 7, 768 | 2. 0 |
| Mountview silt loam, shallow, 5 to 12 percent slopes, eroded | 9, 178 | 2. 4 |
| Mountview silt loam, shallow, 5 to 12 percent slopes, severely eroded | 609 | . 2 |
| Mountview silt loam, shallow, 12 to 20 percent slopes | 904 | . 2 |
| Mountview silt loam, shallow, 12 to 20 percent slopes, eroded | 746 | . 2 |
| Robertsville silt loam, phosphatic | 489 | . 1 |
| Rockland | 29, 435 | 7. 8 |
| Sees silty clay loam | 930 | . 2 |
| Sequatchie loam, phosphatic | 415 | . 1 |
| Stiversville clay loam, 5 to 12 percent slopes, severely eroded | 1, 682 | . 4 |
| Stiversville clay loam, 12 to 20 percent slopes, severely eroded | 953 | . 2 |
| Stiversville silt loam, 2 to 5 percent slopes, eroded | 6, 264 | 1. 6 |
| Stiversville silt loam, 5 to 12 percent slopes, eroded | 10, 280 | 2. 7 |
| Stiversville silt loam, 12 to 20 percent slopes, eroded | 2, 084 | . 5 |

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

| Soil name | Area | Extent | Soil name | Area | Extent |
|---|---|---|---|---|---|
| | *Acres* | *Percent* | | *Acres* | *Percent* |
| Sulphura cherty silt loam, 12 to 20 percent slopes | 273 | 0. 1 | Talbott silty clay, 5 to 12 percent slopes, severely eroded | 1, 336 | 0. 4 |
| Sulphura cherty silt loam, 20 to 50 percent slopes | 7, 356 | 1. 9 | Talbott silty clay loam, 2 to 5 percent slopes, eroded | 2, 547 | . 7 |
| Sulphura cherty silt loam, 20 to 50 percent slopes, severely eroded | 942 | . 2 | Talbott silty clay loam, 5 to 12 percent slopes, eroded | 1, 524 | . 4 |
| Taft silt loam, 0 to 8 percent slopes | 455 | . 1 | Talbott very rocky soils, 2 to 15 percent slopes | 4, 730 | 1. 2 |
| Taft silt loam, phosphatic | 1, 042 | . 3 | | | |
| Talbott silty clay, 2 to 5 percent slopes, severely eroded | 400 | . 1 | Total | 379, 520 | 100. 0 |

## Armour Series

In the Armour series are well-drained, deep, naturally fertile soils in old alluvium or colluvium on stream terraces, toe slopes, and fans. The alluvium or colluvium ranges from 2 to more than 10 feet in thickness and consists of materials washed from soils derived chiefly from phosphatic limestone.

Uneroded Armour soils have a surface layer of dark-brown silt loam, about 10 inches thick, and a subsoil of dark-brown or reddish-brown silty clay loam. Some of the Armour soils are cherty. The noncherty soils, however, amount to about 80 percent of the total area of Armour soils. These soils are medium to strongly acid and are medium to high in content of phosphorus. Slopes range from 0 to 20 percent, but the dominant slopes are between 2 and 12 percent.

The Armour soils on stream terraces are next to the Captina and Maury soils, but those on toe slopes and fans are next to the Dellrose, Mimosa, and Maury soils. Armour soils are generally coarser textured and more friable than Maury soils. They are better drained than the Captina soils and lack the fragipan that is in those soils. Armour soils contain more clay in the subsoil than do the Dellrose soils.

Armour soils are extensive in the eastern two-thirds of the county. They have been cleared in most areas and are used mainly for crops and pasture. These soils are among the most productive in the county and are well suited to the crops and pasture plants commonly grown.

**Armour cherty silt loam, 5 to 12 percent slopes, eroded** (AcC2).—This deep, well-drained, cherty soil is on toe slopes and fans near the edge, or base, of the Highland Rim. A few areas are on gravelly stream terraces.

Representative profile:

0 to 10 inches, dark-brown, very friable cherty silt loam with granular structure.
10 to 48 inches, dark-brown or reddish-brown, friable cherty silty clay loam with blocky structure.
48 to 60 inches +, mottled red and brown cherty silty clay with blocky structure.

The surface layer ranges from brown to dark reddish brown, and the subsoil from dark brown to reddish brown. In places part of the subsoil is in the plow layer, and there are a few severely eroded patches in which the surface layer is cherty or gravelly silty clay loam. On most terraces the subsoil is lighter brown than it is on foot slopes and is slightly coarser textured and more friable. The thickness of the alluvium ranges from 2 to 10 feet or more.

This soil is naturally fertile, contains a moderate amount of organic matter, and has a moderate available moisture capacity. It is easy to keep in good tilth, has a thick root zone, and responds well to management.

About 40 percent of this soil is used for crops, and 40 percent for pasture. About 10 percent is idle, and the rest is in trees. The soil is suited to many kinds of crops and pasture, but the chert or gravel somewhat hampers cultivation. (Capability unit IIIe-4)

**Armour cherty silt loam, 2 to 5 percent slopes** (AcB).—This soil is on gently sloping toe slopes, fans, and stream terraces. The surface layer, a dark-brown cherty silt loam about 8 inches thick, is underlain by a subsoil of dark-brown to reddish-brown cherty or gravelly silty clay loam. In a few severely eroded patches, the plow layer is brown to reddish-brown cherty silty clay loam.

This soil is naturally fertile and has a moderately high available moisture capacity. It is suited to many kinds of crops and pasture. Most of it has been cleared and is used for commonly grown crops and pasture. The soil is relatively easy to work and conserve and is suited to moderately intensive use, but chert or gravel on the surface interferes with the cultivation of some crops. (Capability unit IIe-3)

**Armour cherty silt loam, 12 to 20 percent slopes, eroded** (AcD2).—This soil is on benches and toe slopes below Dellrose and Mimosa soils. In most places the brown cherty silt loam plow layer contains material from the subsoil. A few areas of this soil are severely eroded and have a plow layer of reddish-brown cherty silty clay loam.

The soil is naturally fertile and has a moderate available moisture capacity.

Most areas have been cleared and are used for pasture and crops. With good management and moderately intensive conservation practices, this soil can be cultivated occasionally. Because the soil is steep and cherty, it is somewhat difficult to cultivate. (Capability unit IVe-3)

**Armour cherty silty clay loam, 5 to 12 percent slopes, severely eroded** (AmC3).—This soil is on cherty toe slopes and fans or on gravelly stream terraces. The brown to reddish-brown surface layer is cherty or gravelly silty clay loam that consists largely of material that was formerly in the subsoil. More chert or gravel is on this soil than is on Armour cherty silt loam, 5 to 12 percent slopes, eroded. Many shallow gullies or a few deep ones are present, and there are a few outcrops of rock.

This soil is generally in poor tilth and is moderately low to low in available moisture capacity.

Most areas are now in pasture, but some are still in crops. Because of the fine-textured surface layer and the strong slopes, runoff is rapid and the soil is highly susceptible to further erosion. This soil can produce medium yields of row crops but is so sloping that it should not be cultivated more often than once in every 4 or 5 years. It produces medium to high yields of all commonly grown crops used for hay or pasture. (Capability unit IVe-3)

**Armour silt loam, 2 to 5 percent slopes** (ArB).—This deep, well-drained soil developed in phosphatic alluvium on stream terraces and foot slopes. The most extensive areas are along the Harpeth River and its larger tributaries.

Representative profile:

0 to 12 inches, dark-brown, friable slit loam with granular structure.
12 to 40 inches, brown or dark-brown, friable silty clay loam with blocky structure.
40 to 60 inches +, reddish-brown, friable silty clay loam or silty clay with seams of sand and gravel.

The subsoil is generally redder, heavier textured, and firmer on foot slopes than on terraces. The thickness of the alluvium ranges from 2 to more than 10 feet.

This soil is naturally fertile and is high in available moisture capacity. Tilth is generally good. The root zone is thick, and the response to management is good.

About 90 percent of this soil has been cleared and is used for commonly grown crops and pasture. Most cultivated areas are on slopes of 2 to 3 percent and are less subject to erosion than steeper areas. Because this soil is gently sloping, is generally in good tilth, has a thick root zone, and shows a good response to management, it is well suited to all crops grown locally and to short cropping systems. (Capability unit IIe-1)

**Armour silt loam, 2 to 5 percent slopes, eroded** (ArB2).—This well-drained, deep soil is on stream terraces, toe slopes, and fans. The slopes are commonly 4 or 5 percent. The dark-brown silt loam plow layer contains material from the reddish-brown silty clay loam subsoil. In a few severely eroded patches or larger areas, the plow layer is yellowish-brown or reddish-brown silty clay loam.

Nearly all areas of this soil have been cleared and cultivated. About 60 percent of the cleared part is used for crops, and 40 percent for pasture. Use can be moderately intensive because tilth is generally good, natural fertility is high, available moisture capacity is moderately high, and slopes are gentle. If the soil is well fertilized, it produces high yields of all crops grown locally. (Capability unit IIe-1)

**Armour silt loam, 0 to 2 percent slopes** (ArA).—Most of this soil is on broad, level or nearly level, low stream terraces. The dark-brown silt loam surface layer is about 10 inches thick. The subsoil is dark-brown, friable silty clay loam.

Most areas of this soil have been cleared and are used for crops and pasture. Use can be intensive because the soil is nearly level, is high in natural fertility and in available moisture capacity, and generally is in good tilth. Though runoff is slow, it is adequate to prevent damage from ponding. If well fertilized, this soil can produce high yields of all common crops. It is one of the best soils in the county for tobacco, vegetables, and other high-value crops. (Capability unit I-1)

**Armour silt loam, 5 to 12 percent slopes** (ArC).—The solum of this soil generally is slightly thinner than that of the Armour silt loam, 2 to 5 percent slopes. The surface layer is dark-brown silt loam, 9 to 10 inches thick; and the subsoil is brown to reddish-brown silty clay loam or silty clay. On concave slopes, there is an accumulation of alluvium that was laid down more recently than that in most of this soil.

About 50 percent of this soil is in hardwood forest. Most cleared areas are on concave slopes and are in small, managed, permanent pastures. The high natural fertility, good tilth, and moderately high available moisture capacity make this soil suited to many kinds of crops and pasture, but it is too sloping for frequent cultivation. (Capability unit IIIe-1)

**Armour silt loam, 5 to 12 percent slopes, eroded** (ArC2).—This soil has a brown silt loam surface layer, 4 to 6 inches thick. A few severely eroded patches or larger areas have a plow layer of yellowish-brown or reddish-brown silty clay loam, which is mostly material from the subsoil.

Nearly all of this naturally fertile soil has been cleared and is used for crops and pasture. The soil is well suited to many kinds of crops and pasture, but it is too sloping for annual cultivation. Partly because the available moisture capacity is moderately high, crops respond well to lime and fertilizer, especially to potash and nitrogen. (Capability unit IIIe-1)

**Armour silty clay loam, 5 to 12 percent slopes, severely eroded** (AtC3).—The plow layer of this soil consists mostly of subsoil material, which is reddish-brown silty clay loam or silty clay. Many shallow gullies or a few deep ones are common, and in some of the deep gullies the underlying residuum is exposed. There are also a few outcrops of rock.

The soil is medium acid to strongly acid and medium to high in phosphorus. Though the plow layer is mostly subsoil material, it is fairly easy to work. The soil has a deep, well-aerated root zone and a moderate available moisture capacity.

About 40 percent of this soil is in pasture, 30 percent is in crops, and the rest is idle or has reforested naturally. Crops respond well to management, especially to additions of lime, nitrogen, and potash. If the soil is well managed, it produces medium yields of corn, tobacco, and other summer annuals and high yields of other kinds of crops. (Capability unit IVe-1)

## Ashwood Series

The Ashwood series consists of dark, shallow to moderately deep soils that were derived from phosphatic limestone. Bedrock is generally a few inches to more than 4 feet from the surface, but it crops out in a few places.

These soils have a black silty clay loam surface layer and a yellowish-brown clay subsoil. Slopes range from 2 to 20 percent but generally are from 5 to 12 percent. In places these soils are somewhat poorly drained because water seeps from higher soils. The Ashwood soils are slightly acid to slightly alkaline. They contain a medium to large amount of phosphorus. They have a low available moisture capacity.

Ashwood soils adjoin the Mimosa, Maury, Braxton, and Hampshire soils. Compared to those soils, however, the Ashwood soils have a darker surface layer, are less acid, and are not so deep. In many places where Ashwood soils adjoin very rocky soils or Rockland, they have a thin layer of recent material that has been washed from the rocky areas.

The Ashwood soils are in small areas of the outer Central Basin in the eastern two-thirds of the county. About 50 percent of the acreage has been cleared and is used chiefly for pasture. A few areas are used for small grains and for grasses and legumes that are cut for hay. Because they are shallow to bedrock, are low in available moisture capacity, and in places are broken by rock outcrops, these soils are poorly suited to cultivated crops. They produce fair to good yields of small grains, hay, and pasture.

**Ashwood silty clay loam, 2 to 5 percent slopes** (AwB).—This dark soil has developed in materials weathered from clayey, phosphatic limestone.

Representative profile:

0 to 10 inches, black, friable silty clay loam with granular structure.
10 to 20 inches, dark yellowish-brown, plastic clay with blocky structure.
20 to 26 inches, dark yellowish-brown clay mottled with gray and light olive brown; massive (structureless).
26 inches +, phosphatic limestone bedrock.

Depth to bedrock ranges from 20 to 48 inches, and in places there are a few outcrops of rock. The surface layer generally is black to very dark gray silty clay loam, but in places it is silt loam. The subsoil is silty clay loam to clay and is dark yellowish brown to brownish yellow. A few areas are slightly wet because water seeps from higher slopes.

This soil is slightly acid to slightly alkaline. It contains a moderate to large amount of phosphorus. The available moisture capacity is moderately low. Permeability is moderately slow to slow, and runoff is moderately rapid.

About 50 percent of this soil has been cleared and is used chiefly for pasture, but a few areas are used for crops, mainly small grains and hay. The fine-textured subsoil restricts the penetration of plant roots, moisture, and air. This soil is well suited to grasses and legumes grown for permanent pasture and hay. Crops that grow well in spring when moisture is plentiful produce the best yields. Yields of corn and other summer row crops are medium to low. (Capability unit IIIe–2)

**Ashwood silty clay loam, 5 to 12 percent slopes** (AwC).—This clayey soil has a black surface layer that is about 6 to 8 inches thick and that overlies a yellowish-brown clay subsoil. A few severely eroded patches are present where most of the black silty clay loam surface layer has been lost and the clay subsoil is exposed. Bedrock crops out in a few places.

About 70 percent of this soil has been cleared and is used chiefly for pasture. Small grains and hay are grown in a few areas. Because slopes are strong and permeability is slow, runoff is rapid and the erosion hazard is great. With good management, however, and moderate to intensive conservation practices, the soil can be cultivated occasionally. Yields of row crops are medium to low, but yields of small grains, hay, and pasture are medium to high. (Capability unit IVe–2)

**Ashwood silty clay loam, 12 to 20 percent slopes** (AwD).—In most areas of this soil, the plow layer is black silty clay loam, but in a few severely eroded patches, most of the surface layer has been lost and the yellowish-brown clay subsoil is exposed. This soil ranges from 18 to 36 inches in thickness. In places there are a few outcrops of bedrock.

Nearly all of this soil is in hardwood forest. Because erosion is a hazard and productivity is low, clearing this soil for cultivated crops would not be economical. Cleared areas are best suited to pasture and hay. (Capability unit VIe–2)

## Baxter Series

The Baxter series consists of well-drained, cherty soils on uplands. These soils were derived from cherty limestone. The depth to beds of chert or cherty limestone ranges from 3 to more than 10 feet.

These soils have a brown cherty silt loam surface layer and a yellowish-red to red cherty clay subsoil. The content of the chert ranges from 15 to 50 percent or more by volume. Slopes range from 2 to 30 percent, but the dominant slopes are between 12 and 20 percent. These soils are strongly acid and are low in natural fertility.

Baxter soils are commonly next to Mountview and Bodine soils. They are redder and deeper than Bodine soils and are generally less cherty and more productive.

The Baxter soils are moderately extensive on the Highland Rim in the western part of the county. About 50 percent of the acreage has been cleared and is used for most locally grown crops and pasture. Many of the more gently sloping areas are planted to corn, tobacco, hay, and truck crops. Most of the steeper slopes are in pasture, are idle, or are in hardwoods. Where they are not too steep, Baxter soils are suited to most commonly grown crops, but large additions of fertilizer are required for good yields.

**Baxter cherty silt loam, 12 to 20 percent slopes** (BaD).—This well-drained, cherty soil has developed from cherty limestone on the uplands of the Highland Rim.

Representative profile:

0 to 10 inches, brown, friable cherty silt loam with granular structure.
10 to 18 inches, brown, friable cherty silty clay loam with blocky structure.
18 to 40 inches, yellowish-red or red cherty clay with blocky structure.
40 to 60 inches +, very cherty clay mottled with red, yellow, brown, and gray.

Depth to cherty limestone bedrock ranges from 3 to more than 10 feet. On the surface of the soil, the chert fragments are ¼ inch to 3 inches across, but they ordinarily increase in size and number with increasing depth. In the solum the content of chert is from 15 to 50 percent by volume.

This soil is medium acid to strongly acid, low in natural fertility, and moderate in available moisture capacity. Permeability is moderate to moderately rapid.

A few areas of this soil have been cleared and are used chiefly for pasture, but most areas are in cutover hardwoods. The soil is suited to most crops and pasture commonly grown in the county, and it can be cultivated in a 4- or 5-year cropping system. Although the chert interferes with the tillage of most crops, it also retards runoff and reduces the erosion hazard. This soil responds well to lime and fertilizer. (Capability unit IVe–3)

**Baxter cherty silt loam, 12 to 20 percent slopes, eroded** (BaD2).—This well-drained, cherty soil is on the uplands of the Highland Rim. The plow layer, 4 to 7 inches thick, is brown to yellowish-brown cherty silt loam, and in places it contains some of the yellowish-red and red cherty silty clay subsoil. Included with this soil are a few severely eroded patches that have a redder and finer textured surface layer. The depth to bedrock is 3 to 10 feet or more.

All of this soil has been cleared and cultivated. About 40 percent of it is in pasture, 30 percent is cultivated, and 20 percent is idle. A few small areas have been planted to pine trees. This soil is suited to most commonly grown crops, though it is low in natural fertility and is moderately low in moisture-supplying capacity. Crops respond well to lime and fertilizer. The soil can be cultivated in long cropping systems, but chert may interfere with the tillage of some crops. (Capability unit IVe–3)

**Baxter cherty silt loam, 5 to 12 percent slopes** (BaC).—This well-drained, cherty soil is in small areas on the upper parts of hills. The plow layer is brown or yellowish-brown cherty silt loam in most places, but there are a few severely eroded patches that are redder and finer textured. The upper part of the subsoil is cherty silty clay loam, and the lower part is cherty clay. Bedrock is at a depth of 3 to 10 feet or more.

The soil is low in natural fertility and moderately low in available moisture capacity.

About 45 percent of this soil is in pasture, 25 percent is in crops, and 25 percent is idle. A few areas have been planted to pine trees. Most of the commonly grown crops and pasture plants are fairly well suited to this soil, and they respond well to lime and fertilizer. The soil is fairly easy to work and can be cultivated regularly, but chert interferes with the tillage of some crops. (Capability unit IIIe–4)

**Baxter cherty silt loam, 20 to 30 percent slopes** (BaE).—This soil has a surface layer of brown cherty silt loam, about 7 inches thick, and a subsoil of yellowish-red to red cherty silty clay loam or cherty clay. Cherty limestone bedrock is at a depth of 2 to 10 feet or more. The chert on the surface and throughout the solum is generally greater in quantity and size than the chert of the less steep Baxter soils.

About 50 percent of this soil has been cleared of the hardwood trees and is used chiefly for pasture. The soil is unsuitable for cultivation because it is cherty, is steep and susceptible to erosion, and is low in natural fertility and in available moisture capacity. It is fairly well suited to pasture, and good pasture can be established and maintained by adding liberal amounts of lime and fertilizer. Unless additional pasture is urgently needed, however, clearing is not encouraged. (Capability unit VIe–1)

**Baxter cherty silty clay loam, 5 to 12 percent slopes, severely eroded** (BcC3).—This well-drained, red, cherty soil is on the uplands of the Highland Rim. The surface layer is brown to yellowish-red cherty silty clay loam, which consists mostly of the yellowish-red or red cherty clay from the subsoil. In most areas of this soil more chert is on the surface than is on the surface of less eroded Baxter soils. Many shallow gullies or a few deep ones are common.

This soil is generally in poor tilth and is low in fertility and in available moisture capacity. All of the soil has been cleared and cultivated. Some areas are now in crops and pasture, but most are idle or abandoned and are sparsely covered with weeds and brush. Although fairly well suited to small grains, hay, and pasture, the soil is difficult to work and conserve. Liberal applications of lime and fertilizer and intensive conservation practices are required to maintain satisfactory yields. (Capability unit IVe–3)

**Baxter cherty silty clay loam, 12 to 20 percent slopes, severely eroded** (BcD3).—This is a severely eroded, red cherty soil. The brown or yellowish-red plow layer of cherty silty clay loam is mostly subsoil material. The subsoil is red or yellowish-red cherty clay. In most places a large amount of chert is on the surface. Many shallow gullies or a few deep ones are common. The depth to bedrock is 3 to 10 feet or more. Included in this mapping unit are a few areas on slopes of 20 and 30 percent.

This soil generally has poor tilth, is low in natural fertility and in available moisture capacity, and is subject to severe erosion. Most areas are idle or have been abandoned. Part of the acreage is in pasture, and some is still used for crops. This soil is poorly suited to cultivation. It is best suited to pasture or trees, but good management is required to establish and maintain profitable pasture. (Capability unit VIe–1)

## Bodine Series

In the Bodine series are cherty, droughty, strongly acid soils that are shallow over beds of cherty limestone. The depth to cherty limestone ranges from 18 inches to more than 5 feet.

Bodine soils have a light-brown or yellowish-brown cherty silt loam surface layer, about 8 inches thick (fig. 12). The subsoil is very cherty silty clay loam that is brownish yellow to reddish yellow. The content of chert is 25 to 60 percent of the surface layer and as much as 80 percent of the lower layers. In places varying amounts of weathered shale are on the surface and throughout the profile. Slopes range from 5 to 45 percent, but the domi-

*Figure 12.*—**Cherty Bodine soils on the highly dissected parts of the Highland Rim.**

nant slope is more than 20 percent. Bodine soils are very low in natural fertility and organic matter and are low in available moisture capacity.

In the central and north-central parts of the county, Bodine soils are on the ridgetops above the Sulphura and Dellrose soils, which are on the steeper side slopes. In the western part of the county, Bodine soils are commonly next to Baxter, Mountview, Humphreys, and Greendale soils. Bodine soils are chertier and lighter colored than Baxter soils.

Large areas of Bodine soils occur throughout the more highly dissected parts of the Highland Rim in the western part of the county. Less extensive areas are on the ridgetops in the central and north-central parts of the county. Bodine soils are dominantly in cutover hardwood forest. About 20 percent of the acreage has been cleared and is now idle or in unimproved pasture. A few small areas have been planted to pine trees. Because these soils are cherty and are low in natural fertility and in available moisture capacity, they are poorly suited to crops and have only a low potential for pasture.

**Bodine cherty silt loam, 20 to 45 percent slopes** (BoE).—This cherty soil is shallow over chert beds. Most of it is on steep, wooded slopes in highly dissected areas of the Highland Rim in the western part of the county.

Representative profile:

- 0 to 8 inches, grayish-brown, very friable cherty silt loam with granular structure.
- 8 to 18 inches, yellowish-brown, friable cherty silty clay loam with blocky structure.
- 18 to 36 inches +, mottled brown, red, and gray silty clay loam, sandwiched between layers of chert fragments.

The chert fragments on the surface of this soil range from ½ inch to 3 inches across. With increasing depth the fragments are larger and more numerous. The content of chert ranges from 25 to 80 percent by volume. In places varying amounts of weathered shale are on the surface and throughout the soil. The surface layer is dark grayish brown to grayish brown in wooded areas, but after the soil has been cleared of trees, the supply of organic matter is depleted and the surface layer is yellowish brown to pale brown. The subsoil ranges from yellowish brown to reddish yellow. A few severely eroded areas are dissected by many shallow gullies or a few deep ones, and in some places bedrock of cherty limestone and shale is exposed.

This soil is too steep and too dry for crops. It can be used for pasture, but most of the growth is in spring and yields are low. Forestry is a good use. (Capability unit VIIs–1)

**Bodine cherty silt loam, 5 to 12 percent slopes** (BoC).—Most of this cherty soil is on narrow ridgetops in highly dissected areas of the Highland Rim. The cherty silt loam surface layer is 6 to 8 inches thick and ranges from dark grayish brown in wooded areas to pale brown or yellowish brown in cleared areas. The subsoil is yellowish-brown or reddish-yellow very cherty silty clay loam. A few areas are severely eroded, and these generally have a few shallow gullies and many chert fragments on the surface. The depth to bedrock ranges from 18 inches to more than 5 feet.

About 30 percent of this soil has been cleared, and most of the cleared area is in pasture or is idle. A few areas are used for crops, and a few small areas have been planted to pine trees. Low natural fertility, low available moisture capacity, and cheritiness make this soil poorly suited to cultivated crops. It is better suited to permanent pasture and hay. (Capability unit VIs–1)

**Bodine cherty silt loam, 12 to 20 percent slopes** (BoD).—This soil is on narrow, winding ridgetops in the central and north-central parts of the county and in those less highly dissected areas of the Highland Rim in the western part. The cherty silt loam surface layer ranges from dark grayish brown in wooded areas to pale brown or yellowish brown in cleared areas. The subsoil is very cherty silty clay loam that is yellowish brown or reddish yellow. Bedrock is at a depth of 18 inches to 5 feet or more. A few areas of this soil are severely eroded; these have much chert on the surface, a few outcrops of cherty limestone bedrock, and a few shallow gullies.

About 30 percent of this soil has been cleared, and most of the cleared areas are in unimproved pasture or are idle. A few areas are in crops, and a few areas have been planted to pine trees. Because this soil is cherty and is low in natural fertility and in available moisture capacity, it is very poorly suited to cultivated crops. It is better suited to permanent pasture and hay. Liberal applications of lime and fertilizer are needed for satisfactory yields of pasture and hay. (Capability unit VIs–1)

## Braxton Series

The soils of the Braxton series are cherty, phosphatic, and well drained. They range from 2 to 6 feet or more in depth to phosphatic limestone bedrock. These soils have a brown cherty silt loam surface layer that overlies a subsoil of yellowish-red or reddish-brown cherty silty clay loam or cherty clay. Slopes range from 2 to 20 percent, but the dominant slopes are between 5 and 12 percent.

These soils are medium to strongly acid and contain a moderate amount of organic matter. They are moderately low in available moisture capacity and are medium to high in content of phosphorus.

The Braxton soils are commonly next to Maury, Mimosa, and Hampshire soils. Compared to Maury soils, Braxton soils have a finer textured subsoil and contain more chert. They are similar to Hampshire soils but contain more chert and have a redder subsoil. Braxton soils differ from Mimosa soils by having a browner or redder, lighter textured, more friable subsoil.

Braxton soils are moderately extensive in the outer Central Basin in the eastern two-thirds of the county. Most areas have been cleared and are used for crops and pasture plants commonly grown in the county. These soils are suited to many kinds of crops, but most crops are damaged in summer by drought.

**Braxton cherty silt loam, 2 to 5 percent slopes, eroded** (BrB2).—This well-drained, cherty soil on the uplands of the outer Central Basin has a slowly permeable, clayey subsoil. The soil developed in weathered, cherty, phosphatic limestone.

Representative profile:

- 0 to 10 inches, brown, friable, cherty silt loam with granular structure.
- 10 to 30 inches, brown or reddish-brown, heavy, cherty silty clay loam or cherty clay with blocky structure.
- 30 to 48 inches +, yellowish-red or reddish-brown, heavy cherty clay with blocky structure.

Bedrock is at a depth of 3 to 6 feet or more. The surface layer ranges from very dark brown to yellowish brown, and the subsoil ranges from strong brown to red and from cherty silty clay loam to cherty clay. A few severely eroded areas have a redder, finer textured surface layer than is common. In places there are a few outcrops of bedrock.

The soil is medium to high in phosphorus and is medium acid to strongly acid. The available moisture capacity is moderate to moderately low, and permeability is moderately slow.

Most of this soil has been cleared and is used for small grains and corn, for pasture, and for alfalfa and other hay crops. The soil is suited to all common crops and to pasture. Although crops respond to good management, most of them are damaged in summer by drought, and the chert in the surface layer may interfere with cultivation. (Capability unit IIIe–2)

**Braxton cherty silt loam, 5 to 12 percent slopes, eroded** (BrC2).—The cherty silt loam surface layer of this soil is about 6 inches thick. In many places part of the subsoil has been mixed into the surface layer, and in these places the plow layer is slightly redder and finer textured than that of the Braxton cherty silt loam, 2 to 5 percent slopes, eroded. Limestone bedrock is generally at a depth of 3 to 6 feet, but a few outcrops of bedrock occur over most of the area. A few patches of this soil are severely eroded.

Nearly all areas of this soil are cleared and used for crops and pasture. The soil is suited to many kinds of crops and pasture and is moderately productive. Because of the strong slopes and the moderately slowly permeable subsoil, runoff is rapid and the erosion hazard is high. With good management, that includes moderately intensive conservation practices, the soil can be cultivated occasionally, but chert on the surface and throughout the soil interferes with the tillage of some crops. (Capability unit IVe–2)

**Braxton cherty silt loam, 12 to 20 percent slopes, eroded** (BrD2).—The brown cherty silt loam surface layer of this soil averages about 5 inches in thickness. In most places the plow layer contains subsoil material, which is yellowish-red or reddish-brown cherty silty clay loam or cherty clay. The depth to bedrock ranges from 3 to 6 feet. A few patches are severely eroded, and there are a few outcrops of limestone in places.

Most areas of this soil have been cleared and are used for crops and pasture. Because the slopes are steep and the subsoil is moderately slow in permeability, runoff is rapid to very rapid and erosion is a problem. Although the soil is moderately high in natural fertility, it is moderately low in available moisture capacity and is therefore best suited to permanent pasture and hay. (Capability unit VIe–2)

**Braxton cherty silty clay loam, 5 to 12 percent slopes, severely eroded** (BsC3).—In this soil the plow layer consists mostly of material from the subsoil and is yellowish-red or reddish-brown cherty silty clay loam. The subsoil is reddish-brown cherty clay. Bedrock is at a depth of 2 to 6 feet. The amount of chert on the surface is greater than that on less eroded Braxton soils. Many shallow gullies or a few deep ones are common, and limestone bedrock crops out in a few places.

Much of the acreage is still used for crops and pasture, but a few areas are idle and a few have grown up in trees. Because of the fine-textured surface layer, runoff is rapid to very rapid and infiltration is slow. Consequently, the erosion hazard is high if the soil is cultivated. This soil is best suited to permanent pasture and to hay. (Capability unit VIe–2)

**Braxton cherty silty clay loam, 12 to 20 percent slopes, severely eroded** (BsD3).—The plow layer of this soil is yellowish-brown or reddish-brown cherty silty clay loam that consists mostly of material from the subsoil. The subsoil is reddish-brown or yellowish-red cherty clay. Bedrock is at a depth of 2 to 6 feet or more. Many shallow or a few deep gullies are common, and limestone bedrock crops out in a few places.

All areas of this soil have been cleared and cultivated. A few areas are still in crops or in pasture, but most areas are idle or have reforested naturally. Steep slopes, generally poor tilth, and low available moisture capacity make this soil poorly suited to cultivated crops. It is best suited to permanent pasture and hay. Hay meadows and pasture are difficult to establish, however, because of the severe erosion hazard, the fine-textured surface layer, and the low available moisture capacity. (Capability unit VIe–2)

## Captina Series

The Captina series consists of moderately well drained soils that have a fragipan. These soils developed in old alluvium on stream terraces. The alluvium has washed from soils derived chiefly from phosphatic limestone and ranges from 2 to more than 10 feet in thickness.

Captina soils have a dark-brown silt loam surface layer, 8 to 12 inches thick, and a yellowish-brown silty clay loam subsoil that is mottled with gray below about 2 feet. Slopes range from 0 to 12 percent, but the dominant slopes are between 2 and 5 percent.

These soils are medium acid to strongly acid and have a moderately low available moisture capacity. The permeability is moderately rapid in the upper 2 feet but is slow to very slow in the fragipan.

The Captina soils are on terraces along the larger streams throughout the eastern two-thirds of the county. Most areas have been cleared and are used for crops and pasture. The soils are easy to work and are suited to shallow-rooted crops. Because the fragipan restricts the movement of water and air, these soils are poorly suited to alfalfa and most other deep-rooted plants.

**Captina silt loam, phosphatic, 2 to 5 percent slopes** (CaB).—This moderately well drained soil is on gently sloping stream terraces and has a fragipan or compact layer in the subsoil. The parent material washed from soils derived chiefly from phosphatic limestone.

Representative profile:

0 to 12 inches, dark-brown, very friable silt loam with granular structure.
12 to 24 inches, yellowish-brown, friable silty clay loam with blocky structure.
24 to 40 inches +, mottled gray and brown, compact silty clay loam; massive (structureless).

The alluvium ranges from 2 to more than 10 feet in thickness, and the fragipan is at a depth of 20 to 30 inches. In places a few pieces of gravel and fragments of chert are on the surface and throughout the soil. In many places stratified layers of fine sand, gravel, or chert are at a depth below 2½ feet.

The soil is moderate to moderately low in available moisture capacity, is medium acid to strongly acid, and is medium to high in phosphorus. Runoff is moderate to slow. In the upper layers, permeability is moderately rapid, but in the lower layers it is slow to very slow.

About 80 percent of this soil has been cleared and is used for crops and pasture. The soil is easy to work and is suited to corn, small grains, tobacco, and other crops. It is poorly suited to alfalfa and other deep-rooted crops because the fragipan restricts the penetration of roots and the movement of water and air. Most cultivated areas of this soil are on slopes of 2 to 3 percent and can be used in short cropping systems. (Capability unit IIe–2)

**Captina silt loam, phosphatic, 2 to 5 percent slopes, eroded** (CaB2).—This soil developed in old general alluvium on stream terraces and has a compact layer or fragipan about 18 to 24 inches from the surface. It is commonly on slopes of 3 to 5 percent and has lost some of the surface layer through erosion. The surface layer is dark-brown or dark yellowish-brown silt loam, 5 to 7 inches thick. Above the pan the subsoil is yellowish-brown silty clay loam. The pan is mottled gray and brown, compact silty clay loam. Included with this soil are a few severaly eroded areas in which the plow layer is lighter brown and finer textured than that in less eroded areas.

The soil is moderate in natural fertility and is moderately low in available moisture capacity. It is medium to high in phosphorus. The fragipan restricts root penetration and the movement of air and water. Consequently, the soil is wet during winter and spring and is slightly droughty in the summer.

Practically all areas have been cleared and are used for crops and pasture. This soil is easy to work and is suited to all common crops, but stands of alfalfa and other deep-rooted legumes ordinarily do not last more than 2 years. (Capability unit IIe–2)

**Captina silt loam, phosphatic, 0 to 2 percent slopes** (CaA).—This soil is on level or nearly level stream terraces. It has a fragipan or compact layer at a depth of 20 to 36 inches. The surface layer is dark-brown or dark grayish-brown silt loam, about 12 inches thick. Above the pan the subsoil is yellowish-brown silty clay loam. The pan is mottled gray and brown, compact silty clay loam.

The soil is medium to high in phosphorus, low in potassium, and medium acid to strongly acid. The fragipan restricts the penetration of roots and the movement of water and air. Consequently, the soil is wet during winter and spring and is slightly droughty in summer. Water runs slowly off this level to nearly level soil and ponds in some places.

Most areas have been cleared and are used for crops and pasture. Except for alfalfa and, in wet areas, tobacco, this soil can be used intensively for all crops commonly grown in the county. Yields are medium to high if the soil is well managed. Tobacco can be grown in areas where water does not stand on the surface during rainy periods. (Capability unit IIw–2)

**Captina silt loam, phosphatic, 5 to 12 percent slopes, eroded** (CaC2).—This soil developed in old phosphatic alluvium on stream terraces. It has a fragipan or compact layer in the subsoil at a depth of 16 to 24 inches. The surface layer is dark-brown silt loam, 5 to 7 inches thick. In a few spots the original surface soil has been washed away, and the plow layer extends into the yellowish-brown silty clay loam subsoil. The fragipan is mottled gray and brown, compact silty clay loam. Above the fragipan the soil is friable and very easy to work, but the pan is dense or compact and allows very little root penetration. Also, the pan holds up water, which waterlogs the subsoil during long rainy periods. Because of the shallow root zone, the soil is fairly droughty in summer.

This soil is medium to high in phosphorus, is low in potassium, and is medium to strongly acid. Crops respond well to management, especially to additions of lime, nitrogen, and potash. Nearly all of the common crops can be grown on this soil, but stands of alfalfa ordinarily last only 2 or 3 years because the lower subsoil is periodically wet. Row crops can be grown occasionally in long cropping systems, but the soil is too sloping for frequent cultivation. (Capability unit IIIe–3)

## Colbert Series

In the Colbert series are moderately well drained to somewhat poorly drained soils on nearly level to steep uplands between the outer and inner Central Basin. These soils have developed in clayey materials weathered mostly from limestone.

The plow layer is dark-brown silt loam, about 5 inches thick. The subsoil is dark yellowish-brown, sticky and plastic clay that is mottled yellow and gray and contains small black concretions. Bedrock is at a depth of 12 to 36 inches, and there are a few outcrops. Slopes range from 2 to 20 percent but are dominantly 5 to 12 percent.

These soils are medium to high in phosphorus because they receive seepage and a thin layer of creep from phosphatic soils upslope. They are medium acid to strongly acid in most places, but the range is neutral to strongly acid. Runoff is moderately rapid to rapid, permeability is slow, and available moisture capacity is moderately low.

Colbert soils occur with the Hampshire, Talbott, Dowellton, and Fairmount soils. The Colbert soils have a more plastic and sticky subsoil than have the Hampshire and Talbott soils. They are yellower and are more poorly drained than the Talbott soils and have a thinner subsoil. They are better drained than the Dowellton soils. The surface layer of Colbert soils is thinner than that of Fairmount soils, or the plow layer is lighter colored.

Most areas of these soils were once cleared and cultivated but are now used mainly for pasture. Some areas are still in crops, and a large acreage is idle. These soils are difficult to work and conserve and are therefore not well suited to cultivated crops.

In this county Colbert soils are mapped only in complexes with Hampshire soils.

## Culleoka Series

The Culleoka series consists of well-drained, phosphatic soils that developed in the slope-wash or creep materials

*Figure 13.*—**A profile of Culleoka silt loam. Creep or colluvial material extends to the stone line and overlies residuum of phosphatic limestone.**

(fig 13). The creep materials have moved down the slope from soils derived from interbedded sandy limestone and shale. The creep ranges in thickness from 14 inches to more than 5 feet, and bedrock is at a depth of 2 to 10 feet or more.

Uneroded Culleoka soils have a dark-brown silt loam or loam surface layer, 7 to 9 inches thick. The brown loam to clay loam subsoil is underlain by porous, fine-grained, sandy limestone interbedded with shale. A flaggy phase has been mapped separately in areas where there are varying amounts of sandstone or sandy limestone fragments on the surface and throughout the soil. These fragments are 3 to 12 inches or more across. Slopes range from 5 to 35 percent, but the dominant slopes are between 12 and 30 percent. Seepage and intermittent springs near the base of slopes are common in the steeper areas.

These soils are medium to high in phosphorus and are slightly acid to strongly acid. They have a moderately low available moisture capacity.

The Culleoka soils commonly adjoin or are below Stiversville and Inman soils. They are shallower than the Stiversville soils and not so strongly developed. They are deeper and browner than the Inman soils and have a more friable subsoil.

Culleoka soils are in the eastern half of the county. Most of the acreage has been cleared and cultivated, and about 70 percent of this is now used for pasture, 15 percent is cropped, and 15 percent is idle. These soils are suited to many kinds of pasture and crops, but cultivation is difficult on the steep slopes and in places where sandy limestone fragments, or flags, are concentrated.

**Culleoka flaggy loam, 12 to 20 percent slopes, eroded** (CfD2).—Fragments of flat sandstone or sandy limestone are scattered on the surface and throughout this phosphatic soil. The soil has developed in creep or slope-wash materials that moved down the slopes from soils derived from phosphatic, sandy limestone interbedded with shale.

Representative profile:

0 to 8 inches, dark-brown, very friable flaggy loam with granular structure; many flat, sandy fragments, 3 to 10 inches across.
8 to 20 inches, brown, friable flaggy clay loam with blocky structure; many flat, sandy fragments, 3 to 12 inches across.
20 to 30 inches +, brown clay loam mixed with fragments of sandy limestone and shale.

The creep ranges from 14 to more than 36 inches in thickness, and hard bedrock is at a depth of 2 to 8 feet or more. This creep often overlies clayey soil that is high in phosphorus, especially near the base of the slopes. A few severely eroded areas have many shallow gullies or a few deep ones.

This soil is medium to high in phosphorus, is moderately low in available moisture capacity, and is rapid in permeability. Except on lower slopes that receive seepage, most crops and pastures are damaged in summer by drought.

About 60 percent of this soil has been cleared and is used chiefly for pasture. A few areas are in crops. Because of the sandy fragments and the steep slopes, however, this soil is not suited to cultivated crops. Most of it is best suited to permanent pasture and hay, and some areas probably are best suited to trees. (Capability unit VIs–1)

**Culleoka flaggy loam, 20 to 30 percent slopes, eroded** (CfE2).—The surface layer of this soil is dark-brown or yellowish-brown flaggy loam, 5 to 7 inches thick, and the subsoil is brown flaggy clay loam. This soil developed in creep or slope-wash material that contained flat sandy fragments ranging from 5 to 12 inches across. The creep has moved down the steep slopes from soils derived from phosphatic sandy limestone interbedded with shale. In a few severely eroded areas, the surface layer is lighter colored and finer textured than it is in less eroded areas.

About 50 percent of the acreage has been cleared and is in pasture or is idle. This soil is rapidly permeable and low in available moisture capacity. These limitations, the steep slopes, and the large sandstone fragments make the soil poorly suited to cultivated crops. It is only fair for pasture but is good for trees. (Capability unit VIs–1)

**Culleoka silt loam, 20 to 35 percent slopes** (CkE).—This deep, well-drained, permeable soil has developed on steep slopes in phosphatic loamy creep that rolled or washed from higher soils derived from phosphatic sandy limestone interbedded with shale.

Representative profile:

0 to 12 inches, dark-brown, friable silt loam with granular or crumb structure.
12 to 48 inches, brown or strong-brown, friable silty clay loam or clay loam with blocky structure.
48 to 60 inches +, brown slity clay or clay mottled with yellowish brown, yellowish red, and olive; strong, blocky structure to massive (structureless).

The creep material ranges from 18 inches to more than 5 feet in thickness. Depth to bedrock is 3 to 10 feet or more. In places a few sandstone fragments are on the surface and throughout the soil, but there are not enough of them to interfere with tillage.

The soil is medium to high in phosphorus, low in potassium, and medium acid to strongly acid. Permeability is moderately rapid to rapid. Except for seepage areas on the lower slopes, the soil is moderately low in available moisture capacity.

About 70 percent of this soil has been cleared and is used chiefly for pasture. Although the soil is generally in good tilth and is suited to many kinds of crops and pasture, the slopes are so steep that cultivation is impractical. This soil is well suited to permanent pasture and hay. (Capability unit VIe–1)

**Culleoka silt loam, 20 to 35 percent slopes, severely eroded** (CkE3).—This severely eroded, phosphatic soil has a yellowish-brown silt loam or clay loam surface layer that is mostly subsoil material. Many shallow gullies or a few deep ones are common. In many places a few sandstone fragments are on the surface. The phosphatic loamy creep is 16 to 36 inches thick over sandstone and shale bedrock or clayey soil. The depth to bedrock is 10 feet or more in some places where a thick layer of clay underlies the loamy creep.

A few areas now are used for pasture, but most are idle or have been abandoned and allowed to reforest naturally, chiefly to locust trees. Runoff is rapid to very rapid, and the erosion hazard is great. The soil is too steep for cultivation and is best suited to pasture or to trees. (Capability unit VIe–1)

**Culleoka silt loam, 5 to 12 percent slopes** (CkC).—This soil is generally on narrow benches surrounded by steeper Culleoka soils, or it is on concave slopes next to Stiversville soils. The loamy creep in which the soil has developed ranges from 2 to 6 feet in thickness. Bedrock is at a depth of 3 to 10 feet. The surface layer is dark-brown silt loam, 7 to 12 inches thick. The subsoil is brown, friable clay loam. A few areas are severely eroded, and a few areas have sandy rock fragments on the surface and throughout the soil. These fragments are 3 to 12 inches across.

Most areas have been cleared and are used for crops and pasture. The soil is naturally fertile, has a moderate available moisture capacity, and is suited to many kinds of crops. With good management that includes moderate conservation practices, this soil can be used in short cropping systems. (Capability unit IIIe–1)

**Culleoka silt loam, 12 to 20 percent slopes** (CkD).—The phosphatic loamy creep in which this soil developed ranges from 2 to 6 feet in thickness, and bedrock is at a depth of 3 to 10 feet or more. The surface layer is brown or yellowish-brown silt loam, 5 to 10 inches thick. The subsoil is brown, friable clay loam. In a few eroded patches, the surface layer consists mostly of subsoil material, and in places a few sandstone fragments are on the surface and throughout the soil.

This soil is medium to high in phosphorus and is medium acid to strongly acid. Permeability is moderately rapid to rapid.

About 75 percent of the acreage has been cleared and is used chiefly for pasture and hay. Some fields are in tobacco, corn, small grains, and other crops. Because water enters and moves through the soil rapidly, most crops are damaged in the summer by drought. The soil is well suited to small grain, which grows mostly in periods of greatest rainfall. With good management that includes moderate conservation practices, this soil can be cropped occasionally, and good yields can be maintained. (Capability unit IVe–1)

**Culleoka silt loam, 12 to 20 percent slopes, severely eroded** (CkD3).—Erosion has removed all or nearly all of the original dark-brown surface layer of this soil. In most places the present surface layer consists of material from the brown clay loam subsoil. In places varying amounts of sandstone fragments are on the surface and throughout the soil. Many shallow gullies or a few deep ones are common. In some places the deeper gullies have cut through the loamy creep and have exposed the underlying clayey soil or the bedrock of sandy limestone and shale.

Some areas of this soil are still in cultivated crops, but most are in pasture, are idle, or have reforested naturally. Steep slopes, rapid runoff, and moderately rapid to rapid permeability make this soil droughty and susceptible to further erosion. Therefore, it is best suited to permanent pasture, hay, and trees. (Capability unit VIe–1)

## Dellrose Series

The Dellrose series consists of well-drained, deep soils that developed in cherty slope wash or creep material on steep hillsides. The creep is loamy and ranges from 2 to more than 6 feet in thickness. It is ordinarily underlain by a thick layer of clay and that, in turn, by bedrock at a depth of 3 to 15 feet or more. Angular chert fragments, 1 to 3 inches across, are on the surface and throughout the soil, and in places there are varying amounts of weathered shale.

In uneroded areas the surface layer is dark-brown cherty silt loam, 10 to 15 inches thick. The subsoil is yellowish-brown or reddish-brown cherty silty clay loam. Dellrose soils are commonly on long, steep slopes that range from 12 to 40 percent, but the dominant slopes are from 20 to 30 percent.

These soils are naturally fertile. Underlying phosphatic residuum has given them a medium to high content of phosphorus. They are moderately high in available moisture capacity.

Dellrose soils are fairly extensive and are widely distributed on the steep slopes of hills in the eastern half of the county. They are of lesser extent on the lower slopes leading down from the Highland Rim into the outer Central Basin in the western part of the county. Although about 75 percent of their acreage has been cleared and cultivated, only about 10 percent is still cultivated. Most of the cleared areas are in pasture. These soils are fertile and in places can produce high yields of many kinds of crops, but most areas are too steep for cultivation.

**Dellrose cherty silt loam, 12 to 20 percent slopes** (DeD).—This deep, well-drained soil on low hillsides has developed in cherty creep that washed or rolled from soils derived chiefly from cherty limestone. The creep is medium to high in phosphorus that came from the underlying phosphatic clay.

Representative profile:

0 to 15 inches, dark-brown, very friable cherty silt loam with granular structure.

15 to 48 inches, yellowish-brown to reddish-brown, friable cherty silty clay loam with granular or blocky structure.

48 to 60 inches +, plastic clay mottled with yellow and brown. This layer derived from phosphatic limestone.

This soil is commonly on benches and toe slopes surrounded by steeper Dellrose soils. The creep material in which the soil formed ranges from 2 to 6 feet or more in thickness. Chert fragments on the surface and throughout the soil range from ½ to 3 inches across. The content of chert is 10 to 50 percent by volume. In some areas fragments of both chert and shale are on the surface, and in a few eroded areas the chert is in large amounts.

The soil is naturally fertile and medium acid to strongly acid. It is medium to high in phosphorus. It has a moderately high available moisture capacity. Because the soil is cherty throughout, permeability is moderately rapid to rapid. About 80 percent of this soil has been cleared and is used mainly for pasture. A few areas are used for corn, tobacco, and other crops. The soil is suited to all crops commonly grown in the county and can be cultivated occasionally, but the chert interferes with the tillage of most crops. Because the soil is on benches above steeper soils, it is difficult to reach with farm machinery. (Capability unit IVe-3)

**Dellrose cherty silt loam, 20 to 30 percent slopes** (DeE).—This soil has steeper slopes and a slightly thinner surface layer than Dellrose cherty silt loam, 12 to 20 percent slopes, but is otherwise similar to that soil. It is a fertile soil that is medium to high in phosphorus. Although the soil can produce high yields of many kinds of crops, it is too steep for cultivation with modern machinery. It is highly productive of pasture and trees. (Capability unit VIe-1)

**Dellrose cherty silt loam, 20 to 30 percent slopes, severely eroded** (DeE3).—Erosion has removed all or nearly all of the original dark-brown cherty silt loam surface layer. Shallow gullies or rills are common. A few deep gullies have cut through the yellowish-brown to reddish-brown cherty silty clay loam creep and have exposed the buried clayey residuum. Limestone bedrock crops out in the deeper gullies.

This soil is low in organic matter and is moderately low to low in available moisture capacity. The hazard of further erosion is severe because runoff is rapid on the steep slopes.

Most areas of this soil are idle or are in pasture. Some areas have been reforested naturally, mostly to locust trees. Most of this soil is fairly well suited to permanent pasture, but many of its more severely eroded, gullied areas are best suited to trees. (Capability unit VIIe-1)

**Dellrose cherty silt loam, 30 to 40 percent slopes** (DeF).—This soil is on long, steep hillsides. It developed in 2 to about 6 feet of cherty, phosphatic creep that is underlain by several feet of phosphatic clay. The surface layer is dark-brown or brown cherty silt loam, 6 to 10 inches thick. The subsoil is yellowish-brown or reddish-brown cherty silty clay loam that is friable and easily penetrated by roots.

This naturally fertile soil has medium to high content of phosphorus. It has a moderate available moisture capacity. About 50 percent of the acreage has been cleared and is used chiefly for pasture. A few areas are cultivated. Because the soil is steep, it is difficult to cultivate; but it is one of the best soils in the county for trees, and it can also be used for pasture. (Capability unit VIIe-1)

**Dellrose cherty silt loam, 30 to 40 percent slopes, severely eroded** (DeF3).—Erosion has removed all or nearly all of the original dark-brown cherty silt loam surface layer of this soil. Shallow gullies or rills are common. In places a few deep gullies have cut through the yellowish-brown or reddish-brown cherty silty clay loam creep and have exposed the underlying phosphatic clay. Limestone crops out in places.

The soil is moderately low to low in available moisture capacity. Because runoff is rapid to very rapid, further erosion is a great hazard. Most of this soil has been cleared but is now idle or has reforested naturally. A few areas are used for pasture, but most areas have grown up in brush, weeds, briers, and broomsedge. The soil is not suited to crops and is poorly suited to pasture. It is best suited to trees. (Capability unit VIIe-1)

## Dickson Series

The soils in the Dickson series are moderately well drained and have a fragipan about 2 feet below the surface. They are on the uplands of the Highland Rim. These soils have developed in loess, or windblown material, that overlies cherty clay. The fragipan is ordinarily in the loess at or near the boundary between the loess and the cherty clay. In a few places the loess overlies a 4- to 10-inch layer of cemented Coastal Plain material.

In uneroded areas the surface layer is grayish-brown silt loam, about 8 inches thick. The upper part of the subsoil is yellowish-brown silt loam or light silty clay loam, and the lower part, or fragipan, is mottled brown and gray, compact heavy silt loam or silty clay loam. Slopes range from 2 to 5 percent.

The Dickson soils are strongly acid, low in natural fertility, and moderately low to low in available moisture capacity.

These soils ordinarily adjoin Mountview, Baxter, and Bodine soils. They are not so well drained as the Mountview soils, which do not have a fragipan.

The Dickson soils are on the broader and more gently sloping areas of the Highland Rim in the western part of the county. About 75 percent of their acreage has been cleared of the original hardwood forest. A few areas are idle, but most areas are used for crops and pasture. These soils are easy to work, and crops grown on them respond to good management, especially to additions of lime and fertilizer. The fragipan restricts the movement of water and air and causes some waterlogging in the lower subsoil during wet periods.

**Dickson silt loam, 2 to 5 percent slopes** (DkB).—This moderately well drained soil, on the broad and gently sloping uplands of the Highland Rim, has a fragipan in the subsoil. The soil has developed in loess that overlies clay. The fragipan is generally at or near the boundary between the loess and the cherty clay.

Representative profile:

0 to 8 inches, grayish-brown, friable silt loam with weak, granular structure.
8 to 24 inches, yellowish-brown, friable silty clay loam with blocky structure.
24 to 36 inches, mottled brown and gray, hard and compact silt loam or silty clay loam.
36 to 48 inches +, mottled red, gray, and brown cherty clay with blocky structure.

The loess mantle ranges from 18 to 36 inches in thickness, and the fragipan is at a depth of 18 to 30 inches. In areas of Coastal Plain material, the fragipan consists largely of a thin cemented layer of that material. Included are a few severely eroded areas and a few areas on slopes of as much as 10 percent.

The soil is low in natural fertility, is strongly acid, and has a moderately low available moisture capacity. The upper part of the solum is permeable to air, roots, and water; but the fragipan is very slowly permeable.

Practically all of this soil has been cleared and cultivated. Most of it is used for crops and pasture, but a considerable acreage is now idle. The soil is easy to work and is fairly easy to conserve. Suitability for crops is somewhat limited by low fertility, a moderately low available moisture capacity, and the very slowly permeable fragipan. Lime and fertilizer are required for satisfactory yields of most crops. Under good management, use can be moderately intensive. All crops can be grown, but alfalfa ordinarily lasts for only 2 years because drainage is slow in the lower subsoil. (Capability unit IIe–2)

## Donerail Series

In the Donerail series are moderately well drained, phosphatic soils that have a compact or cemented hardpan.

Uneroded Donerail soils have a dark-brown silt loam surface layer, 8 to 10 inches thick. The subsoil is brown or reddish-brown silty clay loam in the upper part and is mottled with yellowish brown and gray near the hardpan. Some areas of these soils have a hardpan consisting of a cemented layer of concretionary material that is high in phosphorus, iron, and manganese. These areas are mapped as concretionary phases. Slopes range from 0 to 20 percent, but the dominant slopes are between 2 and 12 percent.

The soils are moderate to moderately high in natural fertility, are medium acid to strongly acid, and are moderately low in available moisture capacity.

The Donerail soils are closely associated with the Maury, Hampshire, Mimosa, and Stiversville soils and differ from those soils chiefly in having hardpans and in being less well drained.

The Donerail soils are inextensive. They occur in the outer Central Basin in the eastern half of the county. Most areas have been cleared and are used for crops and pasture. These soils are relatively easy to work, but their suitability for crops and pasture is somewhat limited by the compact layer, or hardpan.

**Donerail silt loam, 2 to 5 percent slopes** (DnB).—This moderately well drained soil is on the uplands of the outer Central Basin, where it developed in residuum weathered from phosphatic limestone. A fragipan, or compact layer, is in the subsoil.

Representative profile:

0 to 10 inches, dark-brown, very friable silt loam with granular structure.
10 to 26 inches, brown or reddish-brown, friable to firm silty clay loam with blocky structure; few black concretions.
26 to 40 inches +, mottled brown and gray, compact, massive (structureless) silty clay loam; common, small, black concretions.

Depth to the compact layer, or fragipan, ranges from 20 to 36 inches. In many places small, rounded, black concretions are on the surface. Generally, the depth to bedrock ranges from 3 to 8 feet. Most of this soil is on concave slopes and has a thin layer of recent sediment on the surface.

The soil is medium to high in phosphorus and is medium acid to strongly acid. The available moisture capacity is moderate. Runoff is medium to slow. The compact layer, or fragipan, restricts the movement of air and water in the soil.

Most areas have been cleared and are used for crops and pasture. The soil is easy to work, and crops grown on it show a fair to good response to management. Yields of nearly all crops are medium to good. Alfalfa does not grow well, because the lower subsoil is wet. (Capability unit IIe–2)

**Donerail silt loam, 2 to 5 percent slopes, eroded** (DnB2).—This eroded soil has a surface layer 3 to 5 inches thinner than that in Donerail silt loam, 2 to 5 percent slopes, but in other respects the two soils are similar. (Capability unit IIe–2)

**Donerail silt loam, 5 to 12 percent slopes, eroded** (DnC2).—This phosphatic soil occurs on the uplands of the outer Central Basin and has a fragipan, or compact layer, in the subsoil. The 4- to 6-inch surface layer of brown silt loam generally contains some subsoil material. The subsoil is brown or reddish-brown silty clay loam. The fragipan, which starts at a depth of about 20 inches, is brown and gray, compact silty clay loam. In many places a few, small, black concretions are on the surface. In a few severely eroded areas, the surface layer is silty clay loam. Limestone bedrock is generally at a depth of 3 to 8 feet, but it crops out in a few places.

The soil is medium to high in phosphorus, is medium acid to strongly acid, and is moderately low to low in available moisture capacity. Because of the strong slopes and the very slowly permeable fragipan, runoff is moderately rapid to rapid and erosion is a problem.

Most of this soil has been cleared and is in crops and pasture. The soil is easy to work, but its suitability for most deep-rooted plants is somewhat limited. Alfalfa stands ordinarily do not last more than 2 years, but yields of other common crops are fair to good. (Capability unit IIIe–3)

**Donerail silt loam, concretionary, 5 to 12 percent slopes, eroded** (DoC2).—This is a moderately well drained soil that has a hardpan consisting largely of cemented concretionary material. It is on the uplands of the outer Central Basin, commonly on the steeper slopes separating broad, gently sloping Stiversville soils and imperfectly drained soils along small drains on the bottom lands.

Representative profile:

0 to 6 inches, dark-brown, friable silt loam with weak, granular structure; many, small, reddish-brown, dark-brown, and black concretions.
6 to 22 inches, dark-brown or reddish-brown silty clay loam with blocky structure; many, small and medium, black and reddish-brown concretions.
22 to 40 inches +, mottled brown, red, and yellow silty clay mixed with black and brown concretions; compact and massive (structureless).

The surface layer ranges from dark-brown to yellowish-brown silt loam. The upper part of the subsoil is silty clay loam to silty clay that is dark brown to reddish brown. Just above the subsoil, the hardpan is generally mottled with yellow and gray and contains more concretions than the horizon above it.

In many places the concretionary layer is very hard and cemented, and it breaks into large chunks or slabs. The concretionary material is high in phosphorus, iron, and manganese. It is generally 16 to 36 inches from the surface, but in places on the steeper slopes it is exposed and a few fragments of the layer, 3 to 12 inches across, are scattered on the surface. Depth to bedrock ranges from 3 to 6 feet.

The soil is medium acid to strongly acid, is medium to high in phosphorus, and has a moderately low available moisture capacity. Runoff is moderately rapid to rapid. The hardpan restricts the movement of water and makes the soil slowly to very slowly permeable.

All areas have been cleared and are in crops and pasture. Although the soil is relatively easy to work, the supply of moisture is too low for consistently high yields of corn and other summer annuals. Small grains, orchardgrass, tall fescue, white clover, red clover, and lespedeza grow well where the soil is adequately fertilized. Alfalfa ordinarily does not last more than 2 years, because of the shallow root zone and the slow drainage in the lower subsoil. (Capability unit IIIe-3)

**Donerail silt loam, concretionary, 2 to 5 percent slopes, eroded** (DoB2).—This soil is similar to Donerail silt loam, concretionary, 5 to 12 percent slopes, eroded, but it is less sloping and its surface layer is 2 or 3 inches thicker. (Capability unit IIe-2)

## Dowellton Series

The soils of the Dowellton series are poorly drained and somewhat poorly drained and have developed in residuum of argillaceous limestone. Bedrock is at a depth of 2 to more than 6 feet.

These soils have a surface layer of grayish-brown to dark-gray silt loam. The subsoil is mottled gray, brown, yellow, olive, and red silty clay or clay that is very firm, sticky, and plastic. Slopes range from 2 to 5 percent.

These soils are medium acid to strongly acid and low in natural fertility. Runoff is slow to medium, and permeability is very slow.

The Dowellton soils occur with the Fairmount, Talbott, and Mercer soils, but they are grayer and more poorly drained than those soils.

Dowellton soils are generally in small, nearly level areas of the inner Central Basin in the southern and eastern parts of the county. About 50 percent of the acreage has been cleared and is used chiefly for pasture. A few areas are used for crops, mainly corn, small grains, and silage crops. A large percentage of trees in the wooded areas are hickory, elm, and cedar. The Dowellton soils are suited to only a few kinds of crops and are poorly suited to cultivation.

**Dowellton silt loam, 2 to 5 percent slopes** (DsB).—This soil is somewhat poorly drained. It has a slowly permeable, highly mottled clayey subsoil that is sticky and plastic.

Representative profile:

0 to 9 inches, grayish-brown, friable silt loam with weak, granular structure.

9 to 30 inches +, mottled light-gray, pale-yellow, yellowish-brown, and reddish-brown, sticky and plastic clay; massive (structureless); many black and dark-brown concretions.

A few small areas of this soil are on slopes of 5 to 12 percent. The surface layer ranges from grayish-brown to dark-gray silt loam, and the mottled clay subsoil generally is splotched with different shades of red. In most places small and medium black concretions are on the surface and throughout the soil in varying amounts.

This soil is low in natural fertility and medium acid to strongly acid. Runoff is medium to slow, and permeability is very slow. Ponding is common, especially during winter and spring.

About 50 percent of the acreage has been cleared and is used chiefly for pasture. A few areas are cultivated and used mainly for small grains, corn, and silage crops. The soil is hard to work and is suited to only a few crops. It is best suited to permanent pasture consisting of water-tolerant plants. Where the soil is artificially drained, fair yields of corn, small grains, and crops for silage can be maintained if liberal amounts of lime and fertilizer are applied. (Capability unit IIIe-5)

## Dunning Series

In the Dunning series are black, poorly drained soils on first bottoms. These soils have developed in slightly acid to neutral alluvium that washed from soils derived chiefly from phosphatic limestone of the uplands.

The surface layer is black silt loam or silty clay loam. The subsoil ranges from black to dark gray and from silt loam to clay. As a result of poor drainage, these soils are mottled gray, olive, and brown in varying degrees. Slopes range from 0 to 5 percent.

These soils are naturally fertile and contain a moderate to moderately high amount of organic matter. They are subject to overflow and are ponded for long periods in some places. During prolonged dry periods, the soils become very dry and hard and large cracks then form.

The Dunning soils are on bottom lands along with Huntington, Lindside, Lanton, Egam, and Melvin soils. They are darker throughout than the Huntington and Lindside soils and lack the 14 to 24 inches of brown, more recent alluvium that is the surface layer of Egam soils. They are darker than the Melvin soils, especially in the upper part of their profile, and they are more poorly drained than the Lanton soils.

The Dunning soils are inextensive and are mainly along the streams in the eastern two-thirds of the county. Most areas have been cleared and are used chiefly for crops and pasture. A few areas are idle. Poor aeration, the fluctuating high water table, and susceptibility to overflow and ponding make these soils unsuited to deep-rooted legumes. If the soils are artificially drained, they produce good yields of the commonly grown summer annuals.

**Dunning silt loam, phosphatic** (Du).—This black, poorly drained soil is on first bottoms, along small drains, and in depressions. Its alluvial parent material washed from soils derived mostly from phosphatic limestone of the uplands.

Representative profile:

0 to 8 inches, very dark gray to black, friable silt loam with granular structure.

8 to 16 inches, very dark gray, friable silty clay loam with a few mottles of dark grayish brown; granular structure.

16 to 36 inches +, mottled gray, olive, and brown silty clay loam; massive (structureless); numerous black and dark-brown concretions.

The thickness of the alluvial parent material ranges from 2 to more than 6 feet. The surface layer is dominantly silt loam but is silty clay loam in a few areas. A layer of dark-brown silt loam, 4 to 8 inches thick, has been recently deposited on the surface. The subsoil ranges from black to dark gray and from silt loam to clay. Most areas of this soil are medium to high in phosphorus throughout the profile.

Runoff and permeability are slow to very slow, and the soil is waterlogged most of the time by a high water table and by seepage from higher soils. Undrained areas of this soil are best suited to permanent, water-tolerant pasture. Artificially drained areas produce fair to good yields of corn, sorghum, soybeans, and other summer annuals. (Capability unit IIIw-1)

## Egam Series

The soils of the Egam series are on first bottoms and consist of about 20 inches of brown silt loam that overlies darker, more compact, poorly drained material. The alluvium in which these soils formed is mostly materials that washed from soils derived from phosphatic limestone.

The Egam soils are brown to dark grayish brown in the upper 15 to 30 inches. The lower subsoil is black or very dark gray, compact silty clay loam. Slopes range from 0 to 5 percent.

These soils are naturally fertile, are medium to high in phosphorus, and are medium acid to neutral. They have a moderately high available moisture capacity.

The Egam soils are on bottom lands along with Huntington, Lindside, Lanton, Melvin, and Dunning soils. They are not so well drained as the Huntington soils and are not so poorly drained as the Melvin soils. In most places the Egam soils are better drained than the Dunning soils and are not so dark in the upper part as are the Lanton and Dunning soils.

The Egam soils are extensive and are along streams and at the base of slopes in many parts of the county. Most of the acreage has been cleared and is used chiefly for crops and pasture. The soils are well suited to summer annuals but are poorly suited to deep-rooted legumes.

**Egam silt loam, phosphatic** (Eg).—This well drained and moderately well drained soil has a dark, compact layer in the subsoil. Most of the alluvium in which it formed washed from soils derived from phosphatic limestone.

Representative profile:

0 to 20 inches, dark-brown, friable silt loam with granular structure.
20 to 40 inches +, very dark-gray or black, firm silty clay loam with mottles of dark reddish brown and gray; massive (structureless); few, small, dark-brown and black concretions.

In depressions and at the base of slopes, a few areas of this soil are black or very dark brown throughout. This soil is well drained to moderately well drained in the upper 15 to 30 inches, but it is moderately well drained to poorly drained at lower depths. The depth to underlying residuum or to bedrock ranges from 2 to more than 10 feet.

The soil is naturally fertile, is medium to high in phosphorus, and is medium acid to neutral. It has a moderately high to high available moisture capacity. Runoff is slow, and permeability is moderately slow to slow. In places ponding is common.

Most of the soil has been cleared and is used for crops and pasture. The use is limited, however, by the moderately well drained to poorly drained, compact subsoil and, in most places, by the hazard of flooding. In general, the soil is poorly suited to deep-rooted legumes but is well suited to most summer annual crops. If it is managed well, it can be used intensively and will produce good yields of crops and pasture. (Capability unit IIw-1)

## Etowah Series

In the Etowah series are deep, well-drained, medium acid to strongly acid soils on high stream terraces. These soils are in alluvium consisting of materials that washed from soils derived largely from limestone.

In uneroded areas, Etowah soils have a dark-brown silt loam surface layer. Their subsoil is reddish-brown or yellowish-red silty clay loam. Slopes range from 2 to 12 percent, but the dominant slopes are between 2 and 5 percent.

These soils are naturally fertile, are moderately rapidly to rapidly permeable, and have a moderate to moderately high available moisture capacity.

The Etowah soils are closely associated with the Armour, Captina, and Talbott soils in the inner Central Basin and with the Mountview and Baxter soils on the Highland Rim. They are generally on higher and older stream terraces than are the Armour soils. Etowah soils are redder than the Mountview soils. They are better drained than the Captina soils and, unlike those soils, lack a fragipan.

The Etowah soils are inextensive. They are along the Harpeth River in the eastern part of the county and along Little Turnbull Creek and Big Turnbull Creek in the western part. Nearly all areas have been cleared and are used for crops and pasture. These soils are well suited to many kinds of crops and pasture.

**Etowah silt loam, 2 to 5 percent slopes** (EtB).—This deep, well-drained, red soil is in old alluvium on high stream terraces. The alluvium washed from soils derived mainly from limestone. In places the old alluvium is capped with a thin layer of loess material.

Representative profile:

0 to 8 inches, dark-brown, friable silt loam with granular structure.
8 to 36 inches, yellowish-red or reddish-brown, friable silty clay loam with blocky structure.
36 to 48 inches +, red or yellowish-red, firm silty clay loam or silty clay with blocky structure; seams of gravel or chert in places.

The thickness of the alluvium ranges from 2 to more than 10 feet. In places beds of gravel are in the subsoil. Most areas in the western part of the county have a thin mantle of loess overlying the old alluvium. A few severely eroded areas have a reddish-brown silty clay loam surface layer.

The soil is naturally fertile and medium acid to strongly acid. The available moisture capacity is moderately high, and permeability is moderate to moderately rapid.

Nearly all of this soil has been cleared and is used for crops and pasture. The soil is easy to work and is suited to many kinds of crops and pasture. It is easy to keep in good tilth, has a thick root zone, is gently sloping, and is therefore suited to moderately intensive use. (Capability unit IIe-1)

**Etowah silt loam, 5 to 12 percent slopes, eroded** (EtC2).—This red, well-drained soil is in alluvium on high stream terraces. The thickness of the alluvium ranges from 2 to more than 6 feet. The surface layer is brown or dark-brown silt loam, about 4 to 6 inches thick, and the subsoil is yellowish-red or reddish-brown silty clay loam. A few areas of this soil are severely eroded and have a reddish-brown silty clay loam surface layer. A thin mantle of loess caps the old alluvium in most areas in the western part of the county. Seams or beds of gravel or chert are in the lower subsoil in places.

This soil is naturally fertile, is medium acid to strongly acid, and has a moderate available moisture capacity. Permeability is moderate to moderately rapid.

Most of this soil has been cleared and is used chiefly for crops and pasture. The soil can produce high yields of all common crops, but it is too sloping for frequent cultivation. (Capability unit IIIe-1)

## Fairmount Series

In the Fairmount series are shallow and clayey soils on the uplands of the inner Central Basin. These soils are a few inches to about 3 feet deep over limestone bedrock.

In uneroded areas the surface layer is very dark grayish-brown, almost black, silty clay loam, about 6 inches thick. The subsoil is dark yellowish-brown clay mottled with shades of brown, olive, and gray. In cultivated areas the plow layer contains material from the subsoil and is lighter colored and finer textured than the surface layer in uncultivated areas. Outcrops of limestone bedrock are common in many places. Slopes range from 2 to 10 percent, but the dominant slopes are less than 5 percent.

The soils are slightly acid to alkaline. They are low in natural fertility and low in available moisture capacity.

The Fairmount soils are closely associated with the Talbott, Hagerstown, and Mercer soils but are shallower and less acid than those soils and have a more plastic subsoil. Their subsoil is not so red as that of the Talbott and Hagerstown soils.

The total acreage of Fairmount soils is small, and most of it has been cleared and cultivated. A few areas are still in crops, and some are in pasture, but most areas are idle or have reforested naturally to cedar and hickory trees. Shallowness to bedrock and the heavy, plastic, slowly permeable subsoil restrict the roots of most plants and make the soils difficult to work and conserve.

**Fairmount silty clay loam, 2 to 10 percent slopes** (FaC).—This shallow, clayey soil is on the uplands of the inner Central Basin. It has developed in clayey residuum weathered from argillaceous limestone.

Representative profile:

- 0 to 6 inches, very dark grayish-brown, friable silty clay loam with granular structure.
- 6 to 24 inches, dark yellowish-brown, very sticky and plastic clay, mottled with shades of olive and gray; a few, small, brown and black concretions.
- 24 inches, limestone bedrock.

Limestone bedrock is at a depth of 10 inches to 3 feet. The surface layer ranges from black to very dark grayish brown and from silt loam to silty clay. In cultivated areas the plow layer contains material from the clay subsoil. A few outcrops of bedrock are common, especially in the eroded areas.

The soil is low in natural fertility, is slightly acid to alkaline, and is low in available moisture capacity. Because of the heavy, plastic clay subsoil, permeability is slow to very slow.

Most areas have been cleared and cultivated and are now in unimproved pasture, are idle, or have grown up to trees. A few areas are still in crops. Because bedrock is near the surface and the clayey subsoil is slowly permeable, the roots of most plants and the movement of water and air are restricted. Also, the soil is difficult to work and conserve. It is poorly suited to row crops but can be used regularly for small grain. It is best suited to drought-resistant plants seeded for pasture and hay. (Capability unit IIIe-5)

## Frankstown Series

The soils in the Frankstown series are well drained, moderately deep, and cherty. They are on the upper parts of high hills and ridges.

Where these soils are not severely eroded, they have a surface layer of dark-brown or grayish-brown cherty silt loam, 6 to 8 inches thick. The subsoil is yellowish-brown cherty silty clay loam. On the surface and throughout the soil are chert fragments ranging from ½ to 3 inches across and, in some places, varying amounts of weathered shale. Slopes range from 5 to 20 percent, but the dominant slopes are between 5 and 12 percent. These soils are low to medium in phosphorus and are medium acid to strongly acid.

Frankstown soils are on ridgetops above the Dellrose and Mimosa soils. They are lighter colored and less productive than the Dellrose soils. Frankstown soils are more productive than Bodine soils and have more highly developed profiles than those soils.

The Frankstown soils are inextensive and occur only on the narrow, winding ridgetops of the higher hills in the eastern and southeastern parts of the county. Only about 20 percent of the acreage has been cleared, and this is used mainly for pasture. Most crops do not get adequate moisture from these soils in the summer. Chert on the surface interferes with cultivation.

**Frankstown cherty silt loam, 5 to 12 percent slopes** (FrC).—This well-drained, moderately deep, cherty soil is on narrow, winding ridgetops of high hills in the eastern part of the county.

Representative profile:

- 0 to 8 inches, dark-brown, friable cherty silt loam with granular structure.
- 8 to 24 inches, yellowish-brown, friable cherty silty clay loam with blocky structure.
- 24 to 36 inches +, yellowish-brown silty clay loam mixed with chert fragments.

The depth to limestone bedrock or beds of chert ranges from 2 to 4 feet. A few areas of this soil are severely eroded. In these areas the plow layer is yellowish-brown cherty silty clay loam, and there is more chert on the surface than in uneroded areas.

The soil is moderate to moderately low in natural fertility and is low to medium in phosphorus. The available moisture capacity is moderately low, and permeability is moderately rapid to rapid.

Most of this soil is in hardwood forest, but a few areas have been cleared and are used chiefly for pasture. A few areas are cropped. The soil is fairly well suited to most crops and pasture plants commonly grown in the county, and it can be cultivated regularly. The chert on the surface and throughout the soil, however, interferes with the tillage of most crops. Yields are generally low because the soil is droughty during the summer. (Capability unit IIIe-4)

**Frankstown cherty silt loam, 12 to 20 percent slopes** (FrD).—This well-drained, moderately deep, cherty soil is on narrow, winding tops of hills in the eastern part of the county. The surface layer is dark-brown or brown cherty silt loam, about 5 to 8 inches thick, and the subsoil is yellowish-brown cherty silty clay loam. A few severely eroded areas have a surface layer of yellowish-brown cherty silty clay loam and, in most places, much chert on the surface.

This soil is moderately low to low in available moisture capacity. It is medium acid to strongly acid.

Most areas of this soil are in hardwood forest, but about 20 percent of the acreage has been cleared and is in pasture. A few small areas are cropped, and a few are idle. Cultivation is difficult because the soil is steep and its surface layer is cherty. It can be cultivated occasionally, but yields of most crops are low because the soil is droughty in summer and fall. It is best suited to permanent pasture, hay, and trees. (Capability unit IVe-3)

## Greendale Series

In the Greendale series are well-drained soils along small drainageways and on foot slopes of the Highland Rim. These soils are in alluvium that ranges from 18 inches to more than 5 feet in thickness and consists of materials washed from soils derived from loess and cherty limestone of the uplands.

The soils in this series have a surface layer of silt loam or cherty silt loam, about 10 inches thick. This layer is dark brown or grayish brown, and the subsoil is brown or yellowish brown. Slopes range from 2 to 12 percent.

These soils are strongly acid. They are moderate to moderately low in natural fertility and have a moderately high available moisture capacity.

Greendale soils are on narrow strips of bottom land and on benches below Bodine, Baxter, Sulphura, Mountview, and Dickson soils. They formed in parent material similar to that of the Humphreys soils, but they are younger than those soils and have a browner subsoil.

The Greendale soils are extensive along the small drains, in depressions, and on foot slopes of the Highland Rim in the western part of the county. About 75 percent of their acreage is in hardwood forest. Most of the more nearly level and gently sloping areas have been cleared and are used for crops and pasture. Crops commonly grown in the county are well suited to these areas and respond well to good management, especially to additions of lime and fertilizer.

**Greendale cherty silt loam, 2 to 12 percent slopes** (GrC).—This well-drained soil has developed in cherty alluvium in the narrow valleys or hollows of highly dissected areas on the Highland Rim. The alluvium consists of materials washed from the cherty uplands.

Representative profile:

- 0 to 10 inches, dark-brown, very friable cherty silt loam with granular structure.
- 10 to 36 inches, yellowish-brown, friable cherty silt loam with granular structure.
- 36 to 40 inches +, yellowish-brown silt loam mixed with fragments of chert.

Chert fragments, 1 to 6 inches across, are numerous in the surface layer, and the amount increases in the subsoil. Areas of this soil below Sulphura soils have varying amounts of shale fragments on the surface and throughout the soil. In places gray mottling in the lower layers indicates imperfect drainage.

This soil is strongly acid and moderately low in natural fertility. Although it is porous and cherty, it receives runoff and seepage from upland slopes and is not droughty. The soil is fairly well suited to the commonly grown crops, but it is difficult to till, and heavy applications of lime and fertilizer are required to maintain satisfactory yields. (Capability unit IIIe-4)

**Greendale silt loam, 2 to 5 percent slopes** (GsB).—This well-drained soil is along small drains and in depressions on the Highland Rim. It is in alluvium that washed from soils derived from loess and cherty limestone.

Representative profile:

- 0 to 12 inches, dark-brown or grayish-brown, very friable silt loam with granular structure.
- 12 to 40 inches, brown or yellowish-brown, friable silt loam or light silty clay loam with blocky or granular structure.
- 40 to 48 inches +, yellowish-brown cherty silty clay loam with gray mottles.

In places the lower layers of this soil, generally those at a depth of 24 inches or more, are imperfectly drained and mottled with gray. The alluvium overlies cherty clay in most places and ranges from 18 inches to more than 5 feet in thickness.

This soil is much less extensive than the cherty Greendale soil. It is in small areas that occur in nearly level and gently sloping depressions and along small drains in the broader, less dissected part of the Highland Rim. Most areas have been cleared and are in crops and pasture. The soil is easy to work and to conserve and is well suited to all common crops. Heavy applications of lime and fertilizer are required, however, to maintain high yields. Although the soil is well suited to intensive use, low areas are ponded for short periods. (Capability unit I-2)

## Gullied Land

Areas of very severely eroded soils that are cut by a close network of moderately deep to deep gullies are mapped as Gullied land regardless of texture or parent material. Although the total acreage is fairly large in the county, this land is in small areas, nearly all of which are on uplands.

**Gullied land** (Gu).—This land type is made up of soils so severely damaged by erosion that only remnants of soil profiles are left between the gullies. Bedrock crops out in many places and is also exposed in the deep gullies.

This land is in small areas but has a fairly large total acreage, most of which is on uplands. Nearly all areas have been cleared and used for crops but were gullied when the soil was overcropped or left idle (fig. 14). A few areas are in native or seeded pasture that is in poor condition, but most areas are idle or have reforested naturally to a sparse growth of low-quality trees.

The soil material in Gullied land generally is strongly acid and is low in natural fertility. The available moisture capacity is low, runoff is very rapid, and permeability is generally slow or very slow.

*Figure 14.*—**Shallow and deep gullies occur when strong slopes are overcropped. The corn is on Mountview soil above the gullied areas.**

Most of this land type is best suited to trees. On slopes of less than 20 percent, areas that have deeper and more fertile soil can be reclaimed for crops and pasture, but the expense is rather high. (Capability unit VIIe-1)

## Hagerstown Series

The Hagerstown series consists of moderately deep to deep, well-drained soils on uplands of the inner Central Basin. These soils have developed in residuum weathered from limestone.

Uneroded areas of Hagerstown soils have a surface layer of dark-brown or dark reddish-brown silt loam, about 10 inches thick. The subsoil is yellowish-red or reddish-brown silty clay loam in the upper part, and it grades to clay at a depth of about 30 inches. Slopes range from 2 to 12 percent, but the dominant slope is between 2 and 5 percent.

These soils are moderately fertile, are medium acid to strongly acid, and are moderate in available moisture capacity.

Hagerstown soils are more friable and coarser textured than Talbott soils and ordinarily have a redder subsoil. They are deeper, redder, and more friable than the Fairmount soils.

Hagerstown soils are in small areas in the inner Central Basin in the eastern part of the county. Nearly all areas have been cleared and are used for crops and pasture. Many kinds of crops and pasture plants are suited, and they respond well to good management, especially to additions of lime and fertilizer.

**Hagerstown silt loam, 2 to 5 percent slopes, eroded** (HaB2).—This is a moderately deep to deep, well-drained, red soil on the broad, gently sloping uplands of the inner Central Basin. The soil has developed in residuum weathered from limestone.

Representative profile:

0 to 10 inches, dark-brown or dark reddish-brown, friable silt loam with granular structure.
10 to 30 inches, yellowish-red, friable silty clay loam with blocky structure.
30 to 48 inches +, yellowish-red clay mottled with brown in the lower part; blocky structure.

A few patches are severely eroded and have a yellowish-red silty clay loam surface layer. Limestone bedrock is at a depth of 2 to 6 feet and crops out in a few places.

This naturally fertile soil has moderate available moisture capacity. Permeability is moderately rapid. The soil has a deep root zone and is easy to keep in good tilth. Response to management is good.

About 90 percent of this soil has been cleared and is used for crops and pasture. It is suited to all common crops and is one of the best soils in the county for alfalfa and other deep-rooted legumes. Use can be moderately intensive because tilth is generally good, the root zone is deep, available moisture capacity is moderate, and slopes are gentle. (Capability unit IIe-1)

**Hagerstown silt loam, 5 to 12 percent slopes, eroded** (HaC2).—This red, well-drained soil has developed in residuum from limestone in the uplands of the inner Central Basin. Depth to bedrock ranges from 2 to 6 feet. About one-half of this soil has been severely eroded and has a plow layer that is mostly yellowish-red clayey subsoil material. In areas that are not severely eroded, the surface layer is dark brown or dark reddish brown and is 4 to 7 inches thick. Many shallow gullies or a few deep ones are in the severely eroded areas, and limestone bedrock crops out in places.

The soil is moderate in natural fertility and moderate to moderately low in available moisture capacity. Runoff is rapid, and permeability is moderate.

Nearly all of this soil has been cleared and cultivated. About 50 percent of it is in crops, 25 percent is in pasture, and the rest is idle or has reforested naturally to a sparse growth of cedar and hickory trees. All crops and pasture plants commonly grown in the county are suited to this soil and respond to good management, especially to additions of lime and fertilizer. Grasses and legumes grow especially well, but the more eroded areas do not produce high yields of summer annuals. (Capability unit IIIe-1)

## Hampshire Series

In the Hampshire series are well drained and moderately well drained, phosphatic soils that have a slowly permeable heavy clay subsoil. These soils have developed in residuum from phosphatic limestone or interbedded limestone and shale.

Uneroded areas of Hampshire soils have a dark-brown silt loam surface layer, about 7 inches thick. The subsoil is yellowish-brown silty clay loam in the upper part and, at a depth of about 15 inches, is yellowish-brown clay mottled with olive and light gray. Bedrock is at a depth of 2 to 6 feet. Slopes range from 2 to 20 percent, but the dominant slopes are between 5 and 12 percent.

These soils are slightly acid to strongly acid. They are medium to high in phosphorus and are moderate to moderately low in available moisture capacity.

Hampshire soils are closely associated with the Maury, Stiversville, Braxton, Talbott, and Inman soils. They are yellower and finer textured than the Maury and Stiversville soils and have a less friable subsoil. They are not so cherty as the Braxton soils.

The Hampshire soils are adjacent to the outer Central Basin in the eastern half of the county. Nearly all areas have been cleared and are in crops and pasture, but the suitability of these soils is limited by their clayey subsoil.

**Hampshire silt loam, 5 to 12 percent slopes, eroded** (HbC2).—This moderately deep to deep soil has a clayey subsoil and is on the uplands of the outer Central Basin. The soil has developed in weathered phosphatic limestone or sandy limestone interbedded with shale.

Representative profile:

0 to 7 inches, dark-brown, friable silt loam with granular structure.
7 to 15 inches, yellowish-brown, friable silty clay loam with blocky structure.
15 to 30 inches, yellowish-brown, plastic clay with a few gray and brown mottles; blocky structure; few, small, dark-brown and black concretions.
30 to 40 inches +, mottled yellowish-brown and gray, very sticky, plastic clay.

Bedrock is generally at a depth of 2 to 6 feet, but it crops out in a few places. In some areas fragments of weathered limestone, siltstone, and shale are in the lower part of the subsoil.

The soil is medium acid to strongly acid to a depth of 10 inches and is medium acid to slightly acid below that depth. It is medium to high in phosphorus and moderately low in available moisture capacity. Runoff is medium to rapid, and permeability is moderately slow to slow.

Most areas of this soil have been cleared and are used mainly for crops and pasture. The heavy clay subsoil restricts penetration of plant roots and the movement of air and water. Consequently, the root zone is shallow, and the soil is droughty in summer.

Under good management, this soil can produce medium yields if it is cultivated only occasionally. Small grains, grasses, and legumes grow much better than summer annuals. Orchardgrass, tall fescue, alfalfa, red clover, and white clover are suitable for pasture or hay. (Capability unit IVe–2)

**Hampshire silt loam, 2 to 5 percent slopes** (HbB).—This well drained and moderately well drained, phosphatic soil is on the uplands of the outer Central Basin and has a slowly permeable clayey subsoil. The soil is generally on nearly level, concave slopes of 2 or 3 percent and is covered by a 4- to 6-inch layer of recent overwash or creep material. Most of these areas are slightly less well drained than are areas of Hampshire silt loam, 5 to 12 percent slopes, eroded, and are mottled closer to the surface. The surface layer is dark grayish-brown silt loam, 8 to 12 inches thick, and the subsoil is yellowish-brown clay.

This soil is moderately fertile and moderate in available moisture capacity. The heavy clay subsoil somewhat restricts the growth of plant roots and the movement of water and air.

About 60 percent of this soil has been cleared and is used mainly for pasture. A few areas are used for small grains and hay. Small grains, orchardgrass, tall fescue, alfalfa, red clover, lespedeza, and white clover grow well on this soil if it is fertilized and otherwise well managed. Generally, yields of corn and other row crops are medium. (Capability unit IIIe–2)

**Hampshire silt loam, 2 to 5 percent slopes, eroded** (HbB2).—The surface layer of this soil is brown or dark-brown silt loam, about 4 to 7 inches thick. The subsoil is yellowish-brown heavy silty clay or clay that is mottled with gray and olive in the lower part. A few severely eroded patches have a yellowish-brown silty clay loam plow layer. Phosphatic limestone is generally at a depth of 2 to 6 feet, but it crops out in places.

The soil is medium to high in phosphorus. It has a moderate to moderately low available moisture capacity.

Nearly all of this soil has been cleared and is used for crops and pasture. The heavy clay subsoil restricts the movement of air and water and the growth of roots. The soil, therefore, is too droughty for most crops in the summer. Although medium yields of corn, tobacco, and other row crops can be produced, this soil is best suited to crops that grow fast in spring when moisture is plentiful. Well suited are small grains, orchardgrass, tall fescue, alfalfa, red clover, lespedeza, and white clover. (Capability unit IIIe–2)

**Hampshire silt loam, 12 to 20 percent slopes, eroded** (HbD2).—This phosphatic soil is on moderately steep uplands of the outer Central Basin. The surface layer is brown to dark-brown silt loam, 4 to 6 inches thick, that contains part of the yellowish-brown clay subsoil. In a few severely eroded patches, the surface layer is yellowish-brown silty clay loam, and in places there are a few outcrops of bedrock. The depth to bedrock is generally between 2 and 5 feet.

The soil is medium to high in phosphorus. It is moderately low in organic matter and is moderately low to low in available moisture capacity.

Most areas have been cleared and are in pasture and crops. Because of the strong slopes, the heavy clay subsoil, and the hazard of erosion, this soil is best suited to permanent pasture and hay. (Capability unit VIe–2)

**Hampshire silty clay loam, 5 to 12 percent slopes, severely eroded** (HcC3).—This clayey, phosphatic soil is on uplands of the outer Central Basin. The plow layer is brown or yellowish-brown silty clay loam, most of which is sticky and plastic material from the clay subsoil. Shallow gullies or rills are common in many places, and there are a few deep gullies in which heavy, mottled clay is exposed. Bedrock is generally at a depth of 1½ to 6 feet, but a few outcrops are on the surface.

Although some areas are still cropped, most areas of this soil are now in pasture or are idle. A few areas have been abandoned and have grown up in sparse stands of black locust, cedar, and hickory. This strongly sloping soil is poorly suited to cultivated crops because it is generally in poor tilth, is susceptible to severe erosion, and is low in available moisture capacity. It is best suited to permanent pasture or hay. (Capability unit VIe–2)

**Hampshire silty clay loam, 12 to 20 percent slopes, severely eroded** (HcD3).—This severely eroded, clayey soil has developed from phosphatic limestone. The brown silty clay loam surface layer consists largely of yellowish-brown clay from the subsoil. Shallow gullies are common, and there are a few deep ones. Some of the deeper gullies have cut through the soil and have exposed the mottled lower subsoil and the bedrock. Bedrock is generally at a depth of 1½ to 5 feet, and it crops out in a few places.

The soil has lost most of its natural fertility and organic matter. The heavy clay subsoil restricts the growth of roots and the movement of water and air.

All areas have been cleared and cultivated. Most areas now are idle, are in pasture, or have reforested naturally. The pasture and the trees are of low quality. A few areas are still used for crops, but yields are low. Because of the fine-textured surface layer and the steep slopes, runoff is rapid to very rapid and further erosion is likely. Most of this soil is best suited to permanent pasture and to hay. A few very severely eroded areas are probably best suited to trees. (Capability unit VIe-2)

## Hampshire-Colbert Complexes

The Hampshire-Colbert complexes are made up of clayey, phosphatic soils that are in a transitional zone between the outer Central Basin and the inner Central Basin. These soils have formed from limestone on slopes below the Inman and Culleoka soils and have received from those soils a medium to large amount of phosphorus in seepage or in a thin layer of creep material. In most places the Hampshire and Colbert soils are so intricately associated that they cannot be separated on a soil map of the scale used in this soil survey. Hampshire soils amount to about 60 percent of the area, and Colbert about 40 percent. Slopes range from 2 to 20 percent, but the dominant slopes are between 5 and 12 percent.

The clayey subsoil of these soils is closer to the surface than that of the Hampshire soils mapped separately.

The Hampshire-Colbert complexes are in the eastern part of the county. About 60 percent of the acreage has been cleared and cultivated. Most areas now are used for pasture, but some are still cropped, and a large acreage is idle. Because of the clayey, slowly permeable subsoil, these soils are difficult to work and to conserve.

**Hampshire-Colbert silt loams, 5 to 12 percent slopes, eroded** (HeC2).—These clayey, phosphatic soils are so intricately intermingled in most places that they cannot be separated on a map of the scale used in this soil survey. They have developed in weathered limestone, in a transitional zone between the outer and inner Central Basin.

Representative profile of the Hampshire soil:

0 to 6 inches, dark grayish-brown, friable silt loam with granular structure.

6 to 30 inches, yellowish-brown or yellowish-red, sticky, plastic clay with blocky structure; few, small, black concretions.

30 to 40 inches +, mottled brown and gray, sticky, plastic clay; few to many, small, black concretions.

Representative profile of the Colbert soil:

0 to 5 inches, dark-brown, friable silt loam with granular structure.

5 to 16 inches, dark yellowish-brown, sticky and plastic clay with mottles of yellow and gray; blocky structure; many, small, black concretions.

16 to 30 inches +, mottled brown, olive, and gray, very sticky and plastic clay; many, small, reddish-brown and black concretions.

Bedrock is generally at a depth of 15 inches to 5 feet, but in many places a few outcrops are on the surface. The surface layer ranges from dark brown to yellowish brown in color and from 3 to 12 inches in thickness. In a few severely eroded patches, the plow layer is lighter colored and finer textured than that in less eroded areas.

The soils in this complex are medium to high in phosphorus, are moderately low in available moisture capacity, and are slowly permeable. They range from neutral to strongly acid but in most places are medium acid to strongly acid. Runoff is moderately rapid to rapid.

About 75 percent of the acreage has been cleared and is used for crops and pasture. A considerable acreage is idle or is in unimproved pasture. The soils are fairly well suited to most crops and pasture grown in the county. They can be cultivated occasionally if they are managed well and intensive conservation practices are used. Because the available moisture capacity is moderately low, these soils produce low to medium yields of corn, tobacco, and other summer annuals. Small grains, orchardgrass, tall fescue, ryegrass, and whiteclover grow fairly well, and yields are medium. (Capability unit IVe-2)

**Hampshire-Colbert silt loams, 2 to 5 percent slopes, eroded** (HeB2).—These clayey soils are on gently sloping uplands in a transitional zone between the outer and inner Central Basin. They have developed over limestone and have received a medium to large amount of phosphorus in seepage water from the higher phosphatic soils in the area. The surface layer is dark-brown or yellowish-brown silt loam, 5 to 7 inches thick. The subsoil is yellowish-brown, sticky, plastic clay. In a few spots or patches, the silty surface layer has been washed away and the clay subsoil is exposed. In many places there are a few outcrops of limestone bedrock, but the average depth to bedrock is 1½ to 5 feet.

These soils are moderately low in natural fertility and have a moderately low available moisture capacity.

Nearly all areas have been cleared and are used mainly for crops and pasture. A large acreage is idle or is in unimproved pasture. Most commonly grown crops and pasture are fairly well suited to the soils, but the soils are somewhat droughty in summer. They are highly susceptible to erosion because the subsoil is fine textured and slowly permeable and runoff is medium to rapid. These soils can be used for cultivated crops in long cropping systems if management is good and conservation practices are moderately intensive. (Capability unit IIIe-2)

**Hampshire-Colbert silt loams, 12 to 20 percent slopes, eroded** (HeD2).—These soils are on steep uplands in a transitional zone between the inner and outer Central Basin. They have received a medium to large amount of phosphorus in seepage from higher soils of the outer Central Basin. Their surface layer is dominantly brown silt loam, 3 to 6 inches thick, but in a few areas it is dark brown and as much as 10 inches thick. A few patches are severely eroded and have a lighter colored, finer textured surface layer that is mostly yellowish-brown clay from the subsoil. Limestone bedrock is at a depth of 1½ to 4 feet, but in many places there are a few outcrops.

These soils are medium acid, are moderately low in natural fertility, and are moderately low to low in available moisture capacity.

About 40 percent of their acreage has been cleared and cultivated, but most cleared areas are now in pasture, a large part of which is wild or unimproved. A few areas are still in crops. The soils are best suited to permanent pasture and hay. Because these soils are steeply sloping and their subsoil is fine textured and slowly permeable, runoff is rapid and the soils are highly susceptible to erosion. (Capability unit VIe-2)

**Hampshire-Colbert silty clay loams, 5 to 12 percent slopes, severely eroded** (HhC3).—These soils occur together in such an intricate pattern that they cannot be shown separately on a map of the scale used in this survey. Their surface layer is yellowish-brown, sticky silty clay loam that is mostly subsoil material. This layer is 3 to 5 inches thick and is underlain by a very sticky, plastic clay subsoil. Many shallow gullies or a few deep ones are common. Limestone bedrock is at a depth of about 12 inches to 4 feet, and in places there are a few outcrops.

These soils are medium to high in phosphorus and are medium acid. They have a low available moisture capacity and a shallow root zone. The clay surface layer is difficult to work because it is sticky when wet and hard and cloddy when dry.

All areas of these soils have been cleared and cultivated. Most areas are now idle, are in unimproved pasture, or have been abandoned and are covered by sparse stands of cedar and hickory. A few areas are still in crops, but yields are low. These soils produce low yields of row crops, but they produce fair yields of small grains, tall fescue, bermudagrass, lespedeza, and whiteclover. Yields can be improved by heavy rates of seeding. (Capability unit VIe–2)

**Hampshire-Colbert silty clay loams, 12 to 20 percent slopes, severely eroded** (HhD3).—These highly erodible clayey soils are on fairly steep uplands in a transitional zone between the outer and inner Central Basin. They have developed over limestone and have received a medium to large amount of phosphorus from the higher phosphatic soils. The surface layer is yellowish-brown silty clay loam or silty clay that is dominantly yellowish-brown plastic clay from the subsoil. Many shallow gullies or a few deep ones, as well as a few outcrops of limestone bedrock, are common. The depth to bedrock ranges from ½ to 4 feet in most places.

These soils are low in natural fertility and are medium acid. Their available moisture capacity is low. Runoff is rapid on these soils because slopes are steep, the surface layer is fine textured, and the subsoil is clayey and slowly permeable. Further erosion, therefore, is very likely. Nearly all of these soils have been cleared, cultivated, and abandoned. Most areas have a sparse growth of cedar, and of hickory and other hardwood trees of low quality. These areas are grazed. A few areas are in improved pasture, and a few are still in crops. Most of the soils are fairly well suited to pasture that can stand drought, but a few of the more severely eroded, shallower areas are probably best suited to trees. (Capability unit VIe–2)

## Hermitage Series

In the Hermitage series are deep, fertile soils on benches and foot slopes of the inner Central Basin. These soils developed in materials that have drifted downslope from soils derived from limestone. Uneroded areas of Hermitage soils have a dark-brown silt loam surface layer, 8 to 10 inches thick, and a subsoil of reddish-brown or yellowish-red, friable silty clay loam. Slopes range from 2 to 5 percent.

These soils are naturally fertile, are medium acid to strongly acid, and are high in available moisture capacity.

Hermitage soils are below Hagerstown and Talbott soils on benches or toe slopes in the eastern part of the county. Most areas have been cleared and are used chiefly for crops and pasture. Many kinds of crops and pasture are suited to these soils and respond well to good management, especially to additions of lime and fertilizer. These soils are among the most productive in the county.

**Hermitage silt loam, 2 to 5 percent slopes** (HmB).—This deep, well-drained, fertile soil is on toe slopes and fans in the inner Central Basin. The soil has developed in materials that drifted downslope from soils derived from limestone.

Representative profile:

0 to 10 inches, dark-brown, very friable silt loam with granular structure.
10 to 40 inches, yellowish-red or reddish-brown, friable silty clay loam with blocky structure.
40 to 48 inches +, yellowish-red silty clay or clay with a few brown mottles; blocky structure.

The surface layer ranges from 8 to 12 inches in thickness and is dark brown or dark reddish brown. Many areas have from 4 to 6 inches of recent overwash on the surface. The creep, or slope wash, is about 2 to 6 feet thick and is underlain by red clay.

This soil is higher in natural fertility than are most other soils in the county. It is medium acid to strongly acid and high in available moisture capacity. Permeability is moderately rapid to rapid.

The soil is easy to work and is suited to crops and pasture commonly grown in the county. High yields can be maintained if management is good. (Capability unit IIe–1)

**Hermitage silt loam, 2 to 5 percent slopes, eroded** (HmB2).—The surface layer of this soil is 4 to 6 inches thinner than that of Hermitage silt loam, 2 to 5 percent slopes, but the two soils are similar in other respects. (Capability unit IIe–1)

## Hicks Series

In the Hicks series are well-drained, strongly acid, phosphatic soils from sandy limestone and interbedded shale. The depth to bedrock ranges from about 2 to 4 feet.

In uneroded areas these soils have a brown silt loam or loam surface layer, about 7 inches thick, and a subsoil of yellowish-brown silty clay loam or clay loam. In most places a few fragments of weathered siltstone or sandy limestone are scattered on the surface and throughout the soil, but they generally do not interfere with tillage. Slopes range from 2 to 12 percent, but the dominant slopes are between 5 and 12 percent.

These soils generally are strongly acid and are low in plant nutrients other than phosphorus. Their available moisture capacity is moderately low to low.

The Hicks soils are on low, rolling hills along with Stiversville, Inman, Culleoka, and Hampshire soils. They are shallower, lighter colored, and more acid than the Stiversville soils. They have a stronger profile than the Inman soils. They differ from the Culleoka soils by having developed in residuum rather than in creep material. The Hicks soils are shallower than the Hampshire soils and have a coarser, more friable subsoil.

The Hicks soils have a small total acreage that is in small areas throughout the eastern part of the county. Nearly all of these areas have been cleared and cultivated. Most of them now are in pasture or are idle, but a few areas are still in crops. The soils are fairly well suited to most crops and pasture grown in the county. Response to management is good.

**Hicks silt loam, 2 to 5 percent slopes, eroded** (HnB2).—This well-drained, phosphatic soil is 2 to 4 feet thick over sandy limestone that is interbedded with shale. Most areas are on narrow ridgetops.

Representative profile:

- 0 to 8 inches, brown, friable silt loam or loam with granular structure.
- 8 to 20 inches, yellowish-brown, friable silty clay loam or clay loam with blocky structure; few fragments of soft shale or sandy limestone.
- 20 inches +, yellowish-brown silty clay with many fragments of soft, sandy limestone and shale.

The surface layer generally is 4 to 8 inches thick, but in a few areas where it is dark brown, the range is 8 to 12 inches. The subsoil, in some areas, is mottled or splotched with various shades of yellow, brown, and gray. A few fragments of soft, nearly decomposed siltstone or sandy limestone are on the surface and throughout the soil in many places, but generally the number of these fragments is not large enough to interfere with tillage.

The soil is strongly acid and is low in plant nutrients other than phosphorus. The available moisture capacity is moderately low, and permeability is moderately rapid to rapid.

Nearly all areas have been cleared and cultivated. Most areas are now in pasture, but some are in crops. The soil is easy to work, and the response to management is good, especially to additions of lime, nitrogen, and potash. All common crops produce medium yields on this soil if it is well managed. Although the soil is sloping, it can be used for row crops every 2 or 3 years if good practices are used to control water. Because the soil is fairly shallow to bedrock, it is important to keep erosion losses at a minimum. (Capability unit IIe–1)

**Hicks silt loam, 5 to 12 percent slopes, eroded** (HnC2).—The surface layer of this soil is brown or yellowish-brown silt loam or loam, 4 to 8 inches thick. The subsoil is yellowish-brown silty clay loam or clay loam. In most places a few fragments of weathered siltstone or sandy limestone are scattered on the surface. The fragments are generally in greater amounts throughout the subsoil. Normally, sandy limestone interbedded with shale is at a depth between 18 and 24 inches, but in places it is at a depth of 3 feet or more. In a few severely eroded patches the plow layer is yellowish-brown clay loam or silty clay loam.

The soil is strongly acid and is low in plant nutrients other than phosphorus. It has rapid permeability and moderately low to low available moisture capacity.

Nearly all of this soil was once cleared and cultivated. Most areas are now in pasture or are idle, but a considerable acreage is in crops. The soil is fairly well suited to the commonly grown crops and is easy to work. Although crops grown on this soil respond well to good management, most crops are somewhat damaged by drought. This soil can be cultivated regularly, and it produces fair to good yields if large amounts of lime and fertilizer are added and if moderately intensive conservation practices are applied. (Capability unit IIIe–1)

**Hicks silty clay loam, 5 to 12 percent slopes, severely eroded** (HoC3).—The surface layer of this soil is brownish-yellow clay loam or silty clay loam that is mostly subsoil material. This layer is 3 to 5 inches thick and is underlain by yellowish-brown clay loam that contains a few fragments of soft or nearly decayed shale, siltstone, and limestone. Most areas of this severely eroded soil contain more of these fragments than do the less eroded areas. Many shallow gullies or a few deep ones are common. Some of the deeper gullies have cut through the soil material to a depth of 18 to 24 inches and have exposed the interbedded, phosphatic, sandy limestone and shale.

The soil is high in phosphorus but is low in other plant nutrients. It is strongly acid and low in available moisture capacity.

All areas of this soil have been cleared and cultivated, but most areas are now idle or are in unimproved pasture. A few areas are still in crops but are difficult to keep in good tilth. Because the surface layer is fine textured and slopes are strong, runoff is rapid and the soil is highly susceptible to erosion. This soil is best suited to permanent pasture and hay, but it can be planted to crops occasionally. Careful management, including liberal applications of lime and fertilizer and intensive conservation practices, is required to obtain fair to good yields of crops and pasture and to protect the soil from further erosion. (Capability unit IVe–1)

## Humphreys Series

The soils of the Humphreys series are deep and are well drained and moderately well drained. They are in alluvium on low terraces, toe slopes, and fans. The alluvium ranges in thickness from 2 to more than 6 feet and consists of materials washed from the uplands of the Highland Rim.

Uneroded areas of Humphreys soils have a dark-brown surface layer, about 8 inches thick, and a yellowish-brown subsoil. Most areas are cherty and have angular chert fragments on the surface and throughout the soil, but there are also areas of silt loam. Slopes range from 2 to 20 percent, but the dominant slopes are between 5 and 12 percent.

These soils are strongly acid and moderately low in natural fertility. They have a moderate to moderately high available moisture capacity.

The Humphreys soils are on benches and toe slopes below Bodine, Baxter, and Mountview soils. They developed from parent material similar to that of the Greendale, Huntington, and Lindside soils, but they are older and lighter colored than those soils and have a slightly finer textured subsoil.

The Humphreys soils are in small areas throughout the Highland Rim in the western part of the county. About 75 percent of the acreage has been cleared, and about 50 percent of the cleared area is in unimproved pasture or is idle. These soils are suited to most crops and pasture grown in the county, but heavy applications of lime and fertilizer are required for high yields.

**Humphreys cherty silt loam, 5 to 12 percent slopes, eroded** (HpC2).—This cherty soil is on toe slopes and fans of the Highland Rim. The parent material is local alluvium that washed or rolled from surrounding soils derived largely from cherty limestone.

Representative profile:

- 0 to 8 inches, dark-brown, very friable cherty silt loam with granular structure.
- 8 to 30 inches, yellowish-brown, friable cherty silty clay loam with blocky structure.
- 30 to 40 inches +, strong-brown cherty silty clay loam with mottles of light yellowish brown and yellowish red; blocky structure.

The surface layer is dark grayish brown or brown in some areas. In places a weak, thin fragipan is in the lower subsoil. The local alluvium ranges from about 2 to 6 feet in thickness. The angular chert generally increases in size and amount with increasing depth, and in places varying amounts of weathered shale fragments are on the surface and throughout the soil.

This soil is strongly acid, is moderately low in natural fertility, and is moderate in available moisture capacity. Permeability is moderate to moderately rapid.

About 85 percent of the soil has been cleared, and about 50 percent of the cleared acreage is in pasture, 30 percent is cultivated, and 20 percent is idle. The chert interferes somewhat with tillage, but the soil is fairly easy to work and the response to management is good. The soil is suited to all crops and pasture commonly grown in the county and can be cultivated every 3 or 4 years, but large amounts of fertilizer are required for good yields. (Capability unit IIIe-4)

**Humphreys cherty silt loam, 2 to 5 percent slopes** (HpB).—This well drained and moderately well drained, cherty soil is on gently sloping, low terraces, toe slopes, and fans. The surface layer is dark grayish-brown or dark-brown cherty silt loam, 4 to 12 inches thick, and is underlain by a subsoil of yellowish-brown, friable cherty silty clay loam. In places a weak, thin fragipan is in the lower part of the subsoil.

The soil is moderate in natural fertility, is medium acid to strongly acid, and is moderate in available moisture capacity.

About 75 percent of the soil has been cleared and is used for many kinds of crops and pasture. Most of the commonly grown crops and pasture plants are suited to this soil, and they respond well to additions of lime and fertilizer. The soil is fairly easy to work and is suited to moderately intensive use, but chert on the surface and throughout the soil intereferes with the cultivation of most crops. The more nearly level areas should be avoided when selecting fields for alfalfa. These areas normally are slightly wet in the lower subsoil. (Capability unit IIe-3)

**Humphreys cherty silt loam, 12 to 20 percent slopes, eroded** (HpD2).—This soil is ordinarily in long, narrow strips at the base of steep upland slopes. The surface layer is dark-brown or yellowish-brown cherty silt loam, 4 to 8 inches thick, and in places contains subsoil material, which is yellowish-brown cherty silty clay loam. In a few severely eroded areas the plow layer is a yellowish-brown cherty silty clay loam. Areas of this soil below Sulphura soils have fragments of shale throughout the profile.

The soil is strongly acid, is moderately low in natural fertility, and is moderate to moderately low in available moisture capacity.

Nearly all of this soil has been cleared and cultivated. About 40 percent of the total acreage is now in pasture, 20 percent is in crops, and 25 percent is idle. The soil is fairly easy to work and can be cultivated occasionally. It is suited to most crops and pasture grown in the county. Crops respond well to additions of lime and fertilizer. Runoff is medium to rapid on the steep slopes, however, and the soil is likely to erode if it is cultivated. Chert on the surface and throughout the soil interferes with tillage. (Capability unit IVe-3)

**Humphreys silt loam, 2 to 5 percent slopes** (HrB).—This soil has developed in local alluvium that is about 2 to 4 feet thick over cherty clay. The soil is on gently sloping foot slopes, fans, and benches at the base of uplands on the Highland Rim. The alluvium washed or rolled mostly from Mountview and other soils that developed in loess-capped residuum of cherty limestone.

Representative profile:

0 to 9 inches, dark-brown, friable silt loam with crumb or granular structure.

9 to 36 inches, yellowish-brown or strong-brown, friable silty clay loam with blocky structure.

36 to 42 inches +, yellowish-brown cherty silty clay loam with a few mottles of yellow and gray.

The surface layer ranges from 4 to 10 inches in thickness and is dark brown to yellowish brown. In places a weak, thin fragipan has developed in the subsoil. In a few severely eroded patches and larger areas, the plow layer is yellowish-brown or strong-brown heavy silt loam.

This soil is moderate in natural fertility, is strongly acid, and is moderately high in available moisture capacity. It is easy to keep in good tilth, and the response to fertilizer is good.

Nearly all areas of this soil have been cleared and cultivated and are used for many kinds of crops and pasture. Seeding alfalfa, however, is risky because the lower subsoil is occasionally waterlogged. Under good management that provides heavy applications of lime and fertilizer and moderately intensive conservation practices, this soil can be cultivated every 2 or 3 years. (Capability unit IIe-1)

**Humphreys silt loam, 5 to 12 percent slopes, eroded** (HrC2).—This soil is on alluvial foot slopes, fans, and benches on the uplands of the Highland Rim. The surface layer of dark-brown or yellowish-brown silt loam is 4 to 7 inches thick. The subsoil is yellowish-brown or strong-brown silty clay loam. Cherty clay underlies the alluvium at a depth of 20 to 36 inches, and bedrock is at a depth of 3 to 10 feet. In places a weak, thin fragipan is 24 to 30 inches below the surface. A few severely eroded areas have a yellowish-brown or strong-brown heavy silt loam plow layer.

This strongly acid soil is moderate to low in fertility and is moderate in available moisture capacity. Good tilth is easily maintained, and the response to fertilizer is good.

Most of this soil has been cleared and is used for many kinds of crops and pasture. The soil can be cultivated regularly, but high rates of fertilization are required for high yields. (Capability unit IIIe-1)

## Huntington Series

In the Huntington series are deep, well-drained, naturally fertile soils on first bottoms. These soils consist of alluvium that has recently washed from soils of the uplands derived from limestone. The alluvium ranges from 2 to more than 10 feet in thickness.

The Huntington soils have a dark-brown surface layer and a dark-brown to dark yellowish-brown subsoil. Slopes range from 0 to 5 percent, but the dominant slopes are less than 2 percent. Three different kinds of Huntington soils are in this county—cherty and phosphatic, noncherty and phosphatic, and local alluvial.

Most of these soils are medium to high in phosphorus. They are medium acid to neutral, are moderate to moderately high in organic matter, and are very high in available moisture capacity.

Huntington soils are on first bottoms along with Lindside, Egam, Dunning, and Melvin soils, but they are better drained than these soils. They do not have a dark, compact subsoil like that in Egam soils. Huntington soils are not mottled with gray in the upper subsoil, as are Melvin and Lindside soils.

Throughout the county the Huntington soils are along streams and small drains and in depressions. Most areas have been cleared and are in crops and pasture. These soils are easy to work, are highly productive, and can be cultivated every year.

**Huntington cherty silt loam, phosphatic** (Hs).—This deep, well-drained cherty soil has developed in cherty alluvium on first bottoms and along small drains. The largest areas are along East Fork, Little Turnbull Creek, Big Turnbull Creek, Lick Creek, and the South Harpeth River. The alluvium consists of mixed materials that washed from soils derived from loess, from cherty limestone, and from phosphatic limestone. Most of this soil is medium to high in phosphorus, but some of it along streams in the western part of the county is low in phosphorus.

Representative profile:

0 to 10 inches, dark-brown, very friable cherty silt loam with granular structure.

10 to 40 inches +, dark-brown, friable cherty silt loam with granular structure; few light yellowish-brown and brownish-gray mottles below 30 inches.

The chert content of this soil ranges from 10 to 30 percent by volume, and, in most places, is greater in the subsoil than in the surface layer. A few areas have a considerable amount of highly weathered shale fragments on the surface and throughout the soil. This soil is generally medium acid to neutral, but it is strongly acid in a few areas at the head of small streams. In many places the lower horizons are mottled to varying degrees, but mottling generally is not closer to the surface than 24 inches.

This soil is naturally fertile and has moderately high to high available moisture capacity. Although the chert interferes with tillage, the soil is easy to keep in good tilth. Response to management is good.

Most of the soil has been cleared and is used chiefly for crops and pasture, but a large acreage is left idle along the South Harpeth River and its tributaries. The main problem is occasional flooding or overwash in winter and spring. The soil can be cultivated every year and produces moderately high yields of all common row crops. (Capability unit IIs-1)

**Huntington silt loam, local alluvium** (Ht).—This deep, well-drained soil has developed in recent alluvium in depressions and along small drainageways in the inner Central Basin. The alluvium is 2 to more than 5 feet thick and consists of materials that washed from soils derived from limestone of the uplands. The soil is dark-brown or dark reddish-brown silt loam to a depth of 30 inches or more. In a few places the subsoil is silty clay loam.

The soil is medium acid to neutral. It has a thick root zone and very high available moisture capacity. It is easy to keep in good tilth.



This soil is well suited to crops and pasture commonly grown in the county. Special care is required, however, in selecting crops to plant in a few depressions that are subject to ponding. This soil can be cultivated every year. (Capability unit I-2)

**Huntington silt loam, phosphatic** (Hu).—This deep, well-drained soil is on first bottoms, along small drains, and in depressions. It has developed in recent alluvium that washed mostly from soils derived from phosphatic limestone. The texture is dominantly silt loam, but a fairly large acreage is loam because the alluvium contains a considerable amount of very fine sand.

Representative profile:

0 to 10 inches, dark-brown, very friable silt loam with granular or crumb structure.

10 to 48 inches +, dark-brown, friable silt loam with granular structure; few gray mottles below 30 inches.

The alluvium ranges from 2 to more than 10 feet in thickness. In some places stratified layers of gravel or sand occur at various depths, but they generally are not closer to the surface than 18 to 20 inches. (Capability unit I-2)

This soil is naturally fertile, is moderately high in organic matter, and is medium acid to neutral. It has a thick root zone and a high available moisture capacity.

Huntington silt loam, phosphatic, is the most extensive soil of the Huntington series and is widely distributed throughout the county. Nearly all of this soil has been cleared and is in cultivated crops. High yields of corn are produced year after year on many fields that received little or no fertilizer. The soil is well suited to many kinds of crops and pasture. It is one of the most productive soils in the county and can be used intensively. The only hazards are occasional overflow on the first bottoms and short periods of ponding in most depressions. (Capability unit I-2)

## Inman Series

The Inman series consists of well-drained and excessively drained, phosphatic soils with a clayey subsoil. These soils were derived from interbedded shale and limestone. Uneroded Inman soils have a dark grayish-brown silt loam surface layer, about 8 inches thick, and a brownish-yellow silty clay or clay subsoil. Bedrock is at a depth of 18 to 48 inches. Slopes range from 5 to 30 percent, but the dominant slopes are between 12 and 20 percent.

These soils are medium to high in phosphorus, are medium acid to strongly acid, and are low in available moisture capacity.

The Inman soils are next to the Culleoka, Hampshire, Stiversville, and Hicks soils. Compared to Culleoka soils, the Inman soils are shallower over bedrock and have developed in residuum rather than in creep material. Inman soils are shallower and have weaker profile development than have the Hampshire, Stiversville, and Hicks soils.

These inextensive soils are in the outer Central Basin in the eastern half of the county. About 75 percent of the acreage has been cleared of the original hardwood forest and is used chiefly for pasture, but a few areas are in crops. These soils are difficult to work and to protect from erosion, and they are poorly suited to cultivation.

**Inman silt loam, 12 to 20 percent slopes** (ImD).—This phosphatic soil is on the uplands of the outer Central Basin. It has developed in clayey residuum that weathered from interbedded sandy limestone and shale.

Representative profile:

0 to 10 inches, dark grayish-brown, friable silt loam with granular structure.

10 to 24 inches +, brownish-yellow or reddish-yellow, very sticky, plastic silty clay or clay with mottles of gray and light yellowish brown; blocky structure or massive (structureless); few soft fragments of sandy limestone and shale.

Bedrock is at a depth of 18 to more than 40 inches. A 4- to 6-inch layer of brown loam or fine sandy creep material is on the surface in places. Cultivated areas have a thinner, lighter colored, and slightly finer textured surface layer than that in the profile described. Small fragments of weathered sandy limestone are common on the surface of most cleared areas. A few patches are severely eroded and have a yellowish-brown silty clay loam surface layer.

The soil is medium to high in phosphorus, is medium acid to strongly acid, and is moderately low to low in available moisture capacity. Runoff is rapid and permeability is slow.

About 75 percent of this soil has been cleared and is used chiefly for pasture. A few areas are in crops, and a few are idle. Because the soil is highly susceptible to erosion, it is poorly suited to crops requiring tillage. It is best suited to permanent pasture and hay. (Capability unit VIe–2)

**Inman silt loam, 5 to 12 percent slopes** (ImC).—This clayey, phosphatic soil has a 4- to 8-inch surface layer of brown or yellowish-brown silt loam that is covered in places by a thin layer of fine, sandy creep material. Small, sandy, weathered fragments are on the surface in many places. The subsoil is brownish-yellow or reddish-yellow silty clay or clay. Depth to bedrock ranges from 18 to more than 40 inches.

Most of this soil has been cleared and is in crops and pasture. A few areas are idle. Because the subsoil is fine textured and bedrock is near the surface, permeability is slow and runoff is medium to rapid. Consequently, this soil is difficult to work and to protect against erosion. It is poorly suited to most deep-rooted legumes. If management is good and conservation practices are moderately intensive, the soil can be cultivated occasionally. Yields are usually low, however, because the soil is droughty. (Capability unit IVe–2)

**Inman silt loam, 20 to 30 percent slopes** (ImE).—This phosphatic soil is on short, steep upland slopes in the Central Basin. The surface layer is dark-brown to yellowish-brown silt loam, 4 to 6 inches thick. It is entirely creep material in places. The subsoil is brownish-yellow to reddish-yellow silty clay or clay. Small fragments of soft, sandy limestone are common on the surface of most cleared areas. A few patches of this soil are severely eroded and have a yellowish-brown silty clay loam surface layer. Sandy limestone and shale bedrock is at a depth of 18 to 40 inches. This soil is medium to high in phosphorus and is low in available moisture capacity. Runoff is very rapid.

About 50 percent of this soil has been cleared and is used mainly for pasture. A few areas are idle. The fine-textured subsoil restricts the growth of roots and the movement of water and air. Because of this slowly permeable subsoil and the steep slopes, runoff is very rapid and the erosion hazard is severe. Therefore, this soil is best suited to permanent pasture. (Capability unit VIe–2)

**Inman silty clay loam, 5 to 12 percent slopes, severely eroded** (InC3).—This soil has a surface layer of brown or yellowish-brown silty clay loam, 3 to 5 inches thick, that is mostly material from the subsoil. The subsoil is yellow or reddish-yellow silty clay or clay. A few, small fragments of weathered sandy limestone are on the surface in most places. Bedrock is at a depth of 1 to 3 feet, and it crops out in a few places. Many shallow gullies or a few deep ones are common.

This soil is high in phosphorus and is medium acid to strongly acid. It has low available moisture capacity. Runoff is rapid to very rapid, and permeability is slow.

Most areas of this soil are in pasture, some areas are still in crops, and a few areas are idle. A few small areas have been reforested naturally, chiefly to locust trees. The fine-textured surface soil generally is in poor tilth and is difficult to work and conserve. Most areas are best suited to permanent pasture and hay. (Capability unit VIe–2)

**Inman silty clay loam, 12 to 20 percent slopes, severely eroded** (InD3).—This clayey soil is on the uplands of the outer Central Basin. The surface layer of brown or yellowish-brown silty clay loam is 3 to 5 inches thick. It consists largely of the brownish-yellow to reddish-yellow silty clay from the subsoil. Many shallow gullies or a few deep ones are common, and in places there are a few outcrops of bedrock. A few, small fragments of soft, sandy limestone are on the surface and throughout the soil. On the surface in some places there are a few fragments of weathered limestone, 3 to 6 inches across.

This soil is high in phosphorus and is medium acid to strongly acid. It is low in available moisture capacity.

All of this soil has been cleared and cultivated, but most of it is now idle or is in pasture. A few areas are still used for crops, and some areas have reforested naturally, chiefly to locust trees. This steeply sloping, fine-textured soil is generally in poor tilth and is difficult to work and conserve. Most areas can best be used for permanent pasture and hay. A few of the more severely eroded areas are probably best suited to trees. (Capability unit VIe–2)

**Inman silty clay loam, 20 to 30 percent slopes, severely eroded** (InE3).—This soil has a surface layer of brown to yellowish-brown silty clay loam that is 3 to 5 inches thick and consists mostly of material from the subsoil. The subsoil is brownish-yellow to reddish-yellow silty clay or clay. Areas with many shallow gullies or a few deep ones are common. Small fragments of weathered, sandy limestone are on the surface in varying amounts, and in places on the surface and throughout the soil there are a few weathered limestone fragments 3 to 6 inches across. Bedrock of interbedded phosphatic, sandy limestone and shale generally is at a depth of 18 to 30 inches.

All of the acreage has been cleared, but most of it is now idle or is in unimproved pasture. A few areas have been abandoned and have reforested naturally, mainly to black locust trees. Because it is slowly permeable and has very rapid runoff, this steeply sloping soil is susceptible to further erosion and is therefore not suited to crops. Most of it is best suited to trees. (Capability unit VIIe–1)

## Lanton Series

In the Lanton series are black, moderately well drained and somewhat poorly drained soils on level bottom lands. These soils have developed in slightly acid to neutral alluvium that washed from soils derived chiefly from phosphatic limestone of the uplands.

The surface layer of these soils is black, or nearly black, silt loam or silty clay loam, and the subsoil is black to very dark-gray silt loam, silty clay loam, or silty clay. To a depth of 18 to 24 inches the soils are fairly free of mottles, but below this depth they generally are mottled in various shades of gray, brown, and olive. Slopes range from 0 to 5 percent, but the dominant slopes are less than 2 percent.

These soils are naturally fertile and are medium to high in phosphorus. They are slightly acid to neutral. Most areas are subject to overflow or to ponding for short periods.

The Lanton soils are not so poorly drained as are the Dunning soils and are less mottled in the upper part of their profile. They are darker throughout than the Huntington and Lindside soils and lack the 14 to 24 inches of brown, recent overwash that is characteristic of the Egam soils.

The Lanton soils are fairly extensive on bottom lands, along small drains, and in depressions throughout the eastern two-thirds of the county. Most areas have been cleared and are used for crops and pasture. Because these soils have a fairly high, fluctuating water table and are likely to be flooded or ponded, they are not suited to most deep-rooted legumes. They are well suited to most summer annuals.

**Lanton silt loam, phosphatic** (La).—This black soil is moderately well drained and somewhat poorly drained. It is on first bottoms, along small drains, and in depressions.

Representative profile:

0 to 12 inches, black, friable silt loam with granular structure.
12 to 30 inches, black, friable silt loam or silty clay loam with granular or blocky structure; few, small, black concretions and a few light-gray mottles in lower part.
30 to 40 inches +, mottled gray, brown, and olive, sticky and plastic silty clay or clay; many, small, black and dark-brown concretions.

The alluvium ranges from 2 to more than 6 feet in thickness, and in many places, the upper layer is dark-brown recent overwash, 4 to 10 inches thick. In some places the surface layer is silty clay loam. The subsoil ranges from black to dark gray and from silt loam to clay. Generally, the lower part of the subsoil is finer than the rest of the profile. Most areas of this soil contain a medium to large amount of phosphorus, but a few areas in the inner Central Basin contain only a small amount.

The main problems in using this soil are the relatively high water table, the hazard of flooding, and the short periods of ponding. Corn, soybeans, grain sorghum, and other summer annuals produce high yields. Better drainage is needed for alfalfa, small grains, and tobacco. Tall fescue, red clover, white clover, and lespedeza are well suited. (Capability unit IIw-1)

## Lindside Series

In the Lindside series are moderately well drained soils on first bottoms. These soils consist of recent alluvium that washed from soils derived chiefly from limestone uplands. They are silt loam or cherty silt loam that is dark brown to a depth of 18 or 20 inches and mottled gray and brown below that depth. Slopes range from 0 to 5 percent, but the dominant slopes are between 0 and 2 percent. Phosphatic, nonphosphatic, and cherty Lindside soils are mapped in this county.

The soils are naturally fertile and are medium acid to slightly acid. They are flooded occasionally and in places are ponded for short periods.

The Lindside soils are on first bottoms along with Huntington, Egam, Melvin, and Dunning soils. They are not so well drained as the Huntington soils but are better drained than the Melvin and Dunning soils. Lindside soils are browner and are coarser in texture than the black Dunning soils. They lack the dark, compact layer that is in the subsoil of the Egam soils.

The Lindside soils are extensive along streams and in depressions throughout the county. They are well suited to summer annuals and to pasture. They are poorly suited to deep-rooted legumes because the water table is periodically high, and in some areas they are ponded or flooded occasionally.

**Lindside cherty silt loam** (Lc).—This deep, cherty, moderately well drained soil is on first bottoms along the small drains, branches, and creeks in the western part of the county. The alluvium washed from soils derived chiefly from cherty limestone of the uplands.

Representative profile:

0 to 12 inches, dark-brown, friable cherty silt loam with granular structure.
12 to 24 inches, dark-brown, friable cherty silt loam with a few gray mottles; few, small, black concretions.
24 to 40 inches +, mottled gray and brown cherty silt loam or cherty silty clay loam.

The cherty alluvium ranges from 2 to more than 10 feet in thickness. Along small drainageways the content of chert is greater than it is on the wide first bottoms.

The soil is moderate in natural fertility and in organic matter and is high in available moisture capacity. It is generally medium acid to slightly acid but ranges from neutral to strongly acid. Runoff is medium to slow, and internal drainage is moderately slow.

Yields of most crops are good. The chert and the short periods of flooding or ponding in winter and spring are the only limitations to use. Because flooding or ponding is likely, alfalfa is poorly suited and planting tobacco is risky. Well suited to this soil are corn, soybeans, and grain sorghum, as well as red clover, white clover, lespedeza, tall fescue, sudangrass, and orchardgrass. Row crops can be grown every year, and they produce good yields if large amounts of fertilizer are applied and cornstalks and other crop residue are plowed under. Many narrow strips along small drains are too small to be used as separate fields. (Capability unit IIs-1)

**Lindside cherty silt loam, phosphatic** (Ld).—This deep, cherty, moderately well drained soil is on first bottoms, along small drains, and in depressions. It is similar to Lindside cherty silt loam except for its high content of phosphorus. The soil has a surface layer of dark-brown cherty silt loam that is 18 inches thick and overlies mottled brown and gray cherty silt loam or cherty silty clay loam. In places appreciable numbers of weathered shale fragments are on the surface and throughout the soil. The alluvium ranges from 2 to more than 10 feet in thickness.

This soil is naturally fertile, is slightly acid to medium acid, and is very high in available moisture capacity. Although it is rapidly permeable, the soil is saturated by a high water table for fairly long periods in winter and spring. Water runs off slowly and ponds in places.

About 85 percent of this soil has been cleared and is used for many kinds of crops and pasture. Because of the high water table, areas that are not drained are best suited to summer annuals and to water-tolerant pasture. Drained areas are suited to most crops and pasture commonly grown. The soil can be used for row crops every year, but the chert on the surface interferes with cultivation Also, crops on first bottoms are likely to be damaged occasionally by floods. (Capability unit IIs-1)

**Lindside silt loam** (Ln).—This moderately well drained soil is on first bottoms along the larger streams in the western part of the county. Small areas are also in depressions and along small drains in the inner Central Basin of the eastern part of the county. The soil has a dark-brown silt loam surface layer, about 18 to 20 inches thick, and a mottled brown and gray silt loam or silty clay loam subsoil. In many places the lower subsoil is chert and sand. The alluvium ranges from 2 to more than 10 feet in thickness.

The soil is moderately high in natural fertility and in organic matter and ranges from medium acid to slightly acid. Runoff is slow. Short periods of flooding and ponding are common, and a high water table generally saturates the soil for fairly long periods in winter and spring. The soil is easy to work, and the response to management is good.

About three-fourths of this soil has been cleared and is used for many kinds of crops and pasture. This soil is one of the most productive in the county. Its use is limited only by occasional flooding or ponding and by a high water table in wet periods. Flooding is mostly in winter and spring, but it varies in amount from one area to another and in some areas seldom occurs. Nearly all crops produce high yields. Alfalfa is poorly suited to this soil, and planting tobacco is risky. Row crops can be grown every year. (Capability unit I-3)

**Lindside silt loam, phosphatic** (Lp).—This deep, moderately well drained soil is on first bottoms along streams that originate in or flow through the phosphatic limestone uplands. Some areas are in depressions.

Representative profile:

0 to 12 inches, dark-brown, very friable silt loam with granular structure.

12 to 24 inches, dark grayish-brown, friable silt loam with granular structure; few mottles of yellowish brown and grayish brown.

24 to 40 inches +, mottled gray and brown silt loam or silty clay loam; few, small, dark-brown and black concretions.

The alluvium ranges from 2 to more than 10 feet in thickness. The depth to mottling ranges from 18 to 30 inches.

The soil is naturally fertile, is moderately high in organic matter, and is very high in available moisture capacity. It is slightly acid to medium acid. Water runs off slowly and is ponded in some areas for short periods. A high water table saturates the soil for fairly long periods, especially in winter and spring.

Nearly all of this soil has been cleared and is used chiefly for crops and pasture. Because it is gently sloping to level and is generally in good tilth, the soil is well suited to intensive use. Except in drained areas, however, it is poorly suited to most deep-rooted legumes, and tillage is often delayed in spring. Drained areas are suited to most crops commonly grown in the county, but some crops may be damaged by floods on most first bottoms or by ponding in depressions. (Capability unit I-3)

## Made Land

Areas of land that have been filled artificially with earth, or earth and some other kind of fill material, are mapped as Made land. These areas generally are part of a landscaping or construction project and have little or no agricultural value.

**Made land** (Ma).—In this land type are areas that have been filled and smoothed artificially. The fill material is earth, trash, or both. In most places it has been moved and spread with heavy machinery.

In Williamson County, most areas of this land type are around Franklin and other towns and were made when building sites were leveled or landscaped. (Capability unit not assigned)

## Maury Series

The soils in the Maury series are deep, well drained, and phosphatic. They have formed from phosphatic limestone, from old valley fill, or from old alluvium. In many places the upper part of these soils seems to contain a considerable amount of loess.

Uneroded Maury soils have a dark-brown silt loam surface layer, 10 to 12 inches thick, and a reddish-brown silty clay loam subsoil. Slopes range from 0 to 12 percent, but the dominant slopes are between 2 and 5 percent (fig. 15).

Maury soils are browner than the Hampshire and Mimosa soils and have a more friable subsoil. They con-

*Figure 15.*—**A typical landscape of Maury soils. Bodine, Sulphura, and Dellrose soils are on ridges in background.**

tain less chert than the Braxton soils. The Maury soils are older than the Armour soils and have a slightly finer textured subsoil.

Most of the Maury soils are in irregularly shaped areas that extend through the central part of the county from Spring Hill to Brentwood. Nearly all areas have been cleared and are used chiefly for crops and pasture. These soils are medium acid to strongly acid and contain a medium to large amount of phosphorus. They produce high yields of commonly grown crops and pasture, and the response to management is good.

**Maury silt loam, 2 to 5 percent slopes** (MbB).—This deep, well-drained, phosphatic soil is on broad, gently sloping uplands of the outer Highland Rim or is on old, high stream terraces.

Representative profile:

0 to 12 inches, dark-brown, friable silt loam with granular structure.
12 to 24 inches, dark-brown or reddish-brown, friable silty clay loam with blocky structure.
24 to 60 inches +, reddish-brown or yellowish-red silty clay loam or silty clay with blocky structure; small, black and reddish-brown concretions.

Some areas of this soil near Spring Hill have a red or dark-red clay subsoil. In places a few chert fragments are on the surface and throughout the soil, and on a few terraces the subsoil contains some gravel. Bedrock is at a depth of about 3 to 10 feet.

The soil is medium to high in phosphorus, is medium acid to strongly acid, and is high in available moisture capacity. Permeability is moderately rapid. Tilth is generally good, and the root zone is deep. Crops respond well to good management.

About 90 percent of this soil has been cleared and is used chiefly for crops and pasture. The soil is suited to all crops and pasture commonly grown and can be used with moderate intensity. It is especially well suited to alfalfa and other deep-rooted legumes. (Capability unit IIe–1)

**Maury silt loam, 2 to 5 percent slopes, eroded** (MbB2).—This deep, well-drained, phosphatic soil has a surface layer of dark-brown or dark reddish-brown silt loam, 4 to 8 inches thick, and a subsoil of reddish-brown silty clay loam. In a few areas near Spring Hill, the subsoil is red or dark-red clay. A few severely eroded patches have a reddish-brown silty clay loam surface layer.

This soil is medium acid to strongly acid, is medium to high in phosphorus, and is moderately high in available moisture capacity. Permeability is moderately rapid to rapid.

Nearly all areas have been cleared and are used for crops and pasture. The soil generally is in good tilth, has a deep root zone, and is suited to many kinds of crops and to pasture. Alfalfa and other deep-rooted legumes grow especially well. Although the soil is well suited to moderately intensive use, erosion is a problem. (Capability unit IIe–1)

**Maury silt loam, 0 to 2 percent slopes** (MbA).—This deep, well-drained, phosphatic soil is on broad, flat uplands and old, high stream terraces, and in many areas it has 4 to 6 inches of recent alluvium on the surface. The surface layer is dark-brown silt loam, 10 to 15 inches thick, and the subsoil is reddish-brown or yellowish-red silty clay loam. Limestone bedrock is generally at a depth of more than 6 feet.

This soil is naturally fertile, is moderately high in organic matter, and is high in available moisture capacity. Runoff is slow, but permeability is moderately rapid.

All of this soil has been cleared and is used for crops and pasture. Because it is level to nearly level, has a deep root zone, and generally is in good tilth, it can be used intensively and is suited to many kinds of crops and pasture. (Capability unit I–1)

**Maury silt loam, 5 to 12 percent slopes, eroded** (MbC2).—This deep, well-drained, phosphatic soil is on uplands of the outer Highland Rim and also is on high stream terraces. The surface layer is dark-brown, friable silt loam, 5 to 10 inches thick. In places it is partly subsoil material, which is reddish-brown or yellowish-red silty clay loam. A few severely eroded patches of this soil have a silty clay loam plow layer. In places a few chert fragments or pebbles are on the surface and throughout the soil. Near Spring Hill a few areas have a reddish-brown silty clay loam surface layer and a red or dark-red silty clay or clay subsoil. Bedrock generally is at a depth of 3 to 10 feet, but it crops out in a few places.

The soil is naturally fertile and moderate in available moisture capacity. Permeability is moderately rapid.

Nearly all areas have been cleared and are used chiefly for crops and pasture. The soil is suited to many kinds of crops and pasture. It is especially well suited to alfalfa and other deep-rooted legumes. Although the soil can be cultivated regularly, good management that provides moderately intensive conservation is required. (Capability unit IIIe–1)

**Maury silty clay loam, 5 to 12 percent slopes, severely eroded** (McC3).—This deep, well-drained, phosphatic soil is on short upland slopes of the outer Highland Rim and is also on high stream terraces. The plow layer is brown or reddish-brown silty clay loam and is predominantly subsoil material of reddish-brown or yellowish-red silty clay loam. Many shallow gullies or a few deep ones are common. In some areas limestone bedrock crops out, and in other places a few weathered chert fragments or pebbles are on the surface and in the soil. A few small areas are on slopes as steep as 15 to 18 percent and are not so severely eroded as areas on slopes of 5 to 12 percent. The less eroded areas have a surface layer of dark-brown silt loam, 4 to 6 inches thick.

This soil is high in phosphorus but is low in other essential elements. It is a little difficult to keep in good tilth because the plow layer is clayey.

All common crops can be grown. The soil produces medium yields of row crops. If it is well managed, it produces high yields of small grains, grasses, and legumes. (Capability unit IVe–1)

## Melvin Series

The soils in the Melvin series are gray and poorly drained. These soils are on first bottoms (fig. 16) in alluvium that washed from soils derived largely from limestone of the uplands.

The surface layer of Melvin soils is dominantly silt loam, but in a few areas, it contains gravel or chert that interferes with tillage. Organic matter generally gives

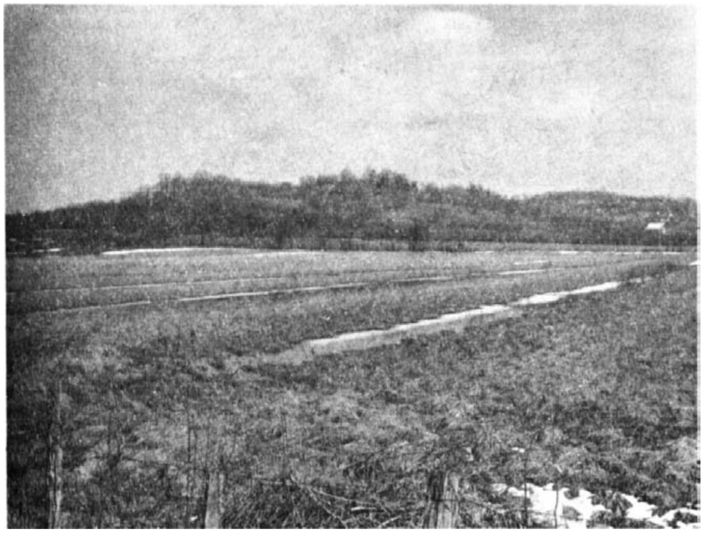

*Figure 16.*—**Poorly drained Melvin soil.**

the surface layer a dark-gray or dark grayish-brown color. The subsoil is dominantly gray silt loam or silty clay loam, mottled with various shades of brown and yellow.

These soils are moderately fertile and slightly acid to medium acid. They have a high to very high available moisture capacity.

Melvin soils are on first bottoms along with Huntington, Lindside, Egam, and Dunning soils. They are more poorly drained than Huntington, Lindside, and Egam soils. Melvin soils are lighter in color than the Dunning soils and have a coarser textured subsoil.

Melvin soils are in small areas throughout the county, and their total acreage is small. Nearly all areas have been cleared and cultivated. Most areas are now used for pasture, but a few are used for row crops. Unless artificially drained, these soils are best suited to permanent, water-tolerant, pasture plants. If drained, they can produce good yields of soybeans, corn, grain sorghum, lespedeza, and other summer annuals. If outlets are available, these soils can be drained because water moves well through their subsoil.

**Melvin silt loam, phosphatic** (Me).—This gray, poorly drained soil is on first bottoms, along small drains, and in depressions. The alluvium washed from soils derived chiefly from phosphatic limestone.

Representative profile:

0 to 8 inches, dark-gray, friable silt loam mottled with brown; granular structure.
8 to 16 inches, gray to dark-gray, friable silt loam with many mottles of brown; granular structure; few, small, black and dark-brown concretions.
16 to 36 inches +, mottled gray and brown silt loam or silty clay loam; many, small and medium, black and dark-brown concretions.

The alluvium ranges from 20 inches to more than 10 feet in thickness. In many places this soil overlies a buried soil that is similar to Dunning soils, which are common on first bottoms throughout the county. Most of the soil is medium to high in phosphorus. Along streams of the Highland Rim in the western part of the county, a few areas are low in phosphorus and some areas have chert on the surface and throughout the soil.

About 60 percent of the soil is in pasture, 30 percent is in crops, and the rest is idle or in trees. In most places the soil material is permeable, but a fluctuating high water table restricts the growth of plant roots and the circulation of air. During wet seasons, the soil is waterlogged and is ponded in places. If they are not drained, most areas of this soil are best suited to permanent pasture. Drained areas, however, can be used intensively, and they produce good yields of corn, sorghum, soybeans, and other summer annuals. (Capability unit IIIw-1)

## Mercer Series

In the Mercer series are moderately well drained soils on the uplands of the inner Central Basin. These soils have either a fragipan or a very slowly permeable, heavy clay layer at a depth of 15 to 30 inches.

The surface layer is dark-brown silt loam, about 7 inches thick. Above the compact and highly mottled fragipan or heavy clay layer, the subsoil is yellowish-brown or reddish-yellow silty clay loam. Slopes range from 2 to 5 percent.

These soils are moderately low in natural fertility and moderately low to low in available moisture capacity. They are medium acid to strongly acid.

The Mercer soils are closely associated with the Talbott, Hagerstown, and Dowellton soils. They are better drained and browner than the Dowellton soils but are not so well drained as the Talbott and Hagerstown soils.

The Mercer soils are mostly in small areas of the inner Central Basin in the eastern part of the county. Nearly all areas have been cleared and are used mainly for crops and pasture. These soils are fairly easy to work, but the fragipan or the heavy clay layer restricts the penetration of roots and the movement of air and water.

**Mercer silt loam, 2 to 5 percent slopes, eroded** (MfB2).—This moderately well drained soil is on the uplands of the inner Central Basin. A fragipan or a compact, heavy clay layer in the subsoil restricts the growth of roots and the movement of air and water.

Representative profile:

0 to 7 inches, dark-brown, friable silt loam with granular structure.
7 to 20 inches, yellowish-brown or reddish-yellow, friable silty clay loam with blocky structure; few, small, black concretions
20 to 30 inches, yellowish-brown, compact silty clay mottled with yellow and reddish yellow; strong, blocky structure or massive (structureless); few, small, black concretions.
30 to 36 inches +, mottled red, yellow, and brown, plastic clay; massive (structureless).

This soil, in many places, appears to have developed in clay that is capped with a thin layer of old alluvium or of loess. The fragipan or the heavy clay layer is at a depth of 15 to 30 inches. In some places above the fragipan or the heavy clay layer, the soil appears to be well drained, and the upper part of the subsoil is reddish yellow or yellowish red. In the moderately well drained areas, however, the upper part of the subsoil is pale brown or brown, mottled with gray. Black concretions generally are on the surface and in the soil. Slopes are dominantly 2 to 5 percent, but a few are as steep as 10 percent, and a few areas are level. In a few severely eroded areas, the plow layer is yellowish-brown silty clay loam. Limestone bedrock generally is at a depth of 2 to 6 feet, but it crops out in places.

The soil is moderately low in natural fertility, is medium acid to strongly acid, and has a moderately low to low available moisture capacity. Runoff is medium, and permeability is slow to very slow.

The total acreage of this soil is small, and most of it has been cleared and is used for crops and pasture. The soil is relatively easy to work, but its use is somewhat limited by the slowly permeable fragipan or the heavy clay layer in the subsoil. Crops respond well to management, especially to applications of lime and fertilizer. Fair to good yields of nearly all crops can be produced. Alfalfa is poorly suited, however, because the root zone is shallow and drainage in the lower subsoil is slow. Tobacco is likely to be drowned out in spots during rainy periods. (Capability unit IIe-2)

## Mimosa Series

The Mimosa series consists of well-drained soils formed from clayey, phosphatic limestone. Uneroded Mimosa soils have a dark-brown silt loam surface layer, about 8 inches thick, and a yellowish-brown, sticky and plastic clay subsoil. Cherty, noncherty, and rocky Mimosa soils have been mapped separately in this county. The depth to bedrock generally ranges from 1½ to 6 feet, but outcrops of rock are common. Slopes range from 2 to 40 percent, but the dominant slopes are between 12 and 30 percent.

The soils are medium to high in phosphorus and medium acid to strongly acid. They have a moderately low available moisture capacity.

The Mimosa soils occur with the Maury, Ashwood, Braxton, Armour, and Dellrose soils. They have a yellower and more plastic subsoil than have the Maury soils. They are more acid and deeper than the Ashwood soils and have a lighter colored surface layer. The Mimosa soils resemble the Braxton soils in many characteristics but are yellower and generally shallower to bedrock.

The Mimosa soils are extensive in the eastern two-thirds of the county. They are on steep lower slopes of the Highland Rim escarpment, and on low ridges and hills in the outer Central Basin. About 65 percent of their acreage has been cleared and is used for pasture. Some of the more gently sloping areas are in crops. Mimosa soils are not very productive of row crops but are fair to good for pasture and hay.

**Mimosa cherty silt loam, 20 to 30 percent slopes, eroded** (MhE2).—This well-drained, phosphatic soil has formed from clayey, phosphatic limestone in steep uplands.

Representative profile:

0 to 8 inches, dark-brown, friable cherty silt loam with granular structure.
8 to 15 inches, yellowish-brown, sticky and plastic clay with blocky structure; few angular chert fragments in upper part.
15 to 36 inches +, yellowish-brown, very sticky and plastic clay with blocky structure.

The cherty silt loam surface layer is 4 to 16 inches thick and consists mostly of creep material from higher soils. In wooded areas the upper 2 or 3 inches of this layer is very dark grayish brown. In some places the surface layer is underlain by 4 to 12 inches of yellowish-brown silty clay loam. A few patches of this soil are severely eroded and have a yellowish-brown silty clay plow layer. Limestone bedrock generally is at a depth of 2 to 6 feet, but a few outcrops occur in places.

The soil is medium to high in phosphorus, is medium acid to strongly acid, and is moderately low in available moisture capacity. Runoff is rapid, and permeability is moderately slow to slow.

About 65 percent of the acreage has been cleared and is used mainly for pasture. A few areas are used for crops, and a considerable acreage is idle. The soil is well suited to pasture. It is poorly suited to cultivated crops, however, because it is steep and cherty, is susceptible to severe erosion, and is low in available moisture capacity. (Capability unit VIe-2)

**Mimosa cherty silt loam, 5 to 12 percent slopes, eroded** (MhC2).—This clayey, phosphatic soil is on the tops of rolling hills and on upland toe slopes throughout the eastern two-thirds of the county. The 4- to 8-inch surface layer is dark-brown cherty silt loam, and in many places the plow layer extends into the yellowish-brown clay subsoil. A few patches are severely eroded and have a surface layer of yellowish-brown cherty silty clay. The depth to bedrock of phosphatic limestone ranges from about 2 to 6 feet, but in places a few outcrops occur.

The soil is medium to high in phosphorus and is medium acid to strongly acid. It has a moderately low available moisture capacity. Runoff is medium to rapid, and permeability is moderately slow to slow.

Most of this soil has been cleared and is used for crops and pasture. The soil is well suited to pasture and is fairly well suited to most commonly grown crops, but chert on the surface and in the plow layer interferes with tillage. Also, most crops are damaged by drought in summer and fall. Although the soil can be cultivated occasionally, erosion is a problem. Contour tillage and other water-control practices reduce erosion. (Capability unit IVe-2)

**Mimosa cherty silt loam, 12 to 20 percent slopes, eroded** (MhD2).—This phosphatic, clayey soil is on the lower slopes of cherty ridges, commonly below Dellrose soils on the long, steep slopes. The surface layer of brown or dark-brown cherty silt loam is 4 to 7 inches thick and is underlain by a yellowish-brown, sticky, plastic clay subsoil. A few uneroded areas have a dark-brown cherty silt loam surface layer that ranges from 8 to 12 inches in thickness. In a few severely eroded patches, the surface layer is brownish-yellow or yellowish-brown cherty silty clay. Limestone bedrock generally is at a depth of 2 to 6 feet, but in places there are a few outcrops.

The soil is medium to high in phosphorus and is medium acid to strongly acid. The available moisture capacity is low, runoff is rapid, and permeability is moderately slow to slow.

About 75 percent of this soil has been cleared and is used mainly for pasture, but a small part is used for crops. The soil is well suited to pasture and to most hay crops, but it is poorly suited to cultivated crops because it is steep, cherty, and susceptible to further erosion. (Capability unit VIe-2)

**Mimosa cherty silty clay, 10 to 20 percent slopes, severely eroded** (MkD3).—This phosphatic, clayey soil is on rolling hills and upland toe slopes throughout the eastern two-thirds of the county. The chert rolled or washed from higher cherty soils and is mostly in the surface layer. This layer is 3 to 5 inches thick. It is yellowish-brown cherty silty clay and consists mostly of yellowish-brown clay from the subsoil. Many shallow gullies or a few deep ones are present. The average depth to limestone bedrock is between 1½ and 5 feet, and outcrops are common in places.

This strongly acid soil is low in plant nutrients other than phosphorus. The available moisture capacity is low, runoff is rapid to very rapid, and permeability is slow.

Most areas of this soil are now in unimproved pasture or are idle. A few areas are still used for crops, but yields are low. Most of this soil is best suited to permanent pasture and to hay, but a few of the more severely eroded areas with outcrops of bedrock are probably better suited to trees. (Capability unit VIe–2)

**Mimosa cherty silty clay, 20 to 30 percent slopes, severely eroded** (MkE3).—This severely eroded, clayey soil is on steep upland slopes of the outer Central Basin. The surface layer is brownish-yellow or yellowish-brown cherty silty clay, and the subsoil is yellowish-brown clay. A few areas of this soil are relatively free of chert, and a few areas are on slopes of more than 30 percent. Many shallow gullies and some deep ones are common. Bedrock generally is at a depth of 1½ to 5 feet, but it crops out in places, especially on the lower slopes.

This soil is medium to high in phosphorus but is low in other essential elements. It is slowly permeable and has a low available moisture capacity. Runoff is rapid to very rapid.

Nearly all of this soil is now in unimproved pasture, is idle, or has been abandoned. Many areas are fairly well suited to permanent pasture. Good pastures are difficult to establish and maintain, however, because the soil is steep, droughty, and susceptible to further erosion. Most areas are probably best suited to trees. (Capability unit VIIe–1)

**Mimosa silt loam, 2 to 5 percent slopes, eroded** (MlB2).—This moderately deep to deep, phosphatic soil is in small areas, mostly on hilltops. It has formed from clayey, phosphatic limestone.

Representative profile:

0 to 8 inches, dark-brown, friable silt loam with granular structure.

8 to 30 inches, yellowish-brown, sticky and plastic silty clay or clay with blocky structure.

30 to 40 inches +, brownish-yellow, very sticky and plastic clay with a few mottles of yellow and yellowish brown in the lower part.

In places the surface layer is underlain by 4 to 8 inches of brown or strong-brown silty clay loam. A few patches are severely eroded and have a brown or yellowish-brown silty clay surface layer. Limestone bedrock is generally at a depth of 2 to 6 feet, but it crops out in places.

The soil is medium to high in phosphorus and is medium acid to strongly acid. It has a moderately low available moisture capacity. Runoff is medium, but internal drainage is slow. The heavy, plastic subsoil restricts the movement of air and water and the growth of plant roots.

Nearly all areas have been cleared and are used mostly for pasture and hay. This soil can be cultivated occasionally, but it does not hold enough moisture to produce high yields of row crops. Small grains, tall fescue, orchardgrass, alfalfa, whiteclover, and lespedeza are among the best suited crops. (Capability unit IIIe–2)

**Mimosa silt loam, 5 to 12 percent slopes, eroded** (MlC2).—This clayey, phosphatic soil is on rolling uplands of the outer Highland Rim. The 4- to 6-inch plow layer, which is dark-brown silt loam, contains some of the yellowish-brown clay from the subsoil. A few patches are severely eroded and have a plow layer of yellowish-brown silty clay or clay. In places there are a few outcrops of limestone bedrock, but the depth to bedrock generally is from 2 to 6 feet.

The soil is medium to high in phosphorus, is medium acid to strongly acid, and is moderately low to low in available moisture capacity. Runoff is rapid and permeability is slow.

Nearly all areas of this soil have been cleared and are used chiefly for crops and pasture. This soil is fairly well suited to most commonly grown crops and can be cultivated occasionally. Good management that includes intensive conservation practices is required to maintain good tilth and to control erosion. (Capability unit IVe–2)

**Mimosa silt loam, 12 to 20 percent slopes, eroded** (MlD2).—This soil has a brown or dark-brown silt loam surface layer that is 4 to 8 inches thick and contains a small amount of the yellowish-brown clay material from the subsoil. A few patches are severely eroded and have a plow layer of yellowish-brown silty clay or clay. In areas below the Dellrose and Sulphura soils, chert and fragments of weathered shale are on the surface and in the surface layer. The phosphatic limestone is generally about 2 to 6 feet below the surface, but it crops out in a few places.

The soil is moderately fertile and medium acid to strongly acid. The available moisture capacity is moderately low to low. Runoff is rapid and permeability is slow.

Most of this soil has been cleared and cultivated. About 45 percent is now in pasture, 30 percent is still cropped, and 20 percent is idle. This soil is best suited to permanent pasture and hay. (Capability unit VIe–2)

**Mimosa silty clay, 10 to 20 percent slopes, severely eroded** (MmD3).—This clayey, phosphatic soil is on rolling and moderately steep hills and on upland toe slopes in the eastern two-thirds of the county. The surface layer is brown or yellowish-brown silty clay, 3 to 5 inches thick, and consists mostly of yellowish-brown clay material from the subsoil. Many shallow gullies or a few deep ones are common, and in places there are a few outcrops of limestone bedrock, especially near the base of slopes.

This soil is strongly acid and is low in natural fertility and organic matter. It is also low in available moisture capacity. Runoff is rapid to very rapid, and permeability is slow.

All of this soil has been cleared and cultivated, but most of it is now idle or is in unimproved pasture. A few areas are still used for crops, but yields are usually low. The soil is best suited to drought-tolerant pasture and hay in most places, but a few of the more severely eroded or gullied areas are probably best suited to trees. (Capability unit VIe–2)

**Mimosa and Ashwood very rocky soils, 5 to 20 percent slopes** (MoD).—These soils have 10 to 50 percent of their surface covered by outcrops of phosphatic limestone. Between the outcrops, the soil material is fine-textured silty clay loam and clay that ranges from a few inches to several feet in thickness.

These soils are low in most plant nutrients except phosphorus, and they are moderately low to low in available moisture capacity.

The soils are extensive in the outer Central Basin in the eastern two-thirds of the county. About 70 percent of their acreage has been cleared and is used mostly for pasture. A few areas are in crops. Most wooded areas are grazed and are in cedar, hickory, and other drought-tolerant hardwoods. Because of the rock outcrops, these soils are very poorly suited to crops, but if properly managed, they produce fair to good pasture. Mowing and clipping are difficult. (Capability unit VIs-1)

**Mimosa very rocky soils, 20 to 40 percent slopes** (MnE).—These soils have 10 to 50 percent of their surface covered by outcrops of phosphatic limestone. In most places the soil material between the outcrops of rock has a thin silt loam or cherty silt loam surface layer and a yellowish clayey subsoil. This soil material ranges from a few inches to several feet in thickness.

Most areas of these soils are severely eroded, and the soils are low in plant nutrients except phosphorus. They are also low in available moisture capacity.

These soils are extensive throughout the steeper or hilly areas of the outer Central Basin. Most areas are in woods, but a considerable acreage has been cleared and is now idle or in unimproved pasture. The wooded areas are in oak, hickory, cedar, and other drought-tolerant trees. The steep slopes, the outcrops of rock, and the severe erosion hazard make these soils unsuited to crops and poorly suited to pasture. In some areas fair permanent pasture can be grown, but most areas are best suited to trees. (Capability unit VIIs-1)

## Mine Pits and Dumps

Excavations, open pits, and dumps have been mapped throughout the county as Mine pits and dumps. Most of these areas have been strip mined for phosphate (fig. 17). Other areas have been excavated for fill material, and some are limestone-quarry dumps and city dumps. The areas range from 1 to more than 200 acres in size. Most of them are near Thompson Station, but a few are just east of Franklin.

**Mine pits and dumps** (Mp).—This land type is made up of excavations, open pits, and dumps of waste material.

*Figure 17.*—**Strip mining for phosphate in Maury soils.**



*Figure 18.*—**Mined area unsuitable for reclaiming.**

Most areas have been strip mined for phosphate. They are from 1 to more than 200 acres in size and have been excavated to a depth of 6 to more than 20 feet. The overburden from the mines has been dumped in rough, uneven, parallel rows or mounds (fig. 18). Most of these areas are near Thompson Station, but a few are just east of Franklin, between and parallel to Liberty Pike and State Highway 96. Small excavations for chert, road fill, and other earth fill are scattered throughout the county. Also included in this land type are limestone-quarry dumps and city dumps.

Generally, areas that have been mined for more than 3 years are covered with a heavy growth of volunteer locust trees. Fair to good crops, pasture, and hay could be grown in many mined areas if they were reclaimed by leveling.

## Mine Land, Reclaimed

This land type consists mostly of reclaimed areas that were mine pits and dumps made in strip mining for phosphate. The areas range from 1 to 100 acres or more, and the largest are around Thompson Station and Franklin.

**Mine land, reclaimed** (Mr).—Most areas of this land type are excavations and dumps that were originally made in strip mining for phosphate and have been reclaimed by leveling (fig. 19). These areas range from 1 to 100 acres or more in size. The largest areas are near Thompson Station and Franklin. Slopes range from 0 to 20 percent, but the dominant slopes are between 2 and 12 percent.

Most of the soil material is parent material and fragments of weathered limestone. Outcrops of limestone bedrock are common, but some areas are free, or nearly free, of rock. The soil material is generally very strongly acid, very low in organic matter, and moderately low in available moisture capacity. Most areas that are free of rock are smooth enough to cultivate and are fairly well

*Figure 19.*—**Land that has been strip mined for phosphate and is being reclaimed.**

suited to most commonly grown crops. The rougher, more irregularly shaped, rockier areas are best suited to pasture and hay. A few of the rockier areas are probably best suited to trees.

## Mountview Series

In the Mountview series are moderately deep and deep, well-drained soils that have developed in loess deposited on cherty clay weathered from cherty limestone.

Uneroded Mountview soils have a grayish-brown silt loam surface layer, 8 to 10 inches thick, and a brown silt loam or silty clay loam subsoil. Shallow Mountview soils are those in which the loess is less than 20 inches thick. Slopes range from 2 to 20 percent, but the dominant slopes are between 2 and 12 percent.

These soils are low in natural fertility and are strongly acid. They have a moderate available moisture capacity.

The Mountview soils are commonly next to Bodine, Baxter, and Dickson soils. They lack the distinct, brittle fragipan that is characteristic of the Dickson soils.

Mountview soils are extensive on the Highland Rim in the western part of the county. About 50 percent of the acreage has been cleared. The soils are suited to many kinds of crops and pasture, which respond well to management, especially to applications of lime and fertilizer. The shallow soils amount to about 80 percent of the total area of Mountview soils in the county.

**Mountview silt loam, 2 to 5 percent slopes** (MsB).—This deep, well-drained soil is on broad, gently sloping uplands of the Highland Rim. It has developed in a mantle of loess over cherty limestone residuum.

Representative profile:

0 to 10 inches, grayish-brown, very friable silt loam with crumb or granular structure.
10 to 30 inches, yellowish-brown or brownish-yellow, friable silt loam or silty clay loam with blocky structure.
30 to 40 inches +, mottled red, brown, and gray cherty clay with blocky structure.

The loess ranges from 20 to 40 inches in thickness. In most places the underlying residuum is yellowish-red cherty clay, but in a few places it is brownish-yellow cherty silt loam. A few fragments of chert are on the surface and throughout the loess in many places.

The soil is low in natural fertility, is medium acid to strongly acid, and is moderate in available moisture capacity. Permeability is moderately rapid. The soil has a thick root zone and generally is in good tilth. Crops respond to good management.

About 70 percent of this soil has been cleared and cultivated. Most of it is used for crops and pasture, but a large acreage is in unimproved pasture or is idle. The soil is well suited to many kinds of crops and pasture, and it can be worked easily and used moderately intensively. Heavy applications of lime and fertilizer are required to maintain good yields. (Capability unit IIe–1)

**Mountview silt loam, 5 to 12 percent slopes, eroded** (MsC2).—This soil has a surface layer of grayish-brown or yellowish-brown silt loam, 4 to 8 inches thick. The subsoil is yellowish-brown or brownish-yellow, friable silt loam or silty clay loam. In a few wooded areas the surface layer is brown and is as much as 12 inches thick. The thickness of the loess over the cherty limestone residuum ranges from 18 to 36 inches. In places a few angular fragments of chert are on the surface and throughout the soil. In a few severely eroded areas, the surface layer is yellowish-brown or brownish-yellow silty clay loam.

The soil is low in natural fertility and strongly acid. It is moderate in available moisture capacity and moderately rapid in permeability. The soil is suited to crops and pasture commonly grown in the county. It is easily worked, has a deep root zone, and can be cultivated regularly in long cropping systems. Crops respond well to management, especially to applications of lime and fertilizer. (Capability unit IIIe–1)

**Mountview silt loam, shallow, 5 to 12 percent slopes** (MvC).—This well-drained soil on the uplands of the Highland Rim has developed in 12 to 20 inches of loess that overlies cherty soil derived from limestone.

Representative profile:

0 to 8 inches, grayish-brown, very friable silt loam with crumb or granular structure; few angular chert fragments, ¼ inch to 2 inches across.
8 to 16 inches, brownish-yellow, friable silt loam or silty clay loam with blocky structure; few angular chert fragments, 1 to 2 inches across.
16 to 36 inches +, yellowish-brown cherty silty clay loam with blocky structure.

The soil is strongly acid, is low in natural fertility, and is moderately low in available moisture capacity. Permeability is moderately rapid. The soil generally is in good tilth, and crops grown on it respond well to management, especially to applications of lime and fertilizer.

Most of this soil is on the wooded, winding ridgetops of the hilly areas that extend from the Highland Rim into the outer Central Basin. Nearly all areas are in trees, mainly oak and other hardwoods, and have been heavily cut over. The soil is well suited to the crops and pasture commonly grown in the county, but it is droughty during summer and fall. (Capability unit IIIe–4)

**Mountview silt loam, shallow, 5 to 12 percent slopes, eroded** (MvC2).—This well-drained soil has a surface layer of yellowish-brown or grayish-brown silt loam, 4 to 8 inches thick. The subsoil above the cherty limestone residuum is yellowish-brown or reddish-yellow silt loam or silty clay loam. In most places a few fragments of chert are on the surface and in the layer of loess. A few patches of this soil are severely eroded and have a yellowish-brown to brownish-yellow surface layer.

The soil is strongly acid and is low in natural fertility. It is moderately low to low in available moisture capacity and moderately rapid in permeability.

Nearly all areas of this soil have been cleared and cultivated. About 25 percent of the acreage is still used for crops, 50 percent is in pasture, and 20 percent is idle. Much of the pasture is unimproved. The soil is fairly well suited to the crops and pasture commonly grown in the county and can be cultivated every 3 or 4 years. Crops grown on it respond to applications of lime and fertilizer, but most crops are damaged by drought in summer and fall. (Capability unit IIIe-4)

**Mountview silt loam, shallow, 5 to 12 percent slopes, severely eroded** (MvC3).—This soil has a surface layer of yellowish-brown to brownish-yellow silt loam, 3 to 5 inches thick. Most of this layer is yellowish-brown to reddish-yellow material from the subsoil. Many shallow gullies or rills are common, and a few deep gullies have cut through 12 to 20 inches of loess and have exposed the cherty limestone residuum. Generally this soil has more chert fragments on the surface than have the uneroded Mountview soils.

The soil is strongly acid and is low in natural fertility. The available moisture capacity is low, runoff is rapid, and permeability is moderate to moderately rapid.

Most of this soil is idle, but a few areas are still in crops and some are in pasture. The soil is fairly well suited to crops and pasture grown in the county, but most crops are damaged by drought. Also, the soil is rather difficult to work, and the hazard of further erosion is great because the surface layer is slightly fine textured and slopes are strong. Under careful management that includes intensive conservation practices, this soil can be cultivated occasionally. (Capability unit IVe-3)

**Mountview silt loam, shallow, 2 to 5 percent slopes** (MvB).—This soil has a surface layer of dark grayish-brown silt loam that is about 8 inches thick and is underlain by a subsoil of yellowish-brown or reddish-yellow, friable silt loam or silty clay loam. The upper 12 to 20 inches of the soil is loess, and the lower part is cherty limestone residuum. In most places a few chert fragments are on the surface and throughout the loess.

The soil is strongly acid, low in natural fertility, and moderate to moderately low in available moisture capacity. Runoff is medium to slow, and permeability is moderate to moderately rapid.

Most of this soil is in cutover hardwoods, mainly oaks, but a few cleared areas are in well-managed pasture. The soil is well suited to the commonly grown crops and pasture. It generally is in good tilth and can be used moderately intensively, but liberal applications of lime and fertilizer are required to maintain good yields. (Capability unit IIe-3)

**Mountview silt loam, shallow, 2 to 5 percent slopes, eroded** (MvB2).—This soil has a surface layer of grayish-brown or yellowish-brown silt loam, 4 to 8 inches thick, and a subsoil of yellowish-brown or reddish-yellow silt loam or silty clay loam. The soil has developed in 12 to 20 inches of loess overlying cherty limestone residuum. In most places chert fragments, 1 inch to 3 inches across, are on the surface and throughout the loess, but they are not in amounts large enough to interfere with tillage. A few patches of this soil are severely eroded and have a yellowish-brown or brownish-yellow silt loam or silty clay loam surface layer.

This soil is strongly acid, is low in natural fertility and is moderately low in available moisture capacity. Permeability is moderately rapid.

The soil is suited to the commonly grown crops and pasture, but liberal applications of lime and fertilizer are required to maintain good yields. Most crops are damaged by drought during summer and fall. Under good management that includes moderately intensive conservation practices, the soil can be cultivated once every 2 or 3 years. (Capability unit IIe-3)

**Mountview silt loam, shallow, 12 to 20 percent slopes** (MvD).—This soil is in loess that ranges from 12 to 20 inches in thickness but generally is about 15 inches thick. The surface layer is dark grayish-brown or grayish-brown silt loam, about 7 inches thick, and the subsoil is yellowish-brown or reddish-yellow silt loam or silty clay loam. In most places a few fragments of chert are on the surface and throughout the loess.

The soil is strongly acid and low in natural fertility. It has a moderately low available moisture capacity. Runoff is medium to rapid, and permeability is moderately rapid to rapid.

Nearly all areas of this soil are in heavily cutover hardwoods, mainly oaks. This soil is fairly well suited to most crops and pasture grown in the county. It generally is in good tilth and is fairly easy to work and to protect against erosion, but high rates of fertilization are required to maintain good yields. (Capability unit IVe-3)

**Mountview silt loam, shallow, 12 to 20 percent slopes, eroded** (MvD2).—This soil, on the uplands of the Highland Rim, has formed in a thin layer of loess that was deposited over residuum weathered from cherty limestone. The loess averages about 15 inches in thickness. The 4- to 8-inch surface layer is yellowish-brown silt loam, and the subsoil is yellowish-brown or reddish-yellow silt loam or silty clay loam. In most places a few chert fragments are on the surface and throughout the loess. In a few severely eroded areas the surface layer is yellowish-brown or brownish-yellow silt loam or silty clay loam.

The soil is strongly acid and is low in natural fertility. It is moderately low in available moisture capacity. Runoff is medium to rapid; permeability, moderately rapid.

Nearly all areas of this soil have been cleared and are used for crops and pasture. A considerable acreage is idle. The soil is fairly well suited to most commonly grown crops and pasture, but heavy rates of fertilization are required to maintain good yields. Most crops are somewhat damaged in summer and fall by drought. The soil is probably best suited to permanent pasture and hay, but it can be cultivated occasionally if management is good and moderately intensive conservation practices are followed. (Capability unit IVe-3)

## Robertsville Series

In the Robertsville series are poorly drained, gray soils in alluvium on stream terraces. The alluvium ranges from 2 to more than 10 feet in thickness and washed from soils derived largely from limestone on uplands.

The Robertsville soils have a grayish-brown silt loam surface layer, about 8 inches thick, that overlies a gray, dense subsoil. In about half the acreage of these soils in Williamson County, there is a strongly developed fragipan, and in the other half the subsoil is heavy clay. Slopes range from 0 to 2 percent.

These soils are medium to high in phosphorus and are medium acid to strongly acid. Because the soils are level or nearly level and are very slowly permeable in the subsoil, water runs off very slowly and the soils are ponded and waterlogged for long periods.

The Robertsville soils are commonly next to Captina and Taft soils, but are more poorly drained than those soils.

The Robertsville soils are on small flats or in depressions along the larger streams throughout the county. Most areas have been cleared and are used chiefly for pasture. These soils generally are too poorly drained for crops. A few areas that are less subject to ponding are used for crops, but crop failures are common.

**Robertsville silt loam, phosphatic** (Rb).—This gray, poorly drained soil has developed in old alluvium on flats or in depressions. About half the soil has a strongly developed fragipan, and the other half has a heavy clay subsoil.

Profile representative of areas with a fragipan:

0 to 8 inches, grayish-brown, very friable silt loam with crumb or granular structure.
8 to 24 inches, gray, friable silt loam or silty clay loam with common mottles of brown; blocky structure; few black concretions.
24 to 40 inches +, mottled gray and brown, very hard and compact silty clay loam; many, small, black and dark-brown concretions.

Robertsville silt loam, phosphatic, has a surface layer that ranges from 4 to 10 inches in thickness. The subsoil is dominantly gray, mottled with various shades of brown, yellow, and olive. In places brown alluvium, 4 to 8 inches thick, has been recently deposited. In a few areas, varying amounts of gravel or chert are on and in the soil.

This soil generally is medium acid to strongly acid, but in some places it is neutral to slightly alkaline. The content of phosphorus normally ranges from medium to high. In the western part of the county, however, a few areas are low in phosphorus.

This soil is in small areas along the larger streams throughout the county. Most of it has been cleared of the native, water-tolerant hardwood trees and is now used for pasture, but several areas are in crops and a few are idle. The highly mottled gray color of the soil indicates that it is waterlogged by a high water table for long periods. Unless it is drained, the soil is best suited to water-tolerant permanent pasture; but if the surface water is removed, the soil can produce fair to good yields of most late summer annuals. (Capability unit IVw-1)

## Rockland

In this land type outcrops of rock occupy 50 to 90 percent of the surface. The rocks are dominantly limestone, but in a few areas, they are shale. Between the rocks are narrow strips of shallow, heavy-textured soil material. Most areas of Rockland are in trees. Although the land is too rocky for crops and pasture, it is a source of agricultural and industrial limestone and can produce marketable cedar trees that are fair to good.

*Figure 20.*—**Rockland.**

**Rockland** (Rc).—Outcrops of rock occupy from 50 to 90 percent of the surface of this land (fig. 20). The rocks, mostly limestone, are generally well above the surface and separated by narrow strips of shallow, fine-textured soil material. In a few areas the rocks are shale. Slopes range from 3 to 30 percent or more.

Most of this land is in the eastern two-thirds of the county. Redcedar and drought-tolerant hardwoods grow in most areas. The use of any machinery is impractical on this land. It has little value for crops and pasture, but it can produce fair to good cedar and is also a source of agricultural and industrial limestone. (Capability unit VIIs-1)

## Sees Series

The soils of this series are black, fine textured, and moderately well drained. They have developed in local alluvium or colluvium that washed from soils derived from phosphatic limestone. The alluvium or colluvium ranges from 2 to more than 6 feet in thickness.

These soils have a black silty clay loam surface layer, about 8 to 10 inches thick, and a dark yellowish-brown or dark grayish-brown clay subsoil. Below a depth of about 20 inches, the subsoil is mottled with gray. Slopes range from 0 to 5 percent.

These soils are medium to high in phosphorus, are moderately high to high in organic matter, and are medium acid to slightly acid. They are slowly permeable, and runoff is medium to slow.

The Sees soils are on footslopes and along drainageways. They are better drained than the Dunning soils and are finer textured in the surface layer and upper subsoil than are the Lanton soils.

The Sees soils are inextensive and are in small areas throughout the eastern two-thirds of the county. About 85 percent of the acreage has been cleared. These imperfectly drained, slowly permeable soils are difficult to work and to keep in good tilth. They are poorly suited to most deep-rooted legumes.

**Sees silty clay loam** (Sc).—This black, fine-textured, moderately well drained soil developed in phosphatic local alluvium or colluvium. It is on toe slopes and fans and along small drainageways throughout the eastern two-thirds of the county.

Representative profile:

0 to 10 inches, very dark gray or black, friable silty clay loam with granular structure.
10 to 18 inches, very dark grayish-brown clay with blocky structure; few, small, black and dark-brown concretions.
18 to 40 inches +, dark-brown or dark yellowish-brown, very sticky and plastic clay mottled with gray and olive brown; blocky structure or massive (structureless); many dark-brown and black concretions.

In places 4 to 8 inches of dark-brown silt loam has been deposited recently on the surface. The texture of the subsoil ranges from silty clay loam to clay. In places this soil receives seepage from steeper, adjoining slopes. These somewhat poorly drained seepy areas generally have more gray mottles in the subsoil than have the moderately well drained areas.

Poor tilth, imperfect drainage, and in places, flooding or ponding limit the use of this soil. Because the soil is fine textured, it can be worked only within a narrow range of moisture content. When the soil dries, it hardens and cracks, and if it is worked too wet, large, hard clods are formed. It is well suited to pasture and to corn, sorghum, soybeans, and other summer annuals. The soil is poorly suited to alfalfa and tobacco, however, because internal drainage is slow. (Capability unit IIw-1)

## Sequatchie Series

In the Sequatchie series are deep, well-drained, loamy soils on low stream terraces. These soils are naturally fertile and are in alluvium that is 3 to more than 10 feet thick.

The Sequatchie soils have a dark-brown loam or fine sandy loam surface layer, about 10 inches thick. The subsoil is yellowish-brown clay loam. Slopes range from 0 to 5 percent.

These soils are medium acid to strongly acid, are medium to high in phosphorus, and contain a moderate amount of organic matter. They have a high available moisture capacity.

The Sequatchie soils are commonly alongside the Huntington, Lindside, and Armour soils. They have a stronger profile development than the Huntington and Lindside soils and are better drained than the Lindside soils. The Sequatchie soils are younger than the Armour soils and contain more sand. They have a weaker profile development than the Armour soils and are generally on lower stream terraces.

The Sequatchie soils are in small areas along the Harpeth, West Harpeth, and Little Harpeth Rivers in the central and eastern parts of the county. Nearly all areas have been cleared and are used for crops and pasture. These productive soils are suited to many kinds of crops and pasture and are easy to work.

**Sequatchie loam, phosphatic** (Se).—This deep, well-drained soil is on low stream terraces. It has developed in loamy or sandy materials that washed from soils of the uplands that were derived chiefly from phosphatic sandy limestone interbedded with shale.

Representative profile:

0 to 10 inches, dark-brown, very friable loam with crumb structure.
10 to 48 inches +, dark-brown or yellowish-brown, friable clay loam or fine sandy clay loam with blocky structure.

The surface layer ranges from loam to fine sandy loam, and the subsoil from fine sandy loam to clay loam.

The soil is naturally fertile and has high available moisture capacity. The content of phosphorus is medium to high. Runoff is slow on this level to gently sloping soil, but infiltration and permeability are rapid. The soil has a thick root zone and generally is in good tilth. Many kinds of crops grow well on this soil and respond to good management.

Nearly all areas of this soil have been cleared. The soil is well suited to intensive use, but occasional overflow is a hazard. (Capability unit I-2)

## Stiversville Series

The Stiversville series consists of deep, well-drained soils on uplands of the outer Central Basin (fig. 21). These soils formed from phosphatic sandy limestone interbedded with shale. Stiversville soils that are not severely eroded have a surface layer of dark-brown silt loam, about 7 inches thick. Their subsoil is reddish-brown or yellowish-brown silty clay loam or clay loam. In some places a few fragments of highly weathered, sandy limestone are on the surface, but they generally are more common in the subsoil. Slopes range from 2 to 20 percent, but the dominant slopes are between 5 and 12 percent.

These soils are moderately high in natural fertility, are medium acid to strongly acid, and have a moderate available moisture capacity.

The Stiversville soils are generally next to Hicks, Culleoka, and Inman soils. They are deeper to rock than the Hicks soils and have a stronger profile development. They are coarser textured and more strongly developed than the Inman soils.

The Stiversville soils are in the eastern half of the county. Most areas have been cleared. These soils are

*Figure 21.*—**Stiversville soils on smooth slope in foreground. Mimosa and Dellrose soils on steep hills in background.**

easy to work and are suited to all commonly grown crops and pasture.

**Stiversville silt loam, 5 to 12 percent slopes, eroded** (StC2).—This well-drained soil is on the uplands of the outer Central Basin. It has formed from phosphatic sandy limestone interbedded with shale. Small fragments of soft, sandy limestone are generally scattered throughout the soil. The depth to bedrock ranges from about 2 to 5 feet.

Representative profile:

0 to 8 inches, dark-brown, very friable silt loam with granular structure.
8 to 20 inches, reddish-brown or yellowish-brown, friable silty clay loam with blocky structure.
20 to 40 inches, dark-brown or reddish-brown, friable silty clay loam or clay loam with blocky structure; common fragments of sandy limestone increase in size and amount with increasing depth.

This soil is medium to high in phosphorus, is medium acid to strongly acid, and is moderate in available moisture capacity. Permeability is moderately rapid to rapid. The soil has a deep root zone and generally is in good tilth.

Nearly all areas of this soil have been cleared, but a considerable acreage is now idle. The soil is easy to work and is suited to many kinds of crops and pasture. Crops grown on it respond to good management, especially to additions of lime. The soil can be cultivated every 3 or 4 years if it is well managed and special practices are used to control water. (Capability unit IIIe–1)

**Stiversville silt loam, 2 to 5 percent slopes, eroded** (StB2).—This deep, well-drained soil is on gently sloping uplands in the eastern half of the county. It has formed from interbedded, phosphatic, sandy limestone and shale and contains highly weathered, sandy fragments in the lower subsoil. The surface layer is dark-brown silt loam, about 8 inches thick. The subsoil is yellowish-brown or reddish-brown silty clay loam or clay loam. In places small fragments of weathered siltstone or sandy limestone are on the surface. A few patches of this soil are severely eroded and have a plow layer of clay loam. Bedrock is at a depth of 2½ to 5 feet.

The soil is medium to high in phosphorus, is medium acid to strongly acid, and is moderate to moderately high in available moisture capacity. It is moderately rapid in permeability.

Many kinds of crops and pasture are suited to this soil. It is easy to work and to conserve and can be used moderately intensively. (Capability unit IIe–1)

**Stiversville silt loam, 12 to 20 percent slopes, eroded** (StD2).—This phosphatic soil is on short slopes of rolling hills. The surface layer of brown or dark-brown silt loam is about 4 to 6 inches thick and is underlain by a subsoil of yellowish-brown or reddish-brown silty clay loam or clay loam. In most places a few fragments of weathered siltstone or sandy limestone are on the surface. These sandy fragments are more common in the lower subsoil. Bedrock is generally at a depth of 2½ to 5 feet.

The soil is medium to high in phosphorus and is medium acid to strongly acid. It has a moderate to moderately low available moisture capacity. Permeability is moderately rapid to rapid.

Nearly all of this soil has been cleared and cultivated. Most of it is now used for pasture, but a considerable acreage is used for crops. Although the soil is suited to all common crops, it is too sloping for frequent cultivation. Plants respond especially well if lime is added to the soil. (Capability unit IVe–1)

**Stiversville clay loam, 5 to 12 percent slopes, severely eroded** (SrC3).—This soil has a surface layer of brown or yellowish-brown clay loam, 3 to 5 inches thick. Most of this layer is yellowish-brown or reddish-brown silty clay loam or clay loam from the subsoil. In most places fragments of weathered siltstone or sandy limestone are on the surface. Many shallow gullies or a few deep ones are common, and in places there are a few outcrops of bedrock. The average depth to bedrock, however, is between 2 and 4 feet.

This soil is medium to high in phosphorus and is medium acid to strongly acid. Although not especially droughty, the soil is generally in poor tilth. Because of the fine-textured surface layer and the strong slopes, further erosion is likely and frequent cultivation is not practical. With careful management that includes intensive conservation practices, the soil can be cultivated every 4 or 5 years. It is fairly well suited to the commonly grown crops and pasture. Crops respond to good management, especially to additions of lime and nitrogen. (Capability unit IVe–1)

**Stiversville clay loam, 12 to 20 percent slopes, severely eroded** (SrD3).—This severely eroded, phosphatic soil is on strongly sloping uplands of the outer Central Basin. The surface layer is brown or yellowish-brown clay loam. This layer is 3 to 5 inches thick and consists mostly of yellowish-brown or reddish-brown silty clay loam or clay loam from the subsoil. Many shallow gullies or a few deep ones are common. In most places fragments of weathered siltstone or sandy limestone, ½ to 3 inches across, are on the surface. These sandy fragments generally are throughout the soil and increase in size and amount with increasing depth. Bedrock of phosphatic sandy limestone is at a depth of 2 to 4 feet.

The soil has lost much of its natural fertility and most of its organic matter. It has low available moisture capacity.

All of this soil has been cleared and cultivated. About 25 percent of the acreage is still in crops, 50 percent is in pasture, and 25 percent is idle or is in sparse stands of trees. Because of the fine-textured surface layer and steep slopes, runoff is rapid and the hazard of further erosion is great. Therefore, the soil is best suited to permanent pasture or hay. (Capability unit VIe–1)

## Sulphura Series

In the Sulphura series are steep soils on high hills and knobs. These soils have developed in residuum of shale, which in most places is mantled by 2 to 14 inches of cherty creep that drifted down from higher soils.

Sulphura soils have a surface layer of dark grayish-brown cherty silt loam about 6 inches thick, and a subsoil of dark-brown shaly silt loam or shaly silty clay loam. Shale bedrock generally is at a depth of 18 to 24 inches, but it crops out on the steeper slopes. Slopes range from 12 to 50 percent but are generally greater than 20 percent.

These soils are medium acid to strongly acid and low in available moisture capacity.

The Sulphura soils are between the Bodine soils and Dellrose soils on hillsides. They are below the Bodine soils, which are on ridgetops and upper slopes, and are above the Dellrose soils, which are on lower slopes.

The Sulphura soils are extensive on the slopes of the high range of hills in the central and north-central parts of the county. About 90 percent of the acreage is in hardwoods, 5 percent is in pasture, and 5 percent is idle. These soils are not suited to cultivated crops, and most areas are very poorly suited to pasture.

**Sulphura cherty silt loam, 20 to 50 percent slopes** (SuE).—This shallow, excessively drained soil is on steep upland slopes. It has developed in shaly residuum mantled by a thin layer of cherty material that drifted from the Bodine soils on the upper slopes.

Representative profile:

0 to 5 inches, dark grayish-brown, very friable cherty silt loam with granular structure.
5 to 20 inches, dark-brown or dark grayish-brown, friable shaly silt loam or shaly silty clay loam with blocky structure.
20 inches +, shale bedrock.

This soil generally is 18 to 24 inches deep over shale bedrock. In a few areas, however, the soil is as much as 4 feet deep, and in many places on the steeper slopes there are a few outcrops of bedrock. The cherty creep over the shaly residuum ranges from 2 to 14 inches in thickness. It is thickest on the upper parts of the slope near the Bodine soils. As the soil extends downslope, the creep becomes thinner and in some places disappears at the lower boundary of the soil. In areas where the creep is thickest, the soil is lighter brown and more acid than it is elsewhere.

In most places this soil is low in phosphorus, but in a few areas the content of phosphorus is medium to high. The soil is low in available moisture capacity. Runoff is rapid to very rapid, and permeability is moderate.

Nearly all areas of this soil are in hardwoods, but a few small areas have been cleared and are idle or are in unimproved, permanent pasture. The soil is limited in its use because it is steep and has rapid runoff, and because it is shallow to bedrock and has low available moisture capacity. It is unsuited to cultivated crops, and most of it is unsuited to pasture. A few of the deeper areas could produce fair pasture, but clearing the soil for this purpose may not be practical. (Capability unit VIIs–1)

**Sulphura cherty silt loam, 20 to 50 percent slopes, severely eroded** (SuE3).—This soil is dark brown or dark yellowish brown, and it has a higher concentration of weathered shale on the surface than have the less severely eroded Sulphura soils. It is normally less than 20 inches deep, and outcrops of shale bedrock are common. In most places many shallow gullies have cut into the shale bedrock.

The soil is low in natural fertility and low to very low in available moisture capacity.

About 25 percent of the acreage has been cleared of the hardwood forest and is idle. This soil is unsuited to crops and pasture. It is best suited to trees. (Capability unit VIIs–1)

**Sulphura cherty silt loam, 12 to 20 percent slopes** (SuD).—This soil is on uplands near the base of the Highland Rim escarpment. It generally ranges from about 20 to 24 inches in depth to shale bedrock, but the depth is as much as 4 feet in some areas. The cherty creep material extends to a depth of 6 to 16 inches and is underlain by residuum of weathered shale.

The soil is medium acid to strongly acid, is moderate to moderately low in natural fertility, and is moderate in available moisture capacity.

About 50 percent of this soil has been cleared and is used chiefly for pasture. A few small areas are in crops, and a few are idle. Most areas are on benches and receive seepage water from the steeper Sulphura soils. The shallower areas are best suited to permanent pasture or trees, but the deeper areas are fairly well suited to most crops and can be cultivated occasionally. Access to these soils with farm machinery, however, is generally difficult. (Capability unit VIs–1)

## Taft Series

In the Taft series are somewhat poorly drained, medium acid to strongly acid soils that have a fragipan. These soils developed in old alluvium on stream terraces, toe slopes, and fans. The alluvium ranges from 2 to 10 feet in thickness and, in most places, consists of materials that washed from soils derived from limestone. In the western part of the county, however, the alluvium washed mostly from soils derived from loess and cherty limestone.

These soils have a brown or dark grayish-brown silt loam surface layer, about 7 inches thick. The subsoil above the fragipan is dominantly grayish-brown or yellowish-brown silty clay loam mottled with shades of gray. Slopes range from 0 to 8 percent, but they are dominantly less than 5 percent.

The soils are medium acid to strongly acid throughout and are generally medium to high in phosphorus. In Williamson County, Taft soils that have a high content of phosphorus are mapped separately.

The Taft soils are commonly next to Captina, Humphreys, and Robertsville soils. They are lighter in color than the Captina soils and are more poorly drained and mottled closer to the surface. They are slightly better drained than the Robertsville soils and are less gray in the upper part.

The Taft soils are inextensive and are in small areas throughout the county. Most areas have been cleared and are used chiefly for pasture, but in the western part of the county, a large part of the acreage is idle. The use of Taft soils is somewhat limited by wetness.

**Taft silt loam, 0 to 8 percent slopes** (TaB).—This somewhat poorly drained soil has a fragipan or dense, compact layer about 20 inches below the surface. Most areas are on terraces, toe slopes, and fans along streams in the western part of the county, but a few areas are in depressions or on broad upland flats of the Highland Rim. The soil has developed in old alluvium or colluvium that washed from soils derived from loess and cherty limestone.

Representative profile:

0 to 6 inches, dark grayish-brown, very friable silt loam with crumb or granular structure.
6 to 24 inches, pale-brown, friable silty clay loam with mottles of light gray; blocky structure; few brown and black concretions.
24 to 36 inches +, mottled yellow, gray, and pale-brown, very hard and compact cherty silt loam or cherty silty clay loam; many dark-brown and black concretions.

The surface layer is silt loam in most places, but in a few areas it is cherty silt loam. The subsoil is generally pale brown or light yellowish brown mottled with various shades of gray, brown, and yellow. In most places the fragipan is partly cemented and very cherty. It is at a depth ranging from 18 to 30 inches.

The soil is low in natural fertility and strongly acid. Runoff is medium to slow, and permeability is very slow.

Most areas of this soil have been cleared and cultivated. About 30 percent of the acreage is still in crops, but most of it is idle or is in native pasture of low quality. The fragipan restricts the movement of water, and the soil remains saturated for long periods in winter and spring. It dries out in the summer and fall and ordinarily is not moist enough for some crops. The fragipan also restricts the penetration of roots and the movement of air. For these reasons, the use of this soil for crops and pasture is limited, though the soil is easy to work when it is not too wet. Planting corn and small grains in low spots is risky because of wetness, but these crops can be grown where surface drainage is good. Alfalfa and tobacco are poorly suited. Soybeans, grain sorghum, red clover, white clover, lespedeza, and tall fescue produce medium to good yields, but the fertilizer requirements are fairly high. (Capability unit IIIw-2)

**Taft silt loam, phosphatic** (Tb).—This somewhat poorly drained soil has a fragipan or a dense, compact layer at a depth of about 20 inches. The soil has developed in old alluvium that washed from soils derived from phosphatic limestone. It is on broad, flat areas or in depressions on stream terraces in the eastern two-thirds of the county. This soil differs from Taft silt loam, 0 to 8 percent slopes, mainly in containing a medium to large amount of phosphorus. Also, it generally has a finer textured subsoil that is free of chert.

Representative profile:

0 to 8 inches, dark grayish-brown, very friable silt loam with granular structure.
8 to 22 inches, grayish-brown or pale-brown silty clay loam mottled with shades of gray, brown, and yellow; blocky structure; few, small, black and dark-brown concretions.
22 to 40 inches +, mottled gray and brown, hard and compact silty clay; many, small, black and dark-brown concretions.

The surface layer is dark brown in some places. In many places brown overwash has been recently deposited on the surface in a layer 4 to 8 inches thick. The depth to the fragipan ranges from 16 to 30 inches.

This soil is medium acid to strongly acid and is medium to high in phosphorus. Runoff and permeability are slow to very slow, and ponding is common in many places.

Most areas of this soil have been cleared and are used chiefly for pasture. Some areas are cropped, and a considerable acreage is idle. The soil remains waterlogged for long periods in winter and spring, but it generally dries out in summer and fall and is then droughty. Best suited to this soil are tall fescue and other pasture plants that are tolerant of water and of drought. If drained, this soil produces fair to good yields of soybeans, grain sorghum, and other summer annuals. (Capability unit IIIw-2)

## Talbott Series

In the Talbott series are moderately deep to deep, well-drained soils on the uplands of the inner Central Basin. These soils have formed from clayey limestone. Talbott soils that are not severely eroded have a surface layer of brown or dark-brown silty clay loam or silt loam, about 7 inches thick. The subsoil is yellowish-red or reddish-yellow clay that is very sticky and plastic. Slopes range from 2 to 15 percent, but the dominant slopes, except in very rocky areas, are between 2 and 5 percent.

These soils are low in natural fertility and are medium acid to strongly acid. They have a clayey, slowly permeable subsoil and a rather shallow root zone that is low in capacity to supply moisture to plants.

The Talbott soils are commonly close to or next to Hagerstown, Fairmount, and Mercer soils. They have a finer textured, more plastic subsoil than have the Hagerstown soils. They are redder and generally deeper than the Fairmount soils and are better drained than the Mercer soils.

The Talbott soils are inextensive and are in small areas in the eastern half of the county. Most areas have been cleared and are used chiefly for crops and pasture. The soils are fairly well suited to most crops and pasture grown in the county and produce low to medium yields. Because of the heavy, plastic subsoil, these soils are highly susceptible to erosion.

**Talbott silty clay loam, 2 to 5 percent slopes, eroded** (TsB2).—This well-drained soil has formed in clayey limestone on the red uplands of the inner Central Basin.

Representative profile:

0 to 8 inches, brown or dark-brown, friable silty clay loam with granular structure.
8 to 24 inches, yellowish-red, firm and plastic clay with blocky structure.
24 to 40 inches +, mottled yellowish-red and yellowish-brown, very sticky and plastic clay.

The surface layer is dark-brown to yellowish-brown silt loam to silty clay loam. The subsoil ranges from yellowish brown to red in color and from silty clay to clay in texture. It is normally highly mottled in the lower part with various shades of red, yellow, and gray. In places varying amounts of chert fragments, 1 to 3 inches across, are on the surface and throughout the soil. A few patches are severely eroded and have a yellowish-brown to yellowish-red silty clay plow layer. Limestone bedrock generally is at a depth of 2 to 5 feet, but it crops out in a few places.

This soil is low in natural fertility, is medium acid to strongly acid, and is moderately low in available moisture capacity. Runoff is medium to rapid, and permeability is moderately slow.

Nearly all areas of this soil have been cleared. The soil is fairly well suited to most commonly grown crops and pasture plants and can be cultivated every 3 or 4 years. It generally produces low to medium yields of row crops and good yields of small grains, hay, and pasture. Because of the fine-textured, slowly permeable subsoil, this soil is highly susceptible to erosion. Good management that includes moderately intensive conservation practices is required to control erosion and to maintain good tilth. (Capability unit IIIe-2)

**Talbott silty clay loam, 5 to 12 percent slopes, eroded** (TsC2).—This red clayey soil is on the uplands of the inner Central Basin and has formed from limestone. The surface layer is brown or yellowish-brown silty clay loam and ranges from 4 to 8 inches in thickness. The subsoil is yellowish-brown or yellowish-red clay and is normally mottled in the lower part with shades of red, yellow, and gray. Included with this soil are a few uneroded areas that have a dark-brown silt loam surface layer as much as 10 inches thick. Also included are a few severely eroded patches that have a yellowish-brown or yellowish-red silty clay surface layer. In places varying amounts of chert are on the surface and in the soil. Bedrock generally is at a depth of 2 to 5 feet, but there are a few outcrops.

The soil is low in natural fertility, is medium acid to strongly acid, and has a moderately low to low available moisture capacity. Because the subsoil is fine textured and slowly permeable, runoff is rapid and the soil is highly susceptible to further erosion.

Most of this soil has been cleared, but much of it is now idle or is in unimproved pasture. The soil is fairly well suited to most commonly grown crops and to pasture and can be cultivated every 4 or 5 years. Yields of summer annuals, however, are low to medium. (Capability unit IVe-2)

**Talbott silty clay, 2 to 5 percent slopes, severely eroded** (TfB3).—This clayey soil has formed from limestone in the uplands of the inner Central Basin. The surface layer is 3 to 5 inches thick. It is yellowish-brown to yellowish-red silty clay that consists mostly of yellowish-red to red clay from the subsoil. Many shallow gullies or a few deep ones are present. In places there are a few outcrops of limestone bedrock, though the average depth to bedrock is between 1½ and 5 feet. Varying amounts of chert are on the surface and throughout the soil in places.

The soil is low in natural fertility and has a low available moisture capacity. Runoff is rapid and permeability is slow.

All of this soil has been cleared and cultivated, but most of it is now idle or is in unimproved pasture. A few areas are still in crops. The soil generally has poor tilth and is difficult to work and conserve. Yields of corn, tobacco, and other row crops are ordinarily low. Small grains, whiteclover, and tall fescue are among the plants best suited to this soil because most of their growth is made in the spring when moisture is plentiful. (Capability unit IVe-2)

**Talbott silty clay, 5 to 12 percent slopes, severely eroded** (TfC3).—The plow layer of this soil is yellowish-brown to yellowish-red silty clay, 3 to 5 inches thick. Most of this layer is the yellowish-red or red clay from the subsoil. Many shallow gullies or a few deep ones are common. In a few areas chert is on the surface and throughout the soil in varying amounts. Limestone bedrock generally is at a depth of 1½ to 5 feet, but it crops out in places.

The soil is low in natural fertility. It generally is poor in tilth and is low in available moisture capacity.

All areas of this soil have been cleared and cultivated. Although a few areas are still in crops, most areas are now idle, are in unimproved pasture, or have been abandoned. The abandoned fields have grown up in sparse stands of low-quality trees, mainly cedar. The soil is best suited to permanent pasture and hay. (Capability unit VIe-2)

**Talbott very rocky soils, 2 to 15 percent slopes** (TvD).—Outcrops of limestone bedrock cover from 10 to 50 percent of the surface of these soils (fig. 22). Between the outcrops of rock, the soil material ranges from a few inches to several feet in thickness. In areas that are not severely eroded, these soils have a surface layer of brown or yellowish-brown silt loam or silty clay loam and a subsoil of yellowish-brown or yellowish-red clay.

***Figure 22.*—Permanent pasture on Talbott very rocky soils.**

These soils are low in natural fertility, are strongly acid, and are low in available moisture capacity.

Talbott very rocky soils are extensive in the eastern part of the county. Although about 60 percent of the acreage has been cleared, most cleared areas are idle, are in pasture, or have reverted to sparse stands of trees, mainly cedar and hickory. Most areas of these soils are fairly well suited to permanent pasture. A few areas that have deeper, more favorable soil materials and fewer outcrops of rock can be planted to crops occasionally. Tillage with machinery is impractical, however, because of the rock outcrops. The rockier and shallower areas are best suited to trees. (Capability unit VIs-1)

# *Use and Management of Soils*

This section describes the use and management of soils for crops and pasture, for trees, for wildlife, and for engineering work.

## Use and Management of Soils for Crops and Pasture

In this subsection the soils are grouped according to their capabilities for producing crops and pasture. The system used for grouping soils according to capability is outlined and explained. This is followed by a description of each capability unit and the management it requires. Also in this subsection is a table that gives estimated yield of principal crops in the county under two defined levels of management.

### *Capability grouping*

The capability classification is one of a number of interpretative groupings of soils made for agricultural purposes. It shows, in a general way, how suitable the soils are for most kinds of farming. It is a practical grouping based on limitations of the soils, the risk of damage when they are used, and the way they respond to management.

In this system all the kinds of soil are grouped at three levels, the capability class, subclass, and unit. Eight capability classes are in the broadest grouping and are designated by Roman numerals I through VIII. In class I are the soils that have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. In class VIII are soils and landforms so rough, shallow, or otherwise limited that they do not produce worthwhile yields of crops, forage, or wood products.

The subclasses indicate major kinds of limitations within the classes. Within most of the classes there can be up to four subclasses. The subclass is indicated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* means that water in or on the soil will interfere with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, stony, or low in fertility; and *c*, used in only some parts of the country, indicates that the chief limitations is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few or no limitations. Class V can contain, at the most, only subclasses *w*, *s*, *and c*, because the soils in it have little or no susceptibility to erosion but have other limitations that limit their use largely to pasture, range, woodland, or wildlife. In Williamson County no soils are in class V.

Within the subclasses are the capability units, which are groups of soils enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping of soils for making many statements about management of soils. Capability units are generally identified by numbers assigned locally, for example, IIe-1 or IIIe-2.

Soils are classified in capability classes, subclasses, and units according to the degree and kind of their permanent limitations, without consideration of major landforming or reclamation that would change the slope, depth, or other characteristics of the soils.

The eight classes in the capability system, and the subclasses and units in this county, are described in the list that follows.

Class I. Soils that have few limitations that restrict their use.
- (No subclass.)
  - Capability unit I-1.—Deep, well-drained soils on nearly level uplands and stream terraces.
  - Capability unit I-2.—Deep, well-drained soils in alluvium.
  - Capability unit I-3.—Deep, moderately well drained, silty or loamy soils in alluvium.

Class II. Soils that have some limitations that reduce the choice of plants or require moderate conservation practices.
- Subclass IIe.—Soils subject to moderate erosion if they are not protected.
  - Capability unit IIe-1.—Gently sloping, deep, well-drained soils on uplands and stream terraces.
  - Capability unit IIe-2.—Gently sloping soils that have a dense, slowly permeable layer.
  - Capability unit IIe-3.—Gently sloping, moderately deep to deep, cherty or gravelly soils on uplands and stream terraces.
- Subclass IIw.—Soils that are moderately limited by excess water.
  - Capability unit IIw-1.—Dark, moderately well drained soils in alluvium.
  - Capability unit IIw-2.—Nearly level soils that have a fragipan and are on stream terraces.
- Subclass IIs.—Soils that are moderately limited by factors affecting tilth or moisture capacity.
  - Capability unit IIs-1.—Deep, cherty or gravelly soils in alluvium.

Class III. Soils that have severe limitations that reduce the choice of plants, require special conservation practices, or both.
- Subclass IIIe.—Soils that are subject to severe erosion if they are cultivated and not protected.
  - Capability unit IIIe-1.—Sloping, fertile, well-drained soils on uplands and stream terraces.
  - Capability unit IIIe-2.—Gently sloping soils that have a clay subsoil.
  - Capability unit III-3.—Sloping soils that have a hardpan.
  - Capability unit IIIe-4.—Sloping, cherty or gravelly soils.
  - Capability unit IIIe-5.—Gently sloping and sloping, clayey soils that are shallow and very slowly permeable.
- Subclass IIIw.—Soils that are severely limited by excess water.
  - Capability unit IIIw-1.—Somewhat poorly drained to poorly drained alluvial soils.
  - Capability unit IIIw-2.—Somewhat poorly drained soils on stream terraces.

Class IV. Soils that have very severe limitations that restrict the choice of plants, require very careful management, or both.
- Subclass IVe.—Soils subject to very severe erosion if they are cultivated and not protected.
  - Capability unit IVe-1.—Sloping and moderately steep, well-drained soils on uplands and stream terraces.
  - Capability unit IVe-2.—Sloping soils that have a clayey subsoil.
  - Capability unit IVe-3.—Sloping to moderately steep cherty soils.
- Subclass IVw.—Soils that are very severely limited for cultivation because of excess water.
  - Capabilitity unit IVw-1.—Level, very poorly drained soils on stream terraces.

Class V. Soils that are subject to little or no erosion hazard but have other limitations, impractical to remove, that restrict the use of the soils largely to pasture, range, woodland, or wildlife food and cover. There are no class V soils in Williamson County.

Class VI. Soils that have severe limitations that make them generally unsuitable for cultivation and that limit their use largely to pasture, woodland, or wildlife food and cover.

Subclass VIe.—Soils severely limited, mainly by risk of erosion, if protective cover is not maintained.

Capability unit VIe-1.—Moderately steep to steep, permeable soils that are severely eroded or subject to severe erosion.

Capability unit VIe-2.—Sloping to steep, clayey soils that are mostly severely eroded.

Subclass VIs.—Soils generally unsuitable for cultivation and other uses because of stones, low moisture capacity, or other limiting features.

Capability unit VIs-1.—Sloping to steep, shallow to moderately deep, cherty, flaggy, or very rocky soils.

Class VII. Soils that are unsuitable for cultivation because of very severe limitations that cannot be corrected without major reclamation and that restrict their use largely to grazing, woodland, or wildlife.

Subclass VIIe.—Soils very severely limited, chiefly by risk of erosion if protective cover is not maintained.

Capability unit VIIe-1.—Steep and very steep soils on uplands.

Subclass VIIs.—Soils very severely limited by chert, stones, shallowness, or moisture capacity.

Capability unit VIIs-1.—Rockland, very rocky soils, shallow soils, and very rocky shallow soils.

Class VIII. Soils and landforms that have limitations that preclude their use, without major reclamation, for commercial production of plants; and that restrict their use to recreation, wildlife, water supply, or esthetic purposes. There are no class VIII soils in Williamson County.

Made land, Mine pits and dumps, and Mine land, reclaimed, have not been classified into capability units because their limitations are too complex or varied.

### *Managing soils by capability units*

The 25 capability units of Williamson County are discussed in the following pages. Characteristics of the soils that affect use and management are described, and the soils in each unit are listed. Also discussed are the capabilities of the soils and their management requirements. Not given in this section are specific recommendations about fertilizer, about varieties and mixtures of seeds, and about rates and dates of seeding. Fertilizer, seed varieties, and seeding requirements change as discoveries are made and prices change. Up-to-date recommendations are published from time to time by the Tennessee Agricultural Experiment Station and Extension Service. The descriptions of the capability units and of the individual soils given in this report will help in selecting good uses and practices for each kind of soil. People of the Soil Conservation Service and the Extension Service will help interpret the statewide recommendations for the soils.

#### CAPABILITY UNIT I-1

In this capability unit are deep, well-drained soils on nearly level uplands and stream terraces. They are among the most fertile and productive soils in the county. The soils are—

Armour silt loam, 0 to 2 percent slopes.
Maury silt loam, 0 to 2 percent slopes.

These soils have a high available moisture capacity and a thick root zone that is readily permeable to air, water, and plant roots. The soils are slightly acid to strongly acid and are medium to high in content of phosphorus. In places the Armour soils are likely to be flooded occasionally for short periods.

The soils in this unit are well suited to many kinds of crops, are easily worked, and can be used intensively. Row crops can be planted annually, but winter cover and green manure may be needed to maintain good tilth and high yields. Some areas are better suited to short rotations than to row crops planted each year.

The soils in this unit are also well suited to pasture. Excellent for permanent pasture is a mixture of orchardgrass and alfalfa or of fescue and whiteclover. Sudangrass, millet, or other grasses provide high-producing supplemental pasture.

High yields of crops and forage can be maintained if lime and fertilizer are applied. Crops on these soils respond especially well to lime, potash, and nitrogen.

Good tilth is fairly easy to maintain without special practices, but tilling when the soils are wet is not advisable. Though erosion is not a problem in most areas, diversions are needed in a few places to protect the soils against excess runoff from steeper adjoining soils.

#### CAPABILITY UNIT I-2

The soils in this capability unit are deep, well drained, fertile, and highly productive. These soils are on bottoms, in depressions, and along small drains. They are likely to be flooded for short periods, and in most places they receive silty or loamy sediments. The soils are—

Greendale silt loam, 2 to 5 percent slopes.
Huntington silt loam, local alluvium.
Huntington silt loam, phosphatic.
Sequatchie loam, phosphatic.

These soils have a high available moisture capacity and a thick root zone that is easily penetrated by air, water, and plant roots. They range from medium acid to neutral. Except for the Greendale soil and Huntington silt loam, local alluvium, these soils are medium to high in phosphorus.

These soils are well suited to many kinds of crops, are easily worked, and can be cultivated intensively. If fertilizer is added and crop residue is returned to the soil, row crops can be grown every year. Suitable crops are corn, small grains, sorghum, soybeans, and vegetables.

These soils are well suited to pasture. Because of their high available moisture capacity, they are more productive in dry seasons than most soils on uplands. Supplemental pasture of sudangrass, millet, or other grasses is highly productive. Orchardgrass, fescue, bermudagrass, and whiteclover are excellent for permanent pasture.

Tobacco and alfalfa grow well on these soils, but the risk of growing these crops is too great on the fields that are likely to be flooded.

These soils produce fairly high yields of crops and forage without fertilizer, but some fertilizer is needed to maintain high yields under intensive use. Crops on the Greendale soil respond well to complete fertilizer and lime. On the Huntington soils crops respond to potash and nitrogen.

Special tillage or cropping is not needed to maintain good tilth or to control runoff and erosion. In places,

*Figure 23.*—**Small stream channel improved in Huntington soil. Sloping and sodding the channel facilitates clipping and prevents clogging.**

however, diversions are required to protect these soils against runoff from adjacent uplands. The practice most needed is improvement of streams and channels to prevent floods from damaging nearby fields (fig. 23).

#### CAPABILITY UNIT I-3

The soils in this capability unit are deep and moderately well drained. They are along large streams, along small drainageways, and in depressions. Most areas of these soils are likely to be flooded and ponded for short periods. A high water table generally saturates the lower subsoil for long periods in winter and spring. Most areas are moderately well drained, however, and removal of excess water is not difficult. The soils are—

Lindside silt loam.
Lindside silt loam, phosphatic.

These soils are moderate to high in natural fertility and are high in available moisture capacity. Most areas are medium to high in phosphorus and are medium acid or slightly acid.

The soils in this unit are easily worked. If they are adequately drained, they are suited to many kinds of crops and can be used intensively. Corn, sorghum, soybeans, and other row crops can be grown every year.

These soils are especially well suited to pasture because their supply of moisture is good. Suitable for permanent pasture are fescue, orchardgrass, bermudagrass, whiteclover, and lespedeza. Sudangrass or millet produces high yields of supplemental summer pasture.

Alfalfa and tobacco generally are not suited to undrained areas of these soils, but these crops can be grown if the soils are drained and are protected from flooding.

Although these soils produce fairly good yields without fertilizer, nearly all crops and pasture plants on the phosphatic Lindside soil respond well to applications of nitrogen and potash. In addition to these amendments, the nonphosphatic Lindside soil requires large amounts of phosphate.

Surface drainage and internal drainage can be improved on these soils in many places. Ponded areas can be drained by open ditches or tile. Most bottom land and areas along small drainageways can be drained by plowing to leave furrows, by alining rows, and by tilling in long, narrow bands parallel to the stream channels. Damage from flooding and sedimentation can be reduced in many places by straightening the stream channels. Good tilth can be maintained if the soils are not tilled or grazed when they are wet.

#### CAPABILITY UNIT IIe-1

The soils in this capability unit are deep and well drained. They have a silt loam or loam surface layer and a friable silty clay loam or clay loam subsoil. The soils are—

Armour silt loam, 2 to 5 percent slopes.
Armour silt loam, 2 to 5 percent slopes, eroded.
Etowah silt loam, 2 to 5 percent slopes.
Hagerstown silt loam, 2 to 5 percent slopes, eroded.
Hermitage silt loam, 2 to 5 percent slopes.
Hermitage silt loam, 2 to 5 percent slopes, eroded.
Hicks silt loam, 2 to 5 percent slopes, eroded.
Humphreys silt loam, 2 to 5 percent slopes.
Maury silt loam, 2 to 5 percent slopes.
Maury silt loam, 2 to 5 percent slopes, eroded.
Mountview silt loam, 2 to 5 percent slopes.
Stiversville silt loam, 2 to 5 percent slopes, eroded.

These soils have a thick root zone that is easily penetrated by air, water, and plant roots. Most of the soils are moderately high in organic matter and have a moderately high to high available moisture capacity. They are some of the most productive soils on uplands and stream terraces in the county.

These soils are well suited to many kinds of crops and pasture, and they can be cultivated frequently. Row crops can be grown 1 year in 2, or as much as 50 percent of the time, but they should not be grown more than 2 years in succession. These soils are well suited to a cropping system in which corn or another row crop is followed by a small grain and then pasture or hay is grown for 2 or more years (figs. 24 and 25).

*Figure 24.*—**Rotational pasture on Maury silt loam, 2 to 5 percent slopes.**

*Figure 25.*—**Annual lespedeza hay on Armour silt loam, 2 to 5 percent slopes.**

These soils are easy to keep in good tilth, but they are susceptible to erosion unless they are well managed. In most areas a few severely eroded spots have a fine-textured surface layer that crusts and forms hard clods if the soil is worked when it is wet. These spots require heavier rates of seeding than do less eroded areas, and more fertilizer and organic matter. Contour cultivation is effective in controlling erosion. On long slopes the hazard of erosion can be reduced by terracing or contour stripcropping. Diversions will protect many areas that receive excess runoff from steep slopes. Natural draws provide excellent sites for sod waterways.

#### CAPABILITY UNIT IIe-2

The soils in this capability unit are moderately well drained and are on gently sloping uplands and stream terraces. These soils have a dense layer, or in some places a cemented layer, normally at a depth of 16 to 30 inches. The soils are—

- Captina silt loam, phosphatic, 2 to 5 percent slopes.
- Captina silt loam, phosphatic, 2 to 5 percent slopes, eroded.
- Dickson silt loam, 2 to 5 percent slopes.
- Donerail silt loam, 2 to 5 percent slopes.
- Donerail silt loam, 2 to 5 percent slopes, eroded.
- Donerail silt loam, concretionary, 2 to 5 percent slopes, eroded.
- Mercer silt loam, 2 to 5 percent slopes, eroded.

These soils have a grayish-brown to dark-brown silt loam surface layer and a brown to light yellowish-brown silty clay loam subsoil. The subsoil overlies a highly mottled, compact layer, which restricts the movement of air and water and the penetration of plant roots. During periods of highest rainfall, a perched water table above the compact layer generally saturates the soils for fairly long periods. During prolonged dry periods, however, the soils dry out, and most crops and pastures are damaged by drought. All of these soils are medium acid to strongly acid and are moderate to moderately low in fertility. The Donerail and Captina soils, however, are medium to high in phosphorus.

The compact layer in these soils somewhat limits their use. Because the soils dry out quickly, yields of most summer annuals are reduced during prolonged dry periods. Corn, sorghum, soybeans, and other row crops can be grown satisfactorily as much as 50 percent of the time, but they should not be grown more than 2 years in succession. These soils are best suited to short cropping systems in which a row crop is followed by a small grain, and then sod or hay is grown for 2 or more years. Small grains grow and mature during seasons of higher rainfall and therefore generally give proportionally higher yields than do most summer annuals.

Leaching and erosion can be controlled by keeping the soils in winter cover or a green-manure crop as much as possible. Crimson clover, vetch, ryegrass, or a small grain following each row crop are effective for this purpose.

These soils produce good pasture and are well suited to fescue, orchardgrass, bermudagrass, whiteclover, and annual lespedeza. They are poorly suited to alfalfa, however, because they have a limited root zone, unfavorable moisture content, and low fertility.

Liming and fertilizing are important in establishing and maintaining most crops and pasture. On all of these soils, crops respond to lime, nitrogen, and potash. On the Captina and Donerail soils, however, crops do not respond so well to phosphate fertilizer.

Because these soils dry out slowly in the spring, seedbed preparation and planting are delayed. Consequently, farmers tend to till the soils when they are too wet. Contour cultivating, terracing, and contour stripcropping are effective in controlling erosion. Excess runoff can be diverted from many areas by diversion ditches, and natural draws provide excellent sites for sod waterways. Damage from trampling can be prevented by carefully controlled grazing, especially when the soils are wet. Drainage ditches can be dug to remove excess surface water in seepage areas.

#### CAPABILITY UNIT IIe-3

The soils in this capability unit are moderately deep to deep and are cherty or gravelly. They occur on gently sloping uplands, stream terraces, toe slopes, and fans. The soils are—

- Armour cherty silt loam, 2 to 5 percent slopes.
- Humphreys cherty silt loam, 2 to 5 percent slopes.
- Mountview silt loam, shallow, 2 to 5 percent slopes.
- Mountview silt loam, shallow, 2 to 5 percent slopes, eroded.

These soils are medium acid to strongly acid, are moderate to low in natural fertility, and are moderately rapid to rapid in permeability. They have a moderate to moderately low available moisture capacity. The Armour soil is medium to high in phosphorus.

The soils are fairly well suited to commonly grown crops and pasture and are well suited to moderately intensive use. In many places chert or gravel is on the surface and in the soil, and yields of most crops are reduced by drought during the growing season. Under good management, these soils produce fair to good yields of corn, sorghum, tobacco, small grains, and alfalfa. They are well suited to cropping systems in which a row crop is grown for not more than 2 years in succession and is followed by grasses and legumes for 2 or more years. After each row crop is harvested, a winter cover of crimson clover, vetch, or small grain is beneficial.

These soils produce good hay and pasture. They are suited to fescue, orchardgrass, bermudagrass, annual lespedeza, white clover, red clover, alfalfa, sericea lespedeza, and most other grasses and legumes. Fairly good supplemental pasture of sudangrass and millet can be grown, but the yields are usually reduced by summer drought.

Crops grown on all of these soils respond to lime and fertilizer. Lime and potash are especially needed to maintain good yields of legumes.

Chert or gravel on the surface interferes with tillage, mowing, and other operations on many of these soils. Consequently, it is best to plant crops that require only a small amount of tillage and to use machinery less likely to be damaged by the chert. Effective in controlling erosion are terraces, diversions, contour cultivation, and contour stripcropping on long uniform slopes. Natural draws provide excellent sites to establish sod waterways for terrace and diversion outlets. Fertility and tilth can be improved by using barnyard manure, green-manure crops, and rotations that include crops that return large amounts of organic material to the soil.

#### CAPABILITY UNIT IIw-1

The soils in this capability unit are nearly black and are moderately well drained. They are along small drainageways, in depressions, and on toe slopes and fans. Surface drainage is generally slow, and most areas are likely to be flooded or ponded for short periods. The soils are—

Egam silt loam, phosphatic.
Lanton silt loam, phosphatic.
Sees silty clay loam.

Most of these soils contain much clay, especially in the subsoil. They are well aerated in the upper 16 to 24 inches, but below this depth they are saturated for long periods and are mottled in varying degrees. Most of these soils are high in natural fertility, are medium to high in phosphorus, and are high in available moisture capacity. They range from medium acid to alkaline, but most of the soils are about neutral.

A relatively high, fluctuating water table and the hazard of flooding or ponding limit the kinds of crops and pasture plants that can be grown on these soils. If adequately drained, most of these soils can be used continuously for corn, sorghum, soybeans, and other row crops. Small grains generally grow well, but these plants tend to lodge and mature later than they do on well-drained soils of uplands. The soils are generally wet late in spring, and the harvest of small grains with heavy machinery is delayed.

Because these soils are naturally fertile and have a high available moisture capacity, they are valuable for pasture. Fescue, bermudagrass, whiteclover, and annual lespedeza are well suited pasture plants. Although alfalfa grows well in some places, it generally is damaged by the excess moisture, which encourages diseases and parasites. Because the soils remain moist during dry periods, they produce high yields of sudangrass and millet in supplemental pasture.

Crops grown on these soils respond well to fertilizer. Nitrogen and potassium are the plant nutrients most needed for high yields. If the soils are planted to row crops continuously, organic matter can be maintained by turning under crop residue.

Surface and internal drainage can be improved in many places. Depressions in bottom land can be drained by plowing to leave furrows, by alining rows, and by plowing and cultivating in long, narrow bands that parallel streams. Generally, ponded areas can be drained by open ditches. Flood damage can be reduced by alining stream channels and clearing and stabilizing streambanks. These soils clod or puddle if tilled when wet, and they harden when they dry. Therefore, to maintain good tilth, they should be tilled within a fairly narrow range of moisture content. When the soils are wet, grazing should be carefully controlled to prevent damage from trampling.

#### CAPABILITY UNIT IIw-2

Captina silt loam, phosphatic, 0 to 2 percent slopes, is the only soil in this capability unit. This nearly level soil is on stream terraces and has a fragipan about 2 feet below the surface.

The plow layer is brown or dark-brown, friable silt loam. Above a compact, highly mottled fragipan, the subsoil is yellowish-brown silty clay loam. The fragipan restricts the movement of air and water and the penetration of plant roots. In winter and spring a perched water table above the fragipan keeps the soil saturated for long periods, but in summer the soil dries out and cannot supply enough moisture to most crops and pastures.

This soil is medium acid to strongly acid, is moderate in natural fertility, and is medium to high in phosphorus.

Row crops can be grown every year on this soil if it is well fertilized and if large amounts of cornstalks or other crop residue are returned to it. Short cropping systems, however, may be better for this soil than row crops grown every year. A rotation of corn or sorghum followed by lespedeza hay is especially well suited. Yields of soybeans are good. Yields of small grains generally are fair to good, but these crops may drown out in the low spots.

This soil also produces good pasture and is suited to fescue, orchardgrass, bermudagrass, whiteclover, and annual lespedeza. Because of the shallow root zone and the perched water table, alfalfa does not grow well.

Most crops require proper liming and fertilizing for good yields, and they respond to lime, nitrogen, and potash. The soil generally is well supplied with phosphorus.

Good management includes removing excess water, maintaining good tilth, and selecting water-tolerant and drought-resistant plants. To keep the soil in good tilth, special care should be taken not to till it when it is too wet. Wetness in spring delays field operations in many places, but these areas can be drained by open ditches or tile. Pastures should be protected from trampling, especially when they are wet.

#### CAPABILITY UNIT IIs-1

The soils in this capability unit are on first bottoms, along small drainageways, and in depressions. Most areas are subject to flooding or ponding and are likely to receive fresh deposits of cherty sediments. The soils are—

Huntington cherty silt loam, phosphatic.
Lindside cherty silt loam.
Lindside cherty silt loam, phosphatic.

The Lindside soils have a relatively high water table and are not well drained, but minor improvements in drainage make them suited to most crops. Most of the soils in this capability unit are medium to high in phosphorus. Chert or gravel on the surface and in the soil interferes with tillage.

If fertility is maintained and the soils are not flooded or ponded, row crops can be grown every year. Small grains can be grown after a row crop in areas where flooding and ponding are not a great hazard. Corn, sorghum, soybeans, and annual lespedeza are well suited. Alfalfa, sericea lespedeza, and tobacco can be grown successfully in fields that have been adequately drained and are not likely to be flooded.

These soils are well suited to pasture and produce high yields of forage. Fescue, bermudagrass, orchardgrass, whiteclover, lespedeza, and alfalfa are suitable pasture plants. Sudangrass and millet make good supplemental pasture.

Crops on Lindside cherty silt loam, a nonphosphatic soil, show good response to a complete fertilizer. Nitrogen and potassium are the main plant nutrients needed on the phosphatic soils. Soils of this capability unit ordinarily do not need lime, and tests should be made before applying lime to them.

Although these soils are level to gently sloping, the chert or gravel interferes with tillage and may damage some farm equipment. The soils can be tilled within a wide range of moisture content without serious damage to tilth. Surface and internal drainage can be improved in some areas by digging open ditches, by laying tile drains, by alining rows, and by plowing and cultivating in long, narrow bands that parallel the stream channel. In places diversions would protect these soils from sediments or overwash from adjoining upland slopes.

CAPABILITY UNIT IIIe-1

The soils in this capability unit are on sloping uplands, terraces, toe slopes, and fans. They are moderately deep to deep and are well drained. The soils are—

Armour silt loam, 5 to 12 percent slopes.
Armour silt loam, 5 to 12 percent slopes, eroded.
Culleoka silt loam, 5 to 12 percent slopes.
Etowah silt loam, 5 to 12 percent slopes, eroded.
Hagerstown silt loam, 5 to 12 percent slopes, eroded.
Hicks silt loam, 5 to 12 percent slopes, eroded.
Humphreys silt loam, 5 to 12 percent slopes, eroded.
Maury silt loam, 5 to 12 percent slopes, eroded.
Mountview silt loam, 5 to 12 percent slopes, eroded.
Stiversville silt loam, 5 to 12 percent slopes, eroded.

These soils have a surface layer of brown or dark-brown silt loam. Their subsoil is friable and ranges from brown to red and from silty clay loam to silty clay. These soils are generally in good tilth and are easily penetrated by air, water, and plant roots. They range from medium acid to strongly acid. In areas that are not severely eroded, the available moisture capacity is moderate to moderately high.

These soils are well suited to many kinds of crops. They respond to good management and can be cultivated regularly. Once every 3 or 4 years, corn, sorghum, soybeans, tobacco, or other row crops can be grown (fig. 26). Suitable cropping systems for these soils are (1) a row crop followed by a small grain, and then pasture grown for 2 or more years; and (2) a row crop followed by alfalfa for 3 or more years. On many farms some areas of these soils are more suitable for pasture or hay than for row crops, especially if the areas are small and are next to steeper, less productive soils. Vetch, crimson clover, or small grains are effective winter cover and green-manure crops,

*Figure 26.*—**Tobacco in foreground on gently sloping Armour soil. Alfalfa hay in background on sloping Maury soil.**

and they protect these soils from erosion and add organic matter.

These soils are among the best in the county for alfalfa, and they are suited to all other common hay crops. In many places the life and yields of most hay crops can be increased by seeding small grain lightly in areas where stands are thin.

These soils produce good pasture and are well suited to orchardgrass, fescue, bermudagrass, redtop, whiteclover, alfalfa, annual lespedeza, sericea lespedeza, and other grasses and legumes.

On most of these soils, crops respond well to lime and complete fertilizer, but on the soils that are medium to high in phosphorus, crops show little response to additions of that element. Borax is generally required to maintain high yields of alfalfa. Deficiencies of some of the minor elements, especially of zinc in corn, have been detected in crops on some of the more highly phosphatic soils in this unit.

These soils are relatively easy to work and to maintain in good tilth and fertility. Diversions, terraces, stripcropping, and contour cultivating are effective in protecting these soils from erosion. In many places natural draws provide excellent sites for sod waterways.

CAPABILITY UNIT IIIe-2

In this capability unit are clayey soils that formed from limestone and are well drained to moderately well drained. The soils are—

Ashwood silty clay loam, 2 to 5 percent slopes.
Braxton cherty silt loam, 2 to 5 percent slopes, eroded.
Hampshire-Colbert silt loams, 2 to 5 percent slopes, eroded.
Hampshire silt loam, 2 to 5 percent slopes.
Hampshire silt loam, 2 to 5 percent slopes, eroded.
Mimosa silt loam, 2 to 5 percent slopes, eroded.
Talbott silty clay loam, 2 to 5 percent slopes, eroded.

The surface layer of these soils is brown or dark-brown silt loam or silty clay loam, and the subsoil is yellowish-brown or reddish-brown, firm and plastic silty clay or clay. The soils range from shallow to deep over limestone bedrock, and a few outcrops are common in most areas. These soils have a moderate to low available moisture capacity. All are medium acid to strongly acid except the Ashwood soil, which is slightly acid to alkaline.

Although these soils are fairly well suited to most crops commonly grown, they are probably best suited to small grains and pasture. Water is held tightly by these clayey soils and is not readily available to plants. Consequently, most crops, especially summer annuals, grow little during dry periods. The heavy clay subsoil also limits the root zone of many plants and slows movement of air and water. Corn, tobacco, grain sorghum, and other row crops can be grown once every 3 or 4 years, but yields are generally low to medium. A suitable cropping system is a row crop followed by a small grain, and then 2 or more years of sod or hay. Water soaks slowly into these clayey soils and runs off rapidly. Therefore, to control erosion, all cropping systems should provide a cover crop after each row crop.

These soils are well suited to most grasses and legumes grown in the county. Suitable pasture plants are tall fescue, orchardgrass, bermudagrass, bluegrass, whiteclover, annual lespedeza, and sericea lespedeza. Alfalfa can be grown successfully for hay or in mixtures for permanent pasture.

Lime, nitrogen, and potash are the amendments most needed for crops and pasture. In addition, most crops and pasture on the Talbott soil respond well to phosphate. For alfalfa, boron is also needed on all of these soils to establish and maintain good stands.

Good tilth is not particularly difficult to maintain, but special care should be taken not to till these soils when they are too wet. The soils can absorb and hold more moisture available to plants if their supply of organic matter is good. Terraces or contour stripcropping is effective in controlling erosion where row crops are grown. In many places where the hazard of erosion is greatest, diversions remove concentrated runoff to more suitable outlets. Natural draws are excellent sites for sod waterways.

### CAPABILITY UNIT IIIe-3

The soils in this capability unit have a fragipan, or compact layer, at about 2 feet below the surface. The soils are—

- Captina silt loam, phosphatic, 5 to 12 percent slopes, eroded.
- Donerail silt loam, 5 to 12 percent slopes, eroded.
- Donerail silt loam, concretionary, 5 to 12 percent slopes, eroded.

These soils have a dark grayish-brown to yellowish-brown silt loam surface layer. Above the highly mottled fragipan, or compact layer, their subsoil ranges from yellowish brown to yellowish red and from silty clay loam to silty clay. All of these soils are slowly to very slowly permeable, are moderately low to low in available moisture capacity, and are medium to high in phosphorus. The concretionary Donerail soil has a hard, cemented layer that is high in iron, manganese, and phosphorus.

The fragipan restricts the penetration of plant roots and the movement of air and water. Consequently, excess water accumulates above this layer during wet periods, but the soils dry out rapidly during dry periods. Suitable crops are corn, sorghum, soybeans, small grains, sericea lespedeza, and annual lespedeza. Small grains grow and mature during periods of highest rainfall and therefore produce higher yields than row crops. Suitable cropping systems are (1) a row crop, a small grain, and sod for 2 or more years; and (2) a row crop followed by a hay crop for 3 or more years. To reduce leaching and erosion, a cover crop should be kept on these soils as much of the time as possible. Crimson clover, vetch, and small grains are good winter cover crops that can be seeded after each row crop.

These soils can produce good yields of pasture and are suited to fescue, orchardgrass, bermudagrass, redtop, whiteclover, sericea lespedeza, and annual lespedeza. Alfalfa is not generally grown for hay or in pasture mixtures, but it can be grown successfully in short rotations.

Lime and fertilizer are needed for all crops and pasture plants on these soils, but the response to phosphate is less than to other fertilizers.

These strongly sloping, very slowly permeable soils are highly susceptible to erosion. In areas that are planted to row crops, contour stripcropping, terracing, or a combination of these, are effective in slowing runoff and controlling erosion. Diversions can be used in many places to carry excess water to safe outlets. Natural drains provide good sites for sod waterways.

### CAPABILITY UNIT IIIe-4

The soils in this capability unit are cherty or gravelly, are moderately deep to deep, and are well drained. The soils are—

- Armour cherty silt loam, 5 to 12 percent slopes, eroded.
- Baxter cherty silt loam, 5 to 12 percent slopes.
- Frankstown cherty silt loam, 5 to 12 percent slopes.
- Greendale cherty silt loam, 2 to 12 percent slopes.
- Humphreys cherty silt loam, 5 to 12 percent slopes, eroded.
- Mountview silt loam, shallow, 5 to 12 percent slopes.
- Mountview silt loam, shallow, 5 to 12 percent slopes, eroded.

Chert or gravel is scattered over the surface and throughout most of these soils. The amount of chert or gravel in the soil varies, but it generally increases with depth. The Mountview soils are relatively free of chert in the upper 14 to 20 inches, but they are underlain by cherty soil. The soils in this unit are medium acid to strongly acid. They are moderately rapid to rapid in permeability and have a moderate to low available moisture capacity. The Armour and Frankstown soils generally range from medium to high in phosphorus.

All common crops can be grown on these soils, but yields are frequently reduced by drought during summer and fall. If the soils are well managed, they produce fair to good yields of corn, sorghum, tobacco, small grains, and annual lespedeza. Best yields can be obtained by growing a row crop only once every 3 or 4 years in cropping systems in which the row crop is followed by a small grain and then pasture, or a row crop is followed by hay for 3 or more years. Alfalfa can be grown, but a high level of management is required to obtain good yields. Some truck crops, especially tomatoes, grow satisfactorily on many of the soils in this unit.

These soils produce good pasture of most grasses and legumes, including orchardgrass, fescue, bermudagrass, whiteclover, sericea lespedeza, annual lespedeza, and alfalfa.

Lime, nitrogen, and potash are most needed for crops and pasture. In addition, phosphate is needed on all soils except the Armour and Frankstown soils. Borax is also needed to maintain good stands and yields of alfalfa.

Because of the chert or gravel, tillage is fairly difficult, but it can be made easier by planting crops that require only a small amount of tillage and by using machinery that is not likely to be damaged by chert and gravel. Diversions, terraces, contour stripcropping, and contour cultivating are effective in retarding excess runoff and controlling erosion. In most places natural drains seeded to permanent sod provide suitable outlets for diversions and terraces. Most areas of the Greendale soil are in narrow, V-shaped valleys that are relatively inaccessible and are difficult to cultivate. These areas are probably best suited to trees or to permanent pasture.

#### CAPABILITY UNIT IIIe-5

The soils in this capability unit have developed from clayey limestone on gently sloping and sloping uplands. The soils are—

Dowellton silt loam, 2 to 5 percent slopes.
Fairmount silty clay loam, 2 to 10 percent slopes.

These soils have a grayish-brown to very dark grayish-brown silt loam or silty clay loam surface layer and a slowly permeable heavy silty clay or clay subsoil that is highly mottled with yellow, brown, gray, olive, and red. In the Fairmount soil, clayey limestone generally is at a depth of 14 to 24 inches, but a few outcrops are common. Most of the Dowellton soil is on broad upland flats and is deeper and more poorly drained than the Fairmount soil. Both of these soils are moderately low to low in natural fertility. Most areas are slightly acid to neutral, but a few are strongly acid.

These soils are poorly suited to row crops and are hard to work. Small grains, sorghum, and soybeans grow fairly well. Cultivated areas can be planted to a small grain that is followed by pasture for 3 or more years. If adequately drained, the Dowellton soil in upland depressions or on broad, level, upland flats can be used more intensively.

These soils are better suited to permanent pasture or hay than to row crops. Fescue, bermudagrass, whiteclover, annual lespedeza, and sericea lespedeza are suitable pasture grasses and legumes. Pastures are easily damaged by overgrazing when the soils are dry and by trampling when they are wet.

Yields of crops and forage can be increased by adding fertilizer, but crops on these soils respond much less to fertilizer than do crops on the deeper, more permeable soils. In places crops on the Dowellton soil do not respond to phosphate.

Good tilth is difficult to maintain unless these soils are tilled within a narrow range of moisture content and unless crop residue is turned under to maintain organic matter. Terraces and diversions are difficult to construct and maintain on most slopes because the soils are shallow to bedrock and have a heavy clay subsoil. If row crops are planted on these slopes, contour stripcropping is the best practice. Natural draws are satisfactory for permanent sod waterways. Surface water can be removed from flats or ponded areas by open ditches. Carefully controlled grazing is necessary to prevent damage to pastures by overgrazing and trampling.

#### CAPABILITY UNIT IIIw-1

In this capability unit are somewhat poorly drained and poorly drained soils on first bottoms. The soils are—

Dunning silt loam, phosphatic.
Melvin silt loam, phosphatic.

Most areas of these soils are likely to be flooded or ponded and are kept wet for a long time by seepage or by a water table that stays at or near the surface. These soils generally are medium to high in phosphorus. The Dunning soil ranges from silt loam to silty clay. It is slightly acid to neutral and contains a moderate to moderately large amount of organic matter. The Melvin soil is generally silt loam and is slightly acid to medium acid. Both of the soils in this unit have a very high available moisture capacity.

Unless these soils are artificially drained, their suitability for crops and pasture is limited. If they are adequately drained, corn, sorghum, soybeans, and other row crops can be grown almost continuously, but harvest in fall is usually difficult because of wetness.

These soils are especially valuable for summer pasture. They remain moist through dry periods of the growing season and thus produce high yields of forage. But pastures are likely to be damaged by trampling during periods of high rainfall. Fescue, bermudagrass, whiteclover, and annual lespedeza are well suited for permanent pasture, and sudangrass and millet produce high yields of forage for supplemental grazing in summer. Alfalfa is poorly suited.

These soils are well supplied with lime. Nitrogen and potash are the fertilizers most needed for crops and pasture.

The soils are fairly easy to work when they are not too wet. Under natural drainage they are so wet that tillage is usually delayed in the spring, and harvesting in fall is difficult, but they can be adequately drained for crops and pasture by digging open ditches, by laying tile, by bedding the sod in long narrow bands, or by planting crops in rows parallel to the stream channel. Very important, especially on the Dunning soil, is tilling within a narrow range of moisture content to prevent hard clods from forming when the soil dries. Flood damage can be reduced in many places by alining stream channels and by clearing, shaping, and sodding streambanks. Most areas along small drainageways provide excellent sites for sod waterways.

#### CAPABILITY UNIT IIIw-2

In this capability unit are somewhat poorly drained, slowly permeable soils on nearly level terraces. The soils are—

Taft silt loam, 0 to 8 percent slopes.
Taft silt loam, phosphatic.

These soils have a brown or dark grayish-brown silt loam surface layer and a subsoil that is highly mottled, grayish-brown to yellowish-brown silty clay loam or silty clay. They have a hardpan at a depth of 16 to 30 inches. Surface runoff and internal drainage are slow to very slow. Consequently, the soils stay saturated during winter and spring, and in most places they are ponded. In summer and fall, however, the soils generally dry out, and most crops and pasture are damaged by drought. The soils are medium to low in organic matter and natural fertility and are medium acid to strongly acid. Most areas are medium to high in phosphorus.

Imperfect drainage and slow permeability limit the kinds of crops that can grow on these soils. Under natural drainage, crop failures are common, but adequately drained fields produce fair to good yields of corn, sorghum, soybeans, small grains, and annual lespedeza. The soils are suited to short cropping systems of a row crop followed by 1 or more years of pasture, a row crop followed by a small grain and annual lespedeza, or a row crop or a small grain followed by lespedeza hay. Row crops should not be grown more than 2 years in succession.

Tall fescue, bermudagrass, whiteclover, and annual lespedeza are suitable pasture plants. Although these soils produce medium to good yields of pasture, they are easily damaged by overgrazing when they are dry and by trampling when they are wet.

Lime and fertilizer are needed for all crops and pastures, and complete fertilizer is needed on the nonphosphatic soil. The response to phosphate is low on the phosphatic soil. Lime and potash are especially needed for most legumes.

These soils are fairly easy to work, but wetness often delays tillage in spring. Also, they are often wet late in fall at harvesttime. Drainage can be improved by open ditches, by bedding the soil in long narrow bands, and by planting crops in rows that parallel natural drains. Because the soils are slowly permeable, tile drainage generally does not work. Diversions can be used in many places to divert excess runoff from higher slopes. Carefully controlled grazing is desirable to prevent damage to pasture from overgrazing and trampling.

#### CAPABILITY UNIT IVe-1

In this capability unit are moderately deep to deep soils on uplands and stream terraces. These soils have a friable subsoil. They are—

Armour silty clay loam, 5 to 12 percent slopes, severely eroded.
Culleoka silt loam, 12 to 20 percent slopes.
Hicks silty clay loam, 5 to 12 percent slopes, severely eroded.
Maury silty clay loam, 5 to 12 percent slopes, severely eroded.
Stiversville clay loam, 5 to 12 percent slopes, severely eroded.
Stiversville silt loam, 12 to 20 percent slopes, eroded.

These soils range from slightly eroded to severely eroded. Unless they are severely eroded, these soils have a brown to dark-brown silt loam surface layer. The subsoil ranges from yellowish brown to red in color and from silty clay loam to clay in texture. The surface layer of the severely eroded soils consists largely of subsoil material that ranges from silty clay loam to silty clay.

These soils are suited to many kinds of crops and pasture. Corn, grain sorghum, soybeans, and tobacco can be grown in cropping systems lasting from 4 to 6 years. A row crop, a small grain, and then pasture or hay for 3 or more years is suitable; or the cropping system can consist entirely of a small grain and pasture or hay of legumes and grasses. In these cropping systems, any of the commonly grown row crops and pasture plants can be used. These soils are among the best in the county for alfalfa.

The soils are also valuable for pasture that is not grown in a cropping system. If they are adequately fertilized and otherwise well managed, they produce good pasture of high carrying capacity.

For most crops grown on these soils, lime, nitrogen, and potash are needed more than other amendments. Soils that are medium to high in phosphorus should be tested before phosphate fertilizer is added. Boron is generally needed to help establish and maintain alfalfa.

The control of water is important on these soils. Contour stripcropping and contour cultivating are good practices for reducing runoff. In many places, diversions can be used to carry excess runoff to safe outlets. Natural draws, seeded or left in sod, provide good drainage outlets. The severely eroded soils crust and form hard clods if they are worked when wet. Their tilth and available moisture capacity can be improved by seeding and fertilizing at high rates, by plowing under crop residue, and by tilling within a fairly narrow range of moisture content.

#### CAPABILITY UNIT IVe-2

The soils in this capability unit are on sloping uplands. They have a clayey subsoil and generally range from 1½ to 5 feet in depth to bedrock, but there are a few outcrops. The soils are—

Ashwood silty clay loam, 5 to 12 percent slopes.
Braxton cherty silt loam, 5 to 12 percent slopes, eroded.
Hampshire-Colbert silt loams, 5 to 12 percent slopes, eroded.
Hampshire silt loam, 5 to 12 percent slopes, eroded.
Inman silt loam, 5 to 12 percent slopes.
Mimosa cherty silt loam, 5 to 12 percent slopes, eroded.
Mimosa silt loam, 5 to 12 percent slopes, eroded.
Talbott silty clay, 2 to 5 percent slopes, severely eroded.
Talbott silty clay loam, 5 to 12 percent slopes, eroded.

If not severely eroded, these soils have a dark-brown silt loam surface layer. The subsoil is yellowish-brown to red, slowly permeable silty clay or clay that is generally mottled with gray, brown, or olive in the lower part. All except the Talbott soils are medium to high in phosphorus. Most of these soils are medium acid to strongly acid, but the Ashwood soils are slightly acid to slightly alkaline. All of these soils are low in available moisture capacity. The severely eroded soils are hard to work; their plow layer is sticky when wet and hard and cloddy when dry.

These soils are only fair for corn, tobacco, and other row crops and at best produce only medium yields. They produce good yields of small grains, however, because the grain matures when moisture is plentiful. These soils erode readily and should not be planted to a cultivated crop more than once every 4 to 6 years. Suitable cropping systems are (1) a row crop followed by a small grain and then sod for 3 or more years, and (2) a row crop followed by hay or sod 4 or more years. A small grain is generally more profitable than a row crop in the cropping system.

These soils are well suited to most commonly grown pasture grasses and legumes. Under good management, fescue, orchardgrass, bermudagrass, whiteclover, annual lespedeza, and sericea lespedeza grow well. Alfalfa can be grown successfully, but good stands are somewhat difficult to establish and maintain.

Crops and pasture grown on most of these soils respond well to lime and to nitrogen and potash fertilizer. In addition, crops on the Talbott soils respond to phosphate.

Practices to control water are important on most of these erosive soils. Terraces, diversions, contour stripcropping, and contour cultivating reduce runoff. After each row crop is harvested, planting a winter cover crop of crimson clover, vetch, or a small grain keeps the soils protected when rainfall is highest. Plowing under the cover crop helps maintain organic matter. Most of the cherty soils and those with outcrops of bedrock are best suited to crops that need only a small amount of tillage. Farm machinery used on these soils may be damaged by the rocks or chert. The fine-textured surface layer of some of these soils crusts when it is dry and forms hard clods if it is tilled when wet. The tilth and available moisture capacity of these soils can be improved by maintaining organic matter and working the soils only within a fairly narrow range of moisture content. High rates of seeding and fertilizing will help to insure good stands and yields.

#### CAPABILITY UNIT IVe-3

In this capability unit are sloping to moderately steep, cherty soils that are slightly to severely eroded. The soils are—

Armour cherty silt loam, 12 to 20 percent slopes, eroded.
Armour cherty silty clay loam, 5 to 12 percent slopes, severely eroded.
Baxter cherty silt loam, 12 to 20 percent slopes.
Baxter cherty silt loam, 12 to 20 percent slopes, eroded.
Baxter cherty silty clay loam, 5 to 12 percent slopes, severely eroded.
Dellrose cherty silt loam, 12 to 20 percent slopes.
Frankstown cherty silt loam, 12 to 20 percent slopes.
Humphreys cherty silt loam, 12 to 20 percent slopes, eroded.
Mountview silt loam, shallow, 5 to 12 percent slopes, severely eroded.
Mountview silt loam, shallow, 12 to 20 percent slopes.
Mountview silt loam, shallow, 12 to 20 percent slopes, eroded.

The soils that are not severely eroded have a dark-brown to brown cherty silt loam surface layer. The subsoil ranges from yellowish brown to red in color and from silty clay loam to clay in texture. The chert generally increases in size and amount with increasing depth. These soils are medium acid to strongly acid. They are moderate to low in natural fertility, are moderately rapid to rapid in permeability, and are moderate to low in available moisture capacity. The Armour, Dellrose, and Frankstown soils are medium to high in phosphorus.

Most of the commonly grown crops and pasture plants are fairly well suited to these soils (fig. 27). The yields of most summer annuals generally are medium to low because available moisture capacity is low. The effects of drought are generally more severe on the severely eroded soils. If the soils in this unit are well managed, most of them produce fair to good yields of corn, sorghum, tobacco, small grains, and hay. A suitable cropping system consists of a row crop followed by a small grain, and then hay or pasture for 3 or more years. Sericea lespedeza and annual lespedeza are suitable hay crops. Alfalfa can be grown successfully on most of the soils, but it requires a high level of management.

Because of summer drought, erosion, and the difficulty of using farm machinery, most of these soils are better suited to permanent pasture or hay than to row crops. All commonly grown grasses and legumes are suitable, including orchardgrass, fescue, bermudagrass, bluegrass, redtop, whiteclover, alfalfa, sericea lespedeza, and annual lespedeza. High yields of pasture can be maintained by good management.

Most crops and pastures respond well to applications of lime. On the Armour, Dellrose, and Frankstown soils crops do not respond to phosphate, but on the other soils crops respond well to a complete fertilizer. Nitrogen and potash are the plant nutrients most needed. Borax is also needed to maintain good stands of alfalfa.

*Figure 27.*—**Corn on Armour soil in foreground, pasture on Dellrose soil, and trees on Sulphura soil in background.**

The fine-textured surface layer of the severely eroded soils, the moderately steep slopes, and the chert on the surface make these soils difficult to work and to conserve. Most of them are too steep for terraces, but slopes of less than 12 percent can be terraced and used effectively for row crops. The tilth and available moisture capacity of the severely eroded soils can be improved greatly by growing green-manure crops frequently and by carefully managing crop residue. Seeding and fertilizing at high rates will help to insure good stands. On all of these soils, contour stripcropping, contour cultivating, and diversions are effective in retarding runoff and in controlling erosion. Most natural draws are good outlets for diversions and terraces if they are kept sodded. In addition to fertilization, mowing to control weeds and careful control of grazing are important in protecting and maintaining pastures.

#### CAPABILITY UNIT IVw-1

Robertsville silt loam, phosphatic, is the only soil in this capability unit. It is on poorly drained stream terraces that are nearly level or slightly depressional.

This light-colored, dominantly gray soil has a fragipan at a depth of 15 to 30 inches, or it has a very slowly permeable clay subsoil that restricts the penetration of plant roots and the movement of air and water. Surface runoff is slow, and in most places ponding is common. The soil generally remains saturated during winter and spring and becomes extremely dry during prolonged dry periods in summer and fall. This soil is medium acid to strongly acid and is moderate to low in natural fertility. In most places it is medium to high in phosphorus.

Most areas of this soil are poorly suited to row crops. With adequate surface drainage, fair yields of a few crops can be produced. Most suitable are soybeans or another summer annual that can be planted late in the spring and harvested early in the fall. Small grains grow satisfactorily in some places, but in most places they are waterlogged in winter. Waterlogging also often delays harvesting with heavy machinery.

This soil is best suited to water-tolerant permanent pasture. Fescue, redtop, whiteclover, and annual lespedeza are suitable pasture plants. Sudangrass and millet are suitable for supplemental summer pasture.

Lime and potash are needed for satisfactory yields of all crops and pastures. Because most of the soil is medium to high in phosphorus, crops on it may not respond to phosphate fertilizer.

This soil is easily worked when it contains the proper amount of moisture. Erosion is not a problem. Excess surface water can be removed by open ditches and by bedding in narrow bands. In some places, however, drainage may not be economical because of the distance to a suitable outlet. Wooded areas should remain in trees unless the need for additional pasture or crop acreage justifies the cost of clearing and draining.

#### CAPABILITY UNIT VIe-1

The soils in this capability unit are on moderately steep to steep uplands. They are moderately deep to deep and are moderately permeable throughout. The soils are—

- Baxter cherty silt loam, 20 to 30 percent slopes.
- Baxter cherty silty clay loam, 12 to 20 percent slopes, severely eroded.
- Culleoka silt loam, 12 to 20 percent slopes, severely eroded.
- Culleoka silt loam, 20 to 35 percent slopes.
- Culleoka silt loam, 20 to 35 percent slopes, severely eroded.
- Dellrose cherty silt loam, 20 to 30 percent slopes.
- Stiversville clay loam, 12 to 20 percent slopes, severely eroded.

Erosion has removed most or all of the surface layer from the soils on the moderately steep slopes. In places there are many shallow or a few deep gullies. Because they are in woods or have not been cultivated frequently, most of the steep soils in this unit are less eroded than are the less sloping soils. All except the Culleoka and Stiversville soils are cherty, and all except the Baxter soils are medium to high in phosphorus. The soils range from moderate to low in available moisture capacity.

Because slopes are steep and erosion is a hazard, these soils are poorly suited to crops that require tillage. Except for some of the more severely eroded areas, the soils are best suited to permanent pasture and hay. The severely eroded areas are best suited to trees.

All of the common grasses and legumes can be grown, including orchardgrass, fescue, bermudagrass, whiteclover, annual lespedeza, sericea lespedeza, and alfalfa.

To produce high yields of forage, all of these soils need lime, and most of them need large additions of complete fertilizer. Liming and fertilizing are difficult on the steeper soils in this unit. Most of the soils are medium to high in phosphorus and do not respond so well to that nutrient as they do to nitrogen and potash. Alfalfa generally needs annual applications of borax.

These soils should be plowed only to reseed pasture. Successive contour strips are best for establishing pastures on long steep slopes. In many places diversions can be used to drain excess runoff from gullies and other critical areas to sodded outlets.

#### CAPABILITY UNIT VIe-2

The soils in this capability unit are clayey, slowly permeable, and highly erodible. They are—

- Ashwood silty clay loam, 12 to 20 percent slopes.
- Braxton cherty silt loam, 12 to 20 percent slopes, eroded.
- Braxton cherty silty clay loam, 5 to 12 percent slopes, severely eroded.
- Braxton cherty silty clay loam, 12 to 20 percent slopes, severely eroded.
- Hampshire-Colbert silt loams, 12 to 20 percent slopes, eroded.
- Hampshire-Colbert silty clay loams, 5 to 12 percent slopes, severely eroded.
- Hampshire-Colbert silty clay loams, 12 to 20 percent slopes, severely eroded.
- Hampshire silt loam, 12 to 20 percent slopes, eroded.
- Hampshire silty clay loam, 5 to 12 percent slopes, severely eroded.
- Hampshire silty clay loam, 12 to 20 percent slopes, severely eroded.
- Inman silt loam, 12 to 20 percent slopes.
- Inman silt loam, 20 to 30 percent slopes.
- Inman silty clay loam, 5 to 12 percent slopes, severely eroded.
- Inman silty clay loam, 12 to 20 percent slopes, severely eroded.
- Mimosa cherty silt loam, 12 to 20 percent slopes, eroded.
- Mimosa cherty silt loam, 20 to 30 percent slopes, eroded.
- Mimosa cherty silty clay, 10 to 20 percent slopes, severely eroded.
- Mimosa silt loam, 12 to 20 percent slopes, eroded.
- Mimosa silty clay, 10 to 20 percent slopes, severely eroded.
- Talbott silty clay, 5 to 12 percent slopes, severely eroded.

These soils have slopes of 5 to 30 percent and are slightly to severely eroded. The soils that are not severely eroded generally have a dark-brown silt loam surface layer, but most of those that are severely eroded have a surface layer that is finer in texture and lighter in color and consists mostly of material from the subsoil. The subsoil ranges from yellowish-brown to red silty clay or clay and is generally mottled in the lower part with varying shades of gray, brown, or olive. Some of the soils are cherty, and some have a few outcrops of limestone bedrock. All are medium to high in phosphorus. They range from strongly acid to alkaline and from moderate to low in available moisture capacity.

These soils are poorly suited to crops that require tillage. Selected crops can be grown occasionally on some of the soils, but special practices and very careful management are required to control water and erosion. Drought severely reduces the yields of most crops. Cultivated areas are best suited to cropping systems in which a small grain is followed by sod or hay for 6 years or more.

These soils are best used for permanent pasture or hay. Alfalfa can be grown on some of the soils, but a good seedbed is generally difficult to prepare, and good stands are hard to establish and maintain. Fescue, bermudagrass, bluegrass, whiteclover, and lespedeza are well suited pasture plants. Yields are generally high in spring but are low in summer and fall because the soils are droughty.

Crops grown on these soils generally respond much less to fertilizer than do crops grown on deeper, more friable soils. On the severely eroded soils, high rates of seeding, liming, and fertilizing are generally required to establish good stands and to maintain high yields.

These soils are difficult to work and conserve. Runoff is rapid because of the steep slopes, the slowly permeable, clayey subsoil, and the fine-textured surface layer of the severely eroded soils. Consequently, these soils are highly susceptible to erosion. Some of the soils are also difficult to till because of the chert on the surface and the outcrops of limestone in places. It is important that all of these soils be tilled within a fairly narrow range of moisture content to prevent hard clods from forming. Most of these soils are on slopes that are steeper than those most desirable for terracing. Diversions and contour stripcropping are best for diverting or retarding excess runoff where row crops are grown.

CAPABILITY UNIT VIs-1

The soils in this capability unit are cherty, flaggy, or very rocky, are shallow to moderately deep, and are on sloping to steep uplands. The soils are—

- Bodine cherty silt loam, 5 to 12 percent slopes.
- Bodine cherty silt loam, 12 to 20 percent slopes.
- Culleoka flaggy loam, 12 to 20 percent slopes, eroded.
- Culleoka flaggy loam, 20 to 30 percent slopes, eroded.
- Mimosa and Ashwood very rocky soils, 5 to 20 percent slopes.
- Sulphura cherty silt loam, 12 to 20 percent slopes.
- Talbott very rocky soils, 2 to 15 percent slopes.

The shallow soils range from a few inches to about 3 feet in depth to shale or stratified layers of chert. The flaggy soils are shallow to moderately deep and are friable, but coarse fragments of highly weathered sandy limestone are on the surface and throughout the profile. Outcrops of limestone occupy from 10 to 50 percent of the surface in areas of the very rocky soils. Between the outcrops the soil material ranges from a few inches to several feet in thickness and is dominantly fine textured, slowly permeable, and highly erodible. These soils range from low to moderately high in fertility, but all are low in available moisture capacity.

Shallowness, fine texture, outcrops of bedrock, and loose flags or fragments of rock make these soils unsuited to crops that require tillage. They vary greatly in their suitability for pasture and hay. Forestry is the best use for many of them.

With good management, fair to good yields of forage can be produced on most of these soils. Suitable plants for pasture and hay are fescue, bermudagrass, bluegrass, redtop, whiteclover, sericea lespedeza, and annual lespedeza. Alfalfa and orchardgrass can be grown successfully on some of the deeper and more fertile soils.

The response to lime and fertilizer is not so great on these soils as it is on deep soils with high available moisture capacity. Liberal applications are needed to establish good stands and to maintain good yields of forage. Some of the highly phosphatic soils do not respond to phosphate fertilizer.

These soils should be plowed or disked only to prepare a seedbed for reestablishing pasture. Seeding long slopes in contour strips is the safest and most efficient way to establish pasture. The first strip should be near the top of the slope to protect succeeding strips farther down the slope. Many areas can be protected from excess runoff by diversions. Carefully controlled grazing is important in preventing damage from overgrazing, especially during dry periods.

CAPABILITY UNIT VIIe-1

The soils and the land type in this capability unit are mostly on steep and very steep uplands. They are—

- Dellrose cherty silt loam, 20 to 30 percent slopes, severely eroded.
- Dellrose cherty silt loam, 30 to 40 percent slopes.
- Dellrose cherty silt loam, 30 to 40 percent slopes, severely eroded.
- Gullied land.
- Inman silty clay loam, 20 to 30 percent slopes, severely eroded.
- Mimosa cherty silty clay, 20 to 30 percent slopes, severely eroded.

These soils are shallow to deep. Except for one Dellrose soil, all are severely eroded and some are gullied. Most of the soils are cherty, are low in natural fertility, and have a low available moisture capacity. In cleared areas surface runoff is generally rapid, and the erosion hazard is great.

Most of these soils and the Gullied land are suited only to trees, but they are used for pasture on many farms because better sites are scarce. The uneroded Dellrose soil produces fair to good pasture.

The cleared areas generally should be reforested. Loblolly pine, black walnut, yellow-poplar, red oak, and white oak grow well on most of the soils. Black locust also grows well and naturally reforests the phosphatic Gullied land and other soils. Redcedar is better suited to the more exposed sites that are less favorable for most trees.

If the soils are used for pasture, establishing contour strips is much safer than plowing the entire slope at one time. Clipping to control weeds and applying lime and fertilizer are desirable, but farm machinery is very difficult to operate because most of the soils are steep and cherty. Good woodland management consists of maintaining a stand of desirable trees, selective harvesting, fire prevention, and the control of grazing or browsing. Many sites on these soils would provide good food and cover for wildlife if sericea lespedeza and bicolor lespedeza were planted.

On slopes of less than 20 percent there are many areas of Gullied land that are deep to bedrock. These areas could be leveled and used for pasture, but this practice is expensive, and only selected areas should be reclaimed in this manner.

CAPABILITY UNIT VIIs-1

The soils and land type in this capability unit are cherty, steep, severely eroded, or rocky; or they have some combination of these characteristics. They are—

- Bodine cherty silt loam, 20 to 45 percent slopes.
- Mimosa very rocky soils, 20 to 40 percent slopes.
- Rockland.
- Sulphura cherty silt loam, 20 to 50 percent slopes.
- Sulphura cherty silt loam, 20 to 50 percent slopes, severely eroded.

Most of these soils and the land type are steep and have rapid runoff. All are low in natural fertility and are very low in available moisture capacity, but they vary greatly in other characteristics.

These soils and the Rockland are suited mainly to trees. Loblolly pine is the best tree for most areas. Black walnut, red oak, white oak, and yellow-poplar grow fairly well on most of the soils. Rockland and the very rocky Mimosa soils are best suited to redcedar, which establishes itself in most areas if protected from fire and grazing.

Good woodland management includes selective harvesting of mature trees and protection from fire and grazing. Eliminating cull trees or weed trees also helps conserve moisture for the more desirable trees.

## *Estimated yields*

Table 2 lists yields of the principal crops grown in Williamson County under two levels of management. This table can be used to compare yields of specified crops and forage on different soils, to compare yields of different crops and forage on the same soil, or to predict the yield of a specified crop on a specified soil under two levels of management.

In all estimates it is assumed that rainfall is average over a long period of time, that there is no irrigation, and there is no overflow hazard on the alluvial soils. Estimates are not given for a crop if it is not commonly grown on the soil or is not suited to it.

In columns A are estimated yields to be expected under management that commonly prevails in the county. These estimates are based largely on observations made by members of the soil survey party, on interviews with farmers and other agricultural workers in the county, and on yield data from similar soils in adjoining counties.

The estimates in columns B are to be expected under a level of management higher than that commonly practiced in Williamson County. Some of these estimates are based on long-term experiments, and some on yields harvested on farms throughout the State in cooperative studies of soil productivity and management. Also, members of the soil survey party collected some yield data throughout the county on specified crops and soils under high levels of management. Most of the estimates in columns B are based on comparisons with similar soils for which yield data were available, and on estimates by men who have had experience with crops and soils in Williamson County.

Under both levels of management, yields were adjusted to reflect the combined effects of slope, erosion, and seasonal variation over a long period of time. Although the estimates are believed to be fairly accurate, all yields in columns B may not be economically feasible. Some of these yields are likely to be less than those necessary to make practical the cultivation of a crop at a high level of management.

*Prevailing management* (yields in columns A).—The level of management varies on different soils, on different farms, and in different parts of the county. The low yields on many productive soils in the county are largely the result of insufficient fertilizer, poor cropping systems, inadequate erosion control, and poor grazing management. Also affecting crop yields are inadequate seedbed preparation, poorly suited varieties, and inadequate control of diseases and insects. Alfalfa, tobacco, and a few other crops are generally managed at a fairly high level because of their more exacting requirements and their high value.

*High level of management* (yields in columns B).—In the high level of management these practices are followed: (1) Adding fertilizer according to needs indicated by chemical tests and by past cropping and fertilization; (2) using high-yielding crop varieties that are suited to the area; (3) preparing the seedbed adequately; (4) seeding at suitable dates and rates and by suitable methods; (5) using shallow cultivation for row crops; (6) inoculating legumes; (7) controlling weeds, insects, and diseases; (8) controlling grazing; and (9) using cropping systems and practices that conserve soil and control water, as described in the capability units.

Under a high level of management, plant nutrients may be supplied in the form of commercial fertilizer, barnyard manure, leguminous residue, or in a combination of these. The kinds and amounts of lime and fertilizer to use are best determined by soil tests. The yields listed in columns B can be expected only when fertilizer is applied according to the results of soil tests or as given for specified crops in the following paragraphs. Also given in the following paragraphs for some crops are rates of seeding or planting appropriate for the rate of fertilization.

Corn: Phosphatic soils that produce 100 or more bushels of corn per acre, as indicated in column B of table 2, require, per acre, 36 to 48 pounds of potash ($K_2O$), 20 to 30 pounds of phosphate ($P_2O_5$), and 110 to 130 pounds of nitrogen (N); nonphosphatic soils require 48 to 72 pounds of potash, 48 to 72 pounds of phosphate, and 110 to 130 pounds of nitrogen. Planting for both phosphatic and nonphosphatic soils should be at a rate of 15,000 to 17,000 plants per acre.

Phosphatic soils that produce 80 to 100 bushels of corn per acre require 24 to 36 pounds of potash, 20 pounds of phosphate, and 80 to 100 pounds of nitrogen; nonphosphatic soils require 36 to 60 pounds of potash, 36 to 60 pounds of phosphate, and 80 to 100 pounds of nitrogen. Planting for both phosphatic and nonphosphatic soils should be at a rate of 11,000 to 13,000 plants per acre.

Soils that produce 50 to 80 bushels of corn per acre require 12 to 48 pounds of potash; 12 to 48 pounds of phosphate; 60 to 75 pounds of nitrogen; and 7,000 to 9,000 plants.

Soils that cannot yield 35 to 40 bushels per acre under good management are poorly suited to corn and can be used more profitably for other crops.

Small grains: Phosphatic soils that produce the yields of oats listed in column B of table 2 require, per acre, at planting time 20 to 40 pounds of potash ($K_2O$), 12 to 20 pounds of phosphate ($P_2O_5$), and 15 to 20 pounds of nitrogen (N); nonphosphatic soils require 20 to 40 pounds of potash, 36 to 48 pounds of phosphate, and 15 to 20 pounds of nitrogen. In spring a topdressing of 30 pounds of nitrogen is also required on both phosphatic and nonphosphatic soils.

Burley tobacco: Phosphatic soils planted to burley tobacco require 220 pounds of potash ($K_2O$), 60 to 90 pounds of phosphate ($P_2O_5$), and 60 to 90 pounds of nitrogen (N); nonphosphatic soils require 100 to 120 pounds of potash, 100 to 120 pounds of phosphate, and 60 to 90 pounds of nitrogen. A leguminous green-manure crop each year is also needed, as well as all barnyard manure available. Planting should be at a rate of 8,400 to 10,000 plants per acre (*9*). In addition to fertilizing and planting at appropriate rates, selecting soils that are not subject to flooding is important.

Alfalfa: To obtain the yields of alfalfa listed in column B of table 2, add lime 2 to 4 months before seeding in amounts needed to bring the pH to about 7.0 (fig. 28). Phosphatic soils require per acre, just before seeding, 150 to 180 pounds of potash ($K_2O$), 60 to 90 pounds of phosphate ($P_2O_5$), 20 to 30 pounds of nitrogen (N), and 20 pounds of borax; nonphosphatic soils require the same amounts of potash, nitrogen, and borax as the phosphatic soils, but they require 120 pounds of phosphate. To maintain stands on both phosphatic and nonphosphatic soils, lime in amounts needed to keep the pH near 7.0. After the first year, fertilize both kinds of soils in amounts determined by soil tests, or apply 125 to 200 pounds of potash, 45 to 75 pounds of phosphate, and 20 pounds of borax before the alfalfa starts growing in spring. Also needed are proper mowing and controlled grazing. Alfalfa should not be cut for hay between about September 15 and the date of the first killing frost.

TABLE 2.—*Estimated average acre yield of principal crops under two levels of management*

[Yields in columns A are those to be expected under common management over a period of years; those in columns B, under a high level of management. Absence of yield indicates that crop is not suited to soil or is not commonly grown on it]

| Soil | Corn | | Oats [1] | | Burley tobacco | | Alfalfa | | Lespedeza: Seeded alone | | Lespedeza: Overseeded on small grain | | Permanent pasture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Lbs.* | *Lbs.* | *Tons* | *Tons* | *Tons* | *Tons* | *Tons* | *Tons* | *Cow-acre-days* [2] | *Cow-acre-days* [2] |
| Armour cherty silt loam, 2 to 5 percent slopes | 30 | 70 | 30 | 60 | 1, 150 | 1, 600 | 2. 0 | 2. 9 | 1. 0 | 1. 2 | 0. 8 | 0. 9 | 75 | 145 |
| Armour cherty silt loam, 5 to 12 percent slopes, eroded | 24 | 55 | 28 | 57 | 920 | 1, 280 | 1. 8 | 2. 7 | . 8 | . 9 | . 6 | . 7 | 71 | 137 |
| Armour cherty silt loam, 12 to 20 percent slopes, eroded | 21 | 46 | 24 | 48 | 805 | 1, 120 | 1. 5 | 2. 2 | . 7 | . 8 | . 5 | . 6 | 60 | 116 |
| Armour cherty silty clay loam, 5 to 12 percent slopes, severely eroded | 17 | 40 | 23 | 47 | 635 | 880 | 1. 4 | 2. 0 | . 6 | . 7 | . 4 | . 5 | 56 | 113 |
| Armour silt loam, 0 to 2 percent slopes | 42 | 90 | 35 | 70 | 1, 400 | 2, 100 | 2. 5 | 3. 2 | 1. 3 | 1. 8 | . 9 | 1. 4 | 125 | 175 |
| Armour silt loam, 2 to 5 percent slopes | 40 | 85 | 35 | 70 | 1, 300 | 2, 200 | 2. 9 | 3. 6 | 1. 3 | 1. 8 | . 9 | 1. 4 | 123 | 173 |
| Armour silt loam, 2 to 5 percent slopes, eroded | 37 | 80 | 35 | 70 | 1, 210 | 2, 045 | 2. 9 | 3. 6 | 1. 2 | 1. 7 | . 8 | 1. 3 | 120 | 170 |
| Armour silt loam, 5 to 12 percent slopes | 36 | 76 | 33 | 67 | 1, 170 | 1, 980 | 2. 7 | 3. 4 | 1. 2 | 1. 6 | . 8 | 1. 2 | 114 | 162 |
| Armour silt loam, 5 to 12 percent slopes, eroded | 32 | 72 | 33 | 66 | 1, 040 | 1, 760 | 2. 5 | 3. 3 | 1. 0 | 1. 4 | . 7 | 1. 1 | 110 | 160 |
| Armour silty clay loam, 5 to 12 percent slopes, severely eroded | 22 | 48 | 27 | 55 | 715 | 1, 210 | 1. 9 | 2. 2 | . 7 | 1. 0 | . 5 | . 8 | 94 | 132 |
| Ashwood silty clay loam, 2 to 5 percent slopes | 15 | 45 | 20 | 40 | 850 | 1, 350 | | | . 5 | 1. 0 | . 3 | . 7 | 60 | 110 |
| Ashwood silty clay loam, 5 to 12 percent slopes | 11 | 33 | 17 | 35 | 620 | 985 | | | . 4 | . 7 | . 2 | . 5 | 51 | 95 |
| Ashwood silty clay loam, 12 to 20 percent slopes | | | 14 | 28 | 510 | 810 | | | . 3 | . 6 | . 1 | . 4 | 42 | 77 |
| Baxter cherty silt loam, 5 to 12 percent slopes | 15 | 40 | 17 | 43 | 800 | 1, 020 | 1. 7 | 2. 3 | . 6 | . 8 | . 5 | . 6 | 47 | 95 |
| Baxter cherty silt loam, 12 to 20 percent slopes | 14 | 39 | 16 | 40 | 770 | 980 | 1. 6 | 2. 2 | . 6 | . 8 | . 5 | . 6 | 44 | 88 |
| Baxter cherty silt loam, 12 to 20 percent slopes, eroded | 12 | 33 | 14 | 35 | 660 | 840 | 1. 4 | 2. 0 | . 5 | . 7 | . 4 | . 5 | 39 | 77 |
| Baxter cherty silt loam, 20 to 30 percent slopes | | | | | | | 1. 3 | 1. 8 | | | | | 36 | 72 |
| Baxter cherty silty clay loam, 5 to 12 percent slopes, severely eroded | 9 | 25 | 12 | 30 | 500 | 630 | 1. 2 | 1. 7 | . 4 | . 5 | . 3 | . 4 | 33 | 66 |
| Baxter cherty silty clay loam, 12 to 20 percent slopes, severely eroded | | | | | | | . 9 | 1. 5 | . 2 | . 3 | | | 25 | 50 |
| Bodine cherty silt loam, 5 to 12 percent slopes | 15 | 35 | 15 | 35 | 700 | 1, 000 | | | . 3 | . 6 | . 2 | . 5 | 35 | 65 |
| Bodine cherty silt loam, 12 to 20 percent slopes | | | 14 | 31 | | | | | . 3 | . 5 | . 1 | . 3 | 31 | 59 |
| Bodine cherty silt loam, 20 to 45 percent slopes | | | | | | | | | | | | | 20 | 46 |
| Braxton cherty silt loam, 2 to 5 percent slopes, eroded | 27 | 59 | 29 | 62 | 900 | 1, 485 | 2. 4 | 3. 3 | . 9 | 1. 4 | . 7 | 1. 0 | 90 | 133 |
| Braxton cherty silt loam, 5 to 12 percent slopes, eroded | 22 | 47 | 26 | 55 | 730 | 1, 205 | 2. 1 | 3. 0 | . 7 | 1. 1 | . 6 | . 8 | 81 | 119 |
| Braxton cherty silt loam, 12 to 20 percent slopes, eroded | 18 | 39 | 21 | 46 | 600 | 990 | 1. 8 | 2. 5 | . 6 | . 9 | . 5 | . 7 | 67 | 98 |
| Braxton cherty silty clay loam, 5 to 12 percent slopes, severely eroded | | | 18 | 35 | | | 1. 5 | 2. 1 | . 5 | . 7 | . 4 | . 5 | 57 | 84 |
| Braxton cherty silty clay loam, 12 to 20 percent slopes, severely eroded | | | | | | | 1. 1 | 1. 6 | . 3 | . 4 | . 2 | . 3 | 43 | 63 |
| Captina silt loam, phosphatic, 0 to 2 percent slopes | 37 | 77 | 28 | 56 | 1, 000 | 1, 600 | 1. 6 | 2. 6 | 1. 3 | 2. 0 | . 9 | 1. 5 | 82 | 153 |
| Captina silt loam, phosphatic, 2 to 5 percent slopes | 35 | 75 | 30 | 60 | 1, 000 | 1, 600 | 1. 8 | 2. 8 | 1. 3 | 2. 0 | . 9 | 1. 5 | 80 | 150 |
| Captina silt loam, phosphatic, 2 to 5 percent slopes, eroded | 32 | 68 | 29 | 57 | 900 | 1, 440 | 1. 7 | 2. 7 | 1. 2 | 1. 8 | . 8 | 1. 4 | 76 | 143 |
| Captina silt loam, phosphatic, 5 to 12 percent slopes, eroded | 30 | 64 | 27 | 54 | 850 | 1, 360 | 1. 6 | 2. 5 | 1. 1 | 1. 7 | . 7 | 1. 3 | 72 | 135 |
| Culleoka flaggy loam, 12 to 20 percent slopes, eroded | 17 | 37 | 18 | 45 | | | . 9 | 2. 2 | . 3 | 1. 0 | . 2 | . 7 | 36 | 81 |
| Culleoka flaggy loam, 20 to 30 percent slopes, eroded | | | | | | | | | . 2 | . 8 | | | 29 | 70 |
| Culleoka silt loam, 5 to 12 percent slopes | 25 | 55 | 30 | 60 | 975 | 1, 600 | 2. 0 | 3. 2 | . 6 | 1. 5 | . 5 | 1. 1 | 70 | 140 |
| Culleoka silt loam, 12 to 20 percent slopes | 20 | 44 | 27 | 54 | 815 | 1, 330 | 1. 7 | 2. 7 | . 4 | 1. 1 | . 4 | . 8 | 63 | 125 |
| Culleoka silt loam, 12 to 20 percent slopes, severely eroded | | | 22 | 44 | | | 1. 4 | 2. 2 | . 3 | . 7 | . 2 | 5 | 51 | 100 |
| Culleoka silt loam, 20 to 35 percent slopes | | | | | | | | | . 2 | . 8 | | | 50 | 102 |
| Culleoka silt loam, 20 to 35 percent slopes, severely eroded | | | | | | | | | | | | | 35 | 70 |
| Dellrose cherty silt loam, 12 to 20 percent slopes | 25 | 49 | 21 | 48 | 780 | 1, 205 | 1. 7 | 2. 6 | . 4 | . 7 | . 4 | . 6 | 63 | 116 |
| Dellrose cherty silt loam, 20 to 30 percent slopes | | | | | | | | | . 2 | . 5 | | | 52 | 96 |
| Dellrose cherty silt loam, 20 to 30 percent slopes, severely eroded | | | | | | | | | . 1 | . 3 | | | 37 | 69 |

See footnotes at end of table.

TABLE 2.—*Estimated average acre yield of principal crops under two levels of management*—Continued

| Soil | Corn | | Oats [1] | | Burley tobacco | | Alfalfa | | Lespedeza | | | | Permanent pasture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Seeded alone | | Overseeded on small grain | | | |
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Lbs.* | *Lbs.* | *Tons* | *Tons* | *Tons* | *Tons* | *Tons* | *Tons* | *Cow-acre-days* [2] | *Cow-acre-days* [2] |
| Dellrose cherty silt loam, 30 to 40 percent slopes | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 48 | 89 |
| Dellrose cherty silt loam, 30 to 40 percent slopes, severely eroded | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 33 | 62 |
| Dickson silt loam, 2 to 5 percent slopes | 20 | 55 | 18 | 50 | 810 | 1,320 | 1.3 | 2.0 | 0.8 | 1.5 | 0.7 | 1.1 | 63 | 108 |
| Donerail silt loam, 2 to 5 percent slopes | 29 | 65 | 25 | 59 | 1,050 | 1,550 | 1.8 | 2.4 | 1.2 | 1.8 | .9 | 1.4 | 73 | 142 |
| Donerail silt loam, 2 to 5 percent slopes, eroded | 27 | 60 | 24 | 57 | 990 | 1,485 | 1.8 | 2.4 | 1.1 | 1.7 | .8 | 1.3 | 71 | 138 |
| Donerail silt loam, 5 to 12 percent slopes, eroded | 22 | 51 | 21 | 51 | 805 | 1,200 | 1.7 | 2.1 | .9 | 1.4 | .7 | 1.0 | 65 | 123 |
| Donerail silt loam, concretionary, 2 to 5 percent slopes, eroded | 23 | 54 | 24 | 52 | 855 | 1,350 | 1.5 | 2.1 | .9 | 1.5 | .7 | 1.1 | 66 | 115 |
| Donerail silt loam, concretionary, 5 to 12 percent slopes, eroded | 18 | 44 | 21 | 47 | 295 | 1,095 | 1.4 | 2.0 | .7 | 1.2 | .6 | .9 | 60 | 105 |
| Dowellton silt loam, 2 to 5 percent slopes | 10 | 40 | ---- | ---- | ---- | ---- | ---- | ---- | .5 | 1.0 | ---- | ---- | 55 | 100 |
| Dunning silt loam, phosphatic | 10 | 50 | ---- | ---- | ---- | ---- | ---- | ---- | .6 | 1.2 | ---- | ---- | 60 | 105 |
| Egam silt loam, phosphatic | 50 | 80 | 30 | 55 | 950 | 1,650 | ---- | ---- | 1.1 | 1.6 | .9 | 1.3 | 110 | 160 |
| Etowah silt loam, 2 to 5 percent slopes | 33 | 74 | 30 | 64 | 1,115 | 1,955 | 2.5 | 3.4 | 1.1 | 1.6 | .8 | 1.2 | 113 | 160 |
| Etowah silt loam, 5 to 12 percent slopes, eroded | 28 | 64 | 27 | 62 | 960 | 1,680 | 2.4 | 3.2 | 1.0 | 1.3 | .7 | 1.0 | 100 | 145 |
| Fairmount silty clay loam, 2 to 10 percent slopes | 11 | 33 | 12 | 30 | ---- | ---- | ---- | ---- | .4 | .9 | .3 | .7 | 50 | 89 |
| Frankstown cherty silt loam, 5 to 12 percent slopes | 20 | 48 | 24 | 52 | 840 | 1,140 | 1.4 | 2.5 | .7 | .9 | .6 | .7 | 57 | 109 |
| Frankstown cherty silt loam, 12 to 20 percent slopes | 18 | 42 | 20 | 44 | 735 | 1,000 | 1.2 | 2.1 | .6 | .8 | .5 | .6 | 48 | 98 |
| Greendale cherty silt loam, 2 to 12 percent slopes | 20 | 60 | 15 | 45 | 1,150 | 1,500 | 1.0 | 2.5 | .8 | 1.2 | .7 | .9 | 60 | 130 |
| Greendale silt loam, 2 to 5 percent slopes | 35 | 90 | 30 | 60 | 1,550 | 2,000 | 1.7 | 3.0 | 1.3 | 1.7 | .9 | 1.3 | 110 | 170 |
| Gullied land | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| Hagerstown silt loam, 2 to 5 percent slopes, eroded | 33 | 74 | 34 | 64 | 1,115 | 1,955 | 2.9 | 4.3 | 1.0 | 1.5 | .7 | 1.1 | 103 | 158 |
| Hagerstown silt loam, 5 to 12 percent slopes, eroded | 28 | 64 | 33 | 62 | 960 | 1,680 | 2.8 | 4.1 | .9 | 1.3 | .6 | 1.0 | 99 | 152 |
| Hampshire silt loam, 2 to 5 percent slopes | 20 | 55 | 25 | 50 | 900 | 1,420 | 1.5 | 2.5 | .9 | 1.2 | .7 | .9 | 70 | 120 |
| Hampshire silt loam, 2 to 5 percent slopes, eroded | 18 | 50 | 24 | 48 | 810 | 1,260 | 1.4 | 2.4 | .8 | 1.1 | .6 | .8 | 65 | 110 |
| Hampshire silt loam, 5 to 12 percent slopes, eroded | 15 | 40 | 21 | 43 | 660 | 1,020 | 1.3 | 2.1 | .6 | .9 | .5 | .6 | 60 | 102 |
| Hampshire silt loam, 12 to 20 percent slopes, eroded | ---- | ---- | 18 | 35 | ---- | ---- | 1.0 | 1.8 | .5 | .7 | .4 | .5 | 49 | 84 |
| Hampshire silty clay loam, 5 to 12 percent slopes, severely eroded | ---- | ---- | 15 | 30 | ---- | ---- | .9 | 1.5 | .4 | .5 | .3 | .4 | 42 | 72 |
| Hampshire silty clay loam, 12 to 20 percent slopes, severely eroded | ---- | ---- | 11 | 23 | ---- | ---- | .7 | 1.1 | .2 | .3 | .2 | .3 | 32 | 54 |
| Hampshire-Colbert silt loams, 2 to 5 percent slopes, eroded | 15 | 40 | 20 | 45 | 800 | 1,200 | 1.1 | 2.0 | .7 | 1.1 | .6 | .8 | 67 | 114 |
| Hampshire-Colbert silt loams, 5 to 12 percent slopes, eroded | 11 | 30 | 17 | 38 | 585 | 900 | .9 | 1.8 | .5 | .8 | .4 | .6 | 50 | 94 |
| Hampshire-Colbert silt loams, 12 to 20 percent slopes, eroded | ---- | ---- | 14 | 32 | ---- | ---- | .7 | 1.5 | .5 | .7 | .3 | .5 | 42 | 77 |
| Hampshire-Colbert silty clay loams, 5 to 12 percent slopes, severely eroded | ---- | ---- | 12 | 27 | ---- | ---- | .7 | 1.2 | .4 | .5 | .2 | .4 | 36 | 66 |
| Hampshire-Colbert silty clay loams, 12 to 20 percent slopes, severely eroded | ---- | ---- | 9 | 20 | ---- | ---- | .6 | 1.0 | .2 | .3 | .1 | .3 | 27 | 50 |
| Hermitage silt loam, 2 to 5 percent slopes | 35 | 78 | 30 | 65 | 1,150 | 2,000 | 2.5 | 3.4 | 1.2 | 1.7 | .9 | 1.3 | 110 | 165 |
| Hermitage silt loam, 2 to 5 percent slopes, eroded | 32 | 70 | 29 | 63 | 1,035 | 1,800 | 2.5 | 3.4 | 1.1 | 1.5 | .8 | 1.1 | 107 | 160 |
| Hicks silt loam, 2 to 5 percent slopes, eroded | 20 | 65 | 25 | 60 | 900 | 1,550 | 1.5 | 2.8 | .9 | 1.3 | .7 | .9 | 80 | 120 |
| Hicks silt loam, 5 to 12 percent slopes, eroded | 16 | 52 | 23 | 57 | 720 | 1,440 | 1.4 | 2.4 | .7 | 1.2 | .5 | .7 | 76 | 114 |
| Hicks silty clay loam, 5 to 12 percent slopes, severely eroded | 11 | 36 | 14 | 47 | 495 | 850 | .8 | 1.6 | .5 | .7 | .4 | .5 | 62 | 94 |
| Humphreys cherty silt loam, 2 to 5 percent slopes | 25 | 60 | 25 | 55 | 1,150 | 1,500 | 1.8 | 2.4 | .9 | 1.1 | .7 | .8 | 65 | 125 |
| Humphreys cherty silt loam, 5 to 12 percent slopes, eroded | 20 | 48 | 23 | 52 | 920 | 1,200 | 1.7 | 2.2 | .7 | .8 | .5 | .6 | 61 | 119 |
| Humphreys cherty silt loam, 12 to 20 percent slopes, eroded | 18 | 42 | 20 | 44 | 805 | 1,050 | 1.4 | 2.0 | .6 | .7 | .4 | .5 | 52 | 100 |
| Humphreys silt loam, 2 to 5 percent slopes | 20 | 70 | 25 | 60 | 1,250 | 1,850 | 2.0 | 3.0 | 1.1 | 1.6 | .8 | 1.2 | 85 | 140 |
| Humphreys silt loam, 5 to 12 percent slopes, eroded | 16 | 56 | 23 | 57 | 1,000 | 1,500 | 1.9 | 2.9 | .8 | 1.3 | .6 | .9 | 81 | 133 |
| Huntington cherty silt loam, phosphatic | 40 | 90 | 30 | 55 | 1,100 | 1,600 | 2.0 | 2.8 | 1.3 | 1.7 | 1.0 | 1.2 | 120 | 160 |
| Huntington silt loam, local alluvium | 40 | 105 | 30 | 60 | 1,500 | 2,000 | 2.2 | 3.0 | 1.2 | 2.0 | .9 | 1.5 | 120 | 180 |
| Huntington silt loam, phosphatic | 55 | 105 | 35 | 60 | 1,500 | 2,000 | 2.2 | 3.0 | 1.5 | 2.0 | 1.0 | 1.5 | 140 | 180 |
| Inman silt loam, 5 to 12 percent slopes | 15 | 32 | 20 | 45 | 650 | 1,000 | .5 | 1.5 | .5 | 1.0 | .4 | .9 | 50 | 100 |

See footnotes at end of table.

TABLE 2.—*Estimated average acre yield of principal crops under two levels of management*—Continued

| Soil | Corn | | Oats [1] | | Burley tobacco | | Alfalfa | | Lespedeza | | | | Permanent pasture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Seeded alone | | Overseeded on small grain | | | |
| | A | B | A | A | A | B | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Lbs.* | *Lbs.* | *Tons* | *Tons* | *Tons* | *Tons* | *Tons* | *Tons* | *Cow-acre-days* [2] | *Cow-acre-days* [2] |
| Inman silt loam, 12 to 20 percent slopes | ---- | ---- | 16 | 36 | ---- | ---- | 0.4 | 1.3 | 0.4 | 0.8 | 0.3 | 0.8 | 41 | 81 |
| Inman silt loam, 20 to 30 percent slopes | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | .3 | .8 | ---- | ---- | 35 | 69 |
| Inman silty clay loam, 5 to 12 percent slopes, severely eroded | ---- | ---- | 14 | 31 | ---- | ---- | .2 | 1.0 | .3 | .6 | .2 | .5 | 35 | 69 |
| Inman silty clay loam, 12 to 20 percent slopes, severely eroded | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 26 | 52 |
| Inman silty clay loam, 20 to 30 percent slopes, severely eroded | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 20 | 40 |
| Lanton silt loam, phosphatic | 45 | 95 | 30 | 55 | 950 | 1,600 | ---- | ---- | 1.4 | 1.9 | 1.0 | 1.4 | 95 | 150 |
| Lindside cherty silt loam | 25 | 70 | 20 | 40 | 975 | 1,500 | ---- | ---- | 1.0 | 1.5 | .7 | 1.1 | 70 | 130 |
| Lindside cherty silt loam, phosphatic | 40 | 80 | 25 | 45 | 900 | 1,500 | ---- | ---- | 1.1 | 1.6 | .8 | 1.1 | 100 | 140 |
| Lindside silt loam | 30 | 85 | 22 | 43 | 925 | 1,550 | ---- | ---- | 1.2 | 1.7 | .8 | 1.2 | 75 | 150 |
| Lindside silt loam, phosphatic | 50 | 85 | 30 | 55 | 975 | 1,650 | ---- | ---- | 1.3 | 1.8 | .9 | 1.3 | 115 | 160 |
| Made land | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| Maury silt loam, 0 to 2 percent slopes | 40 | 85 | 34 | 68 | 1,300 | 2,200 | 3.1 | 3.6 | 1.3 | 1.8 | .9 | 1.4 | 115 | 170 |
| Maury silt loam, 2 to 5 percent slopes | 38 | 80 | 35 | 70 | 1,300 | 2,200 | 3.3 | 3.9 | 1.3 | 1.8 | .9 | 1.4 | 115 | 165 |
| Maury silt loam, 2 to 5 percent slopes, eroded | 35 | 74 | 34 | 68 | 1.210 | 2,045 | 3.2 | 3.9 | 1.2 | 1.7 | .8 | 1.3 | 113 | 163 |
| Maury silt loam, 5 to 12 percent slopes, eroded | 30 | 68 | 33 | 66 | 1,040 | 1,760 | 3.1 | 3.7 | 1.0 | 1.4 | .7 | 1.1 | 109 | 157 |
| Maury silty clay loam, 5 to 12 percent slopes, severely eroded | 21 | 42 | 27 | 55 | 715 | 1,210 | 2.2 | 3.0 | .7 | 1.0 | .5 | .8 | 85 | 129 |
| Melvin silt loam, phosphatic | 15 | 60 | ---- | ---- | ---- | ---- | ---- | ---- | .5 | 1.5 | ---- | ---- | 65 | 115 |
| Mercer silt loam, 2 to 5 percent slopes, eroded | 23 | 59 | 19 | 48 | 900 | 1,350 | 1.6 | 2.5 | .9 | 1.6 | .7 | 1.2 | 57 | 114 |
| Mimosa cherty silt loam, 5 to 12 percent slopes, eroded | 15 | 40 | 21 | 43 | 695 | 1,200 | 1.7 | 2.8 | .6 | .9 | .5 | .7 | 68 | 106 |
| Mimosa cherty silt loam, 12 to 20 percent slopes, eroded | ---- | ---- | 18 | 35 | ---- | ---- | 1.4 | 2.3 | .5 | .8 | .4 | .6 | 56 | 88 |
| Mimosa cherty silt loam, 20 to 30 percent slopes, eroded | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 48 | 75 |
| Mimosa cherty silty clay, 10 to 20 percent slopes, severely eroded | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | .4 | .6 | ---- | ---- | 48 | 75 |
| Mimosa cherty silty clay, 20 to 30 percent slopes, severely eroded | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 19 | 28 |
| Mimosa silt loam, 2 to 5 percent slopes, eroded | 23 | 54 | 29 | 57 | 900 | 1,485 | 2.2 | 2.8 | .9 | 1.4 | .7 | 1.0 | 86 | 128 |
| Mimosa silt loam, 5 to 12 percent slopes, eroded | 18 | 44 | 25 | 51 | 730 | 1,250 | 2.0 | 2.8 | .7 | 1.1 | .6 | .8 | 77 | 115 |
| Mimosa silt loam, 12 to 20 percent slopes, eroded | ---- | ---- | 21 | 42 | ---- | ---- | 1.8 | 2.3 | .6 | .9 | .5 | .7 | 63 | 106 |
| Mimosa silty clay, 10 to 20 percent slopes, severely eroded | ---- | ---- | 16 | 34 | ---- | ---- | 1.2 | 1.9 | .4 | .6 | .3 | .4 | 47 | 71 |
| Mimosa very rocky soils, 20 to 40 percent slopes | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 20 | 40 |
| Mimosa and Ashwood very rocky soils, 5 to 20 percent slopes | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | .3 | 1.0 | ---- | ---- | 35 | 60 |
| Mine pits and dumps | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| Mine land, reclaimed | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| Mountview silt loam, 2 to 5 percent slopes | 25 | 70 | 25 | 60 | 1,250 | 2,000 | 2.0 | 2.8 | 1.1 | 1.6 | .8 | 1.2 | 80 | 135 |
| Mountview silt loam, 5 to 12 percent slopes, eroded | 20 | 56 | 23 | 57 | 1,000 | 1,600 | 1.9 | 2.6 | .8 | 1.3 | .6 | .9 | 76 | 128 |
| Mountview silt loam, shallow, 2 to 5 percent slopes | 25 | 55 | 20 | 50 | 1,150 | 1,450 | 1.8 | 2.5 | .9 | 1.1 | .7 | .8 | 55 | 110 |
| Mountview silt loam, shallow, 2 to 5 percent slopes, eroded | 23 | 51 | 20 | 48 | 1,070 | 1,350 | 1.8 | 2.5 | .8 | 1.0 | .6 | .7 | 54 | 108 |
| Mountview silt loam, shallow, 5 to 12 percent slopes | 22 | 50 | 19 | 45 | 1,035 | 1,305 | 1.7 | 2.5 | .8 | .9 | .6 | .7 | 53 | 107 |
| Mountview silt loam, shallow, 5 to 12 percent slopes, eroded | 20 | 44 | 19 | 43 | 920 | 1,160 | 1.7 | 2.3 | .7 | .8 | .5 | .6 | 52 | 105 |
| Mountview silt loam, shallow, 5 to 12 percent slopes, severely eroded | 14 | 30 | 16 | 30 | 635 | 795 | 1.4 | 1.9 | .4 | .5 | .3 | .4 | 43 | 86 |
| Mountview silt loam, shallow, 12 to 20 percent slopes | 19 | 41 | 17 | 40 | 865 | 1,090 | 1.5 | 2.1 | .7 | .8 | .5 | .6 | 47 | 94 |
| Mountview silt loam, shallow, 12 to 20 percent slopes, eroded | 17 | 38 | 16 | 35 | 805 | 1,015 | 1.4 | 2.0 | .6 | .7 | .4 | .5 | 44 | 80 |
| Robertsville silt loam, phosphatic | 5 | 30 | 10 | 35 | ---- | ---- | ---- | ---- | .4 | 1.0 | .3 | .9 | 40 | 80 |
| Rockland | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| Sees silty clay loam | 40 | 75 | 25 | 55 | 900 | 1,500 | ---- | ---- | 1.1 | 1.5 | .9 | 1.3 | 95 | 150 |
| Sequatchie loam, phosphatic | 42 | 90 | 35 | 70 | 1,300 | 2,100 | 2.2 | 3.0 | 1.3 | 1.8 | .9 | 1.4 | 120 | 170 |

**See footnotes at end of table.**

TABLE 2.—*Estimated average acre yield of principal crops under two levels of management*—Continued

| Soil | Corn | | Oats [1] | | Burley tobacco | | Alfalfa | | Lespedeza: Seeded alone | | Lespedeza: Overseeded on small grain | | Permanent pasture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
| | *Bu.* | *Bu.* | *Bu.* | *Bu.* | *Lbs.* | *Lbs.* | *Tons* | *Tons* | *Tons* | *Tons* | *Tons* | *Tons* | *Cow-acre-days* [2] | *Cow-acre-days* [2] |
| Stiversville clay loam, 5 to 12 percent slopes, severely eroded | 17 | 38 | 23 | 55 | 660 | 1, 100 | 2. 2 | 3. 1 | 0. 6 | 0. 8 | 0. 4 | 0. 6 | 78 | 117 |
| Stiversville clay loam, 12 to 20 percent slopes, severely eroded | ---- | ---- | 18 | 42 | ---- | ---- | 1. 7 | 2. 4 | . 4 | . 6 | . 3 | . 4 | 60 | 90 |
| Stiversville silt loam, 2 to 5 percent slopes, eroded | 28 | 68 | 29 | 68 | 1, 115 | 1, 860 | 2. 8 | 3. 4 | . 9 | 1. 4 | . 7 | 1. 0 | 98 | 148 |
| Stiversville silt loam, 5 to 12 percent slopes, eroded | 24 | 56 | 28 | 66 | 960 | 1, 600 | 2. 7 | 3. 3 | . 8 | 1. 2 | . 6 | . 9 | 95 | 143 |
| Stiversville silt loam, 12 to 20 percent slopes, eroded | 21 | 48 | 24 | 56 | 840 | 1, 400 | 2. 0 | 2. 9 | . 7 | 1. 0 | . 5 | . 8 | 80 | 120 |
| Sulphura cherty silt loam, 12 to 20 percent slopes | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | . 3 | . 6 | ---- | ---- | 36 | 63 |
| Sulphura cherty silt loam, 20 to 50 percent slopes | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 27 | 33 |
| Sulphura cherty silt loam, 20 to 50 percent slopes, severely eroded | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| Taft silt loam, 0 to 8 percent slopes | 18 | 45 | 15 | 40 | ---- | ---- | ---- | ---- | . 5 | 1. 3 | . 4 | . 9 | 51 | 100 |
| Taft silt loam, phosphatic | 20 | 45 | 17 | 43 | ---- | ---- | ---- | ---- | . 7 | 1. 3 | . 6 | . 9 | 60 | 100 |
| Talbott silty clay, 2 to 5 percent slopes, severely eroded | 12 | 33 | 19 | 38 | 510 | 870 | 1. 5 | 2. 1 | . 5 | . 8 | . 4 | . 5 | 60 | 94 |
| Talbott silty clay, 5 to 12 percent slopes, severely eroded | ---- | ---- | 15 | 30 | ---- | ---- | 1. 2 | 1. 7 | . 4 | . 6 | . 3 | . 4 | 48 | 75 |
| Talbott silty clay loam, 2 to 5 percent slopes, eroded | 18 | 50 | 24 | 48 | 765 | 1, 305 | 1. 9 | 2. 7 | . 8 | 1. 2 | . 6 | . 8 | 76 | 119 |
| Talbott silty clay loam, 5 to 12 percent slopes, eroded | 15 | 40 | 21 | 43 | 620 | 1, 060 | 1. 7 | 2. 4 | . 7 | . 9 | . 5 | . 7 | 68 | 106 |
| Talbott very rocky soils, 2 to 15 percent slopes | ---- | ---- | ---- | ---- | ---- | ---- | . 5 | 1. 0 | . 3 | . 7 | ---- | ---- | 30 | 60 |

[1] Yields of oats in tons can be estimated by dividing the number of bushels per acre by 31.

[2] Number of days in the grazing season that 1 acre will provide grazing for a cow or a steer, a horse, 5 swine, or 7 sheep without injury to the pasture.

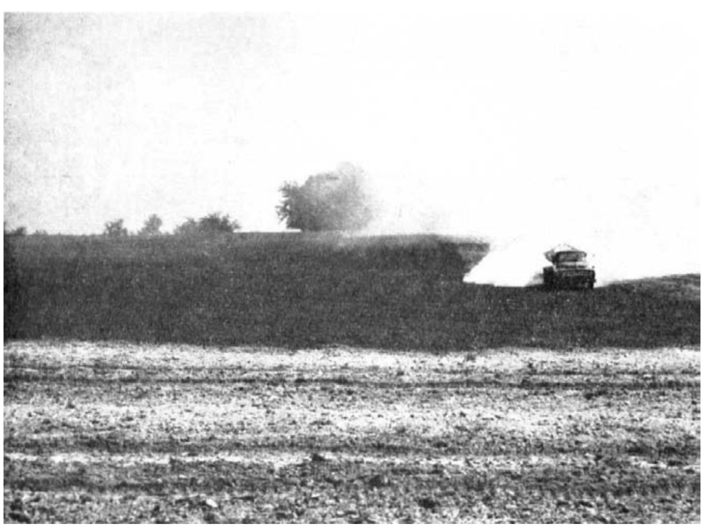

*Figure 28.*—**Liming Maury soil before seeding to alfalfa.**

Lespedeza (Korean and Kobe): Under a high level of management, lespedeza that is seeded alone on a well-prepared seedbed requires, per acre, at seeding time, 30 to 40 pounds of potash ($K_2O$). Phosphatic soils also require 10 to 20 pounds of phosphate ($P_2O_5$) and nonphosphatic soils, 30 to 40 pounds. Lespedeza that is overseeded on small grain in spring requires, per acre, in fall when the small grain is seeded, 30 to 50 pounds of potash. In addition, phosphatic soils need 15 to 30 pounds of phosphate, and nonphosphatic soils need 36 to 60 pounds. In spring, as a topdressing, both kinds of soils require 15 to 30 pounds of nitrogen. Heavy applications of nitrogen in spring tend to reduce the stand of lespedeza.

Because oats are more competitive than wheat or barley, they are less desirable for overseeding on lespedeza. Yields of lespedeza overseeded on small grain generally are about 75 percent as much as yields of lespedeza seeded alone.

Permanent pasture: To establish permanent pasture at a high level of management, additions of lime and fertilizer needed per acre are: (1) before seeding, 2 to 3 tons of lime; (2) at seeding time on phosphatic soils, 90 to 120 pounds of potash ($K_2O$), 45 to 60 pounds of phosphate ($P_2O_5$), and 15 to 20 pounds of nitrogen (N); or (3) at seeding time on nonphosphatic soils, 100 to 120 pounds of potash, 100 to 120 pounds of phosphate, and 20 to 30 pounds of nitrogen. To maintain permanent pasture, additions per acre are: (1) in early spring, 60 to 90 pounds, of potash and 30 pounds of nitrogen as an annual topdressing on phosphatic soils, or 60 pounds of potash, 60 pounds of phosphate, and 30 pounds of nitrogen on nonphosphatic soils; (2) lime as needed to maintain a pH between 6.2 and 7.0. In addition, grazing should be controlled and the pasture clipped frequently to control weeds.

Suitable mixtures for permanent pasture are orchardgrass and whiteclover or fescue and whiteclover. On some soils bluegrass, bermudagrass, redtop, sericea lespedeza, and annual lespedeza are better suited and may be substituted for the mixtures, or used with them.

## Managing Woodland [1]

This subsection describes the woodland of Williamson County, explains woodland suitability grouping, describes the groups and lists the soils in them, and discusses factors affecting woodland management.

### *Woodland in Williamson County*

Williamson County, in Middle Tennessee, is in the Central Forest Region of North America. The county is rolling to hilly. Its land area amounts to about 550 square miles, one-fourth of which is a chain of wooded hills 800 to 1,200 feet above sea level. Originally the county was a wilderness of hardwood and redcedar trees.

Hunters and explorers came to the county as early as 1784, but permanent settlements were not made until shortly before 1800. Much of the fertile land was then cleared for farming.

The production of lumber became important in about 1840, when the first steam sawmill was erected. In 1961 there were in the county 16 sawmills, a handle manufacturing plant, a wooden box company, and a furniture manufacturing plant. Much of the lumber produced is used for local purposes, but the redcedar and good hardwood are shipped to adjoining counties for processing.

Woodland amounts to 140,659 acres, or approximately 37 percent of the county's total land area of 379,520 acres. About 72 percent of this woodland is in eastern redcedar and cedar-hardwood forest types, and 28 percent is in various hardwood types. Most of the woodland in the county is in the following forest types, as classified by the Society of American Foresters (*11*) [2]: post oak–black oak (SAF 40); eastern redcedar (SAF 46); eastern redcedar–hardwoods (SAF 48); black locust (SAF 50); white oak–red oak–hickory (SAF 52); yellow-poplar–white oak–northern red oak (SAF 59); cottonwood (SAF 63); sassafras–persimmon (SAF 64).

Forest fires were frequent in the county before 1953, when a county-wide system for controlling them was adopted. Since then landowners have practiced better woodland management by planting trees and by limiting grazing.

### *Woodland suitability grouping of soils*

The soils of Williamson County have been placed in 12 woodland suitability groups to assist those who manage woodland. A woodland suitability group is made up of soils that have about the same suitability for wood crops, need about the same management, and have about the same potential productivity.

Listed in table 3 and described in the text are the 12 woodland suitability groups. This table also lists the average site index rating for important trees in each group, the average yearly tree growth, and the trees that should be given priority in planting and in managing existing stands. Some of the terms used in the table and in the narrative part of this subsection require explanation.

The potential productivity of a soil for a specified kind of tree may be expressed as a *site index*. The site index is the height that a tree of a given species, growing on a given soil in an even-aged, well-managed stand, will attain in 50 years. Although site index is not a direct indication of the potential productivity of a given soil, soils having a high site index produce high yields of trees. Available moisture capacity is an important factor in determining site index. In table 3, the site indexes are the averages for the soils in the group.

Potential soil productivity was determined for yellow-poplar, black walnut, redcedar, cottonwood, bottom-land oaks, and upland oaks. In determining the site index ratings, the number of plots used were 52 for yellow-poplar, 35 for upland oaks, 11 for black walnut, and 13 for redcedar. The number of trees in each plot ranged from 2 to 8 and averaged 4 trees per plot. Site indexes were estimated for pines by using available information; measurements on plots were not taken.

Potential soil productivity was determined for yellow-scientist and woodland conservationist working together on selected study sites. The soil scientist determined whether the site was representative of the soil being studied, and the woodland conservationist determined whether the forest cover and other conditions were acceptable. The soil scientist examined and recorded detailed information about soils. The woodland conservationist measured the height and diameter of selected dominant or codominant trees and determined the ages of the trees from ring counts on increment borings. The average index was calculated for each site, and the site index curves were used to determine the site index values.

The limitations of each soil for the trees listed in table 3 were determined by the soil scientists and foresters, who measured the trees on specified soils. The interpretations, or ratings, were prepared in conference and represent the judgments of those participating. Each kind of soil was rated on its potential productivity of the important trees as affected by plant competition, equipment limitations, seedling mortality, windthrow, and erosion. These hazards and limitations were rated *slight*, *moderate*, or *severe*. The relative term expresses the degree of limitation as explained in the following paragraphs.

*Plant competition.*—When a woodland is disturbed by fire, by cutting or grazing, or by some other means, undesirable brush, trees, and plants may invade. The invading growth competes with the desirable trees and hinders their establishment and growth.

Competition is *slight* if unwanted plants are no special problem. It is *moderate* if the invaders delay but do not prevent the establishment of a normal, fully stocked stand. Where plant competition is moderate, seedbed preparation is generally not needed, and simple methods can be used to prevent undesirable plants from invading. Competition is *severe* if trees cannot regenerate naturally. Where competition is severe, carefully prepare the site and use management that includes controlled burning, spraying with chemicals, and girdling.

[1] Written by C. E. BURGER, woodland conservationist, Soil Conservation Service.

[2] Italic numbers in parentheses refer to Literature Cited, p. 145.

TABLE 3.—*Woodland suitability grouping of soils*

[Dashed lines indicate values were not estimated or calculated]

| Group and description of the soils | Map symbol | Potential productivity | | | |
|---|---|---|---|---|---|
| | | Trees | Average site index [1] | Average yearly growth [2] | Species suitability [3] |
| | | | | *Bd. ft. per acre* | |
| Group 1: Well-drained soils that are mostly on low terraces and foot slopes and have a medium-textured surface layer and subsoil, a very deep root zone, and a high available moisture capacity. | ArA, ArB, ArB2, ArC, ArC2; AcB, AcC2, AcD2; AmC3; AtC3; CfD2, CfE2; CkC, CkD, CkD3, CkE, CkE3; DeD, DeE, DeE3, DeF, DeF3; EtB, EtC2; HaB2, HaC2; HmB, HmB2; HpB, HpC2, HpD2; HrB, HrC2; MbA, MbB, MbB2, MbC2; McC3. | Yellow-poplar [4] | 90±6 (13) | 690 | All commercial hardwoods in area, redcedar, loblolly pine, and shortleaf pine. |
| | | Black walnut [5] | 71 (3) | ---------- | |
| | | Redcedar [6] | 55 (1) | 290 | |
| | | Upland oaks [7] | 70 (3) | 290 | |
| | | Loblolly pine | ------------ | 580 | |
| | | Shortleaf pine | ------------ | 450 | |
| Group 2: Well drained or moderately well drained soils that are mostly on rolling and hilly uplands and have a thin, medium-textured surface layer and a plastic clay subsoil. Root zone ranges from 2 to 4 feet, and available moisture capacity is low. | AwB, AwC, AwD; BrB2, BrC2, BrD2; FaC; HbB, HbB2, HbC2, HbD2; HeB2, HeC2, HeD2; ImC, ImD, ImE; MhC2, MhD2, MhE2; MlB2, MlC2, MlD2; TsB2, TsC2. | Black walnut [5] | 55 | ---------- | White oak, southern red oak, white ash, black oak, black locust, loblolly, shortleaf and Virginia pines, and redcedar. |
| | | Redcedar [6] | 46 (3) | 220 | |
| | | Upland oaks [7] | 70 | 220 | |
| | | Loblolly pine | ------------ | 580 | |
| | | Shortleaf pine | ------------ | 450 | |
| | | Virginia pine | ------------ | 450 | |
| Group 3: Severely eroded, clayey soils on uplands. Root zone ranges from 1 to 4 feet, and available moisture capacity is very low. | BsC3, BsD3; HcC3, HcD3; HhC3, HhD3; InC3, InD3, InE3; MkD3, MkE3; MmD3; TfB3, TfC3. | Black walnut [5] | 70 | ---------- | All commercial hardwoods, redcedar, and loblolly, Virginia, and shortleaf pines. |
| | | Redcedar [6] | 46 (4) | 220 | |
| | | Upland oaks [7] | 70 | 220 | |
| | | Loblolly pine | ------------ | 580 | |
| | | Shortleaf pine | ------------ | 450 | |
| | | Virginia pine | ------------ | 450 | |
| Group 4: Soils that are mostly on rolling and steep uplands and have many limestone outcrops; fine-textured, slowly permeable soil material between the rocks. Root zone is shallow, and available moisture capacity is very low. | MnE; TvD; MoD; Rc. | Redcedar [6] | 40±8 (8) | 170 | Black walnut, redcedar, loblolly pine, shortleaf pine, and black locust. |
| | | Black walnut [5] | 55 (2) | ---------- | |
| | | Loblolly pine | ------------ | ---------- | |
| | | Shortleaf pine | 60 | 360 | |
| Group 5: Moderately well drained soils that have a fragipan or a compact layer at a depth of about 2 feet; medium textured and friable in the upper 2 feet, but slowly permeable and poorly aerated below this depth; moderately low available moisture capacity. | CaA, CaB, CaB2, CaC2; DkB; DnB, DnB2, DnC2; DoB2, DoC2; MfB2. | Yellow-poplar [4] | 98 (3) | 690 | All commercial hardwoods in area, loblolly pine, and shortleaf pine. |
| | | Upland oaks [7] | 73±5 (5) | 220 | |
| | | Loblolly pine | 75 (1) | 450 | |
| | | Shortleaf pine | 65 (1) | 360 | |
| Group 6: Well-drained to excessively drained, cherty soils on rolling to steep uplands. Root zone ranges from shallow to moderately deep. Available moisture capacity is good on east and north slopes but is very low on ridgetops and south and west slopes. | BaC, BaD, BaD2, BaE; BcC3, BcD3; BoC, BoD, BoE; FrC, FrD; SuD, SuE, SuE3. | Yellow-poplar [4] | 89±6(20) | 690 | Yellow-poplar, black walnut, redcedar, upland oaks, and loblolly, shortleaf, and Virginia pines. |
| | | Black walnut [5] | 78(1) | ---------- | |
| | | Redcedar [6] | 40 | 170 | |
| | | Upland oaks [7] | 69±8(15) | 220 | |
| | | Loblolly pine | 80(1) | 580 | |
| | | Shortleaf pine | 62(1) | 360 | |
| | | Virginia pine | 68(1) | 450 | |

See footnotes at end of table.

TABLE 3.—*Woodland suitability grouping of soils*—Continued

| Group and description of the soils | Map symbol | Potential productivity | | | |
|---|---|---|---|---|---|
| | | Trees | Average site index [1] | Average yearly growth [2] | Species suitability [3] |
| | | | | *Bd. ft. per acre* | |
| Group 7:<br>Well-drained soils that are mainly on uplands and have a medium-textured surface layer and subsoil, a moderately deep root zone, and a moderate to moderately high available moisture capacity. | HnB2, HnC2; HoC3; MsB, MsC2; MvB, MvB2, MvC, MvC2, MvC3, MvD, MvD2; SrC3, SrD3; StB2, StC2, StD2. | Yellow-poplar [4]<br>Black walnut [5]<br>Upland oaks [7]<br>Loblolly pine<br>Shortleaf pine | 87±8(11)<br>70(3)<br>67±6(9)<br>66<br>64(1) | 690<br>----------<br>220<br>450<br>360 | All commercial hardwoods in area, loblolly pine, and shortleaf pine. |
| Group 8:<br>Well drained and moderately well drained soils that are on bottom lands and are silt loam, loam, or fine sandy loam to a depth of 3 feet or more. Root zone is very deep, and available moisture capacity is very high. | Eg; GrC; GsB; Hs; Ht; Hu; Ln; Lp; Lc; Ld; Sc; Se. | Yellow-poplar [4]<br>Black walnut [5]<br>Upland oaks [7]<br>Loblolly pine<br>Shortleaf pine | 90±6(5)<br>75(2)<br>62<br>83(1)<br>73(1) | 800<br>----------<br>170<br>580<br>450 | All commercial hardwoods in area, loblolly pine, and shortleaf pine. |
| Group 9:<br>Black, wet soils that are on bottom lands and are fine textured and slowly permeable; often waterlogged and ponded in winter and spring. | Du; La | Cottonwood<br>Sweetgum<br>Bottom-land oaks | 100<br>90<br>90 | 920<br>----------<br>520 | Cherrybark oak, Shumard oak, swamp white oak, cottonwood, and other bottom-land hardwoods. |
| Group 10:<br>Poorly drained soil that is on bottom lands and is medium textured to a depth of 3 feet or more; often waterlogged by flooding and seepage in winter and spring. | Me | Cottonwood | 90 | ---------- | Cottonwood and bottom-land oaks. |
| Group 11:<br>Light-colored, gray soils that are poorly drained and somewhat poorly drained and have a slowly permeable, dense subsoil; very wet and often ponded in winter and spring; very dry in summer. Root zone is shallow and available moisture capacity is variable. | DsB; Rb; TaB; Tb | Bottom-land oaks<br>Sweetgum<br>Upland oaks [7] | 91(3)<br>90<br>69(2) | 520<br>----------<br>220 | All commercial hardwoods in area. |
| Group 12:<br>Various kinds of sites, including areas that are deeply cut by gullies and areas that have been mined. | Gu; Ma; Mp; Mr | Highly variable conditions make on-site appraisals necessary. | ---------- | ---------- | Loblolly pine, shortleaf pine, black locust, and all commercial hardwoods in area. |

[1] Site index at 50 years, except cottonwood, which is at 30 years. (For site index definition, see narrative section.) Standard deviation was calculated for each woodland suitability group having tree crop of 4 or more measured trees per plot. Numbers in parentheses are numbers of plots measured for each wood crop. Site indexes without numbers of plots in parentheses were estimated.

[2] International Log Rule. Based on 85 percent of potential production from well-stocked stand. The stands have periodic commercial thinnings and a harvest of trees every 5 to 10 years. The cutting cycles vary by sites.

[3] Approximate order of preference. Species suitability includes trees to manage and trees to plant later. Listed are trees that are normally available from State Forestry Division Nursery or other sources.

[4] Site index for yellow-poplar computed by method described in "Site Index Comparisons for Several Forest Species in the Southern Appalachians" (*4*).

[5] Site index for black walnut computed by method described in "Site Index Curves for Plantation Black Walnut, Central States Region" (*6*).

[6] Site index for redcedar computed from data obtained in 271 observations made by foresters of the Tennessee Valley Authority.

[7] Site index for upland oaks computed from height growth data in "Yield, Stand, and Volume Tables for Even-Aged Upland Oak Forests" (*10*).

*Equipment limitation.*—Drainage, slope, stoniness, soil texture, or other soil characteristics may restrict or prohibit the use of ordinary equipment in pruning, thinning, harvesting, or other woodland management. Different soils may require different kinds of equipment, methods of operation, or seasons when equipment may be used.

Limitation is *slight* if there are no restrictions on the type of equipment or on the time of year that the equipment can be used. It is *moderate* if slopes are moderately steep, if heavy equipment cannot be used because of wetness in winter and early in spring, or if the use of equipment damages the tree roots to some extent. Equipment limitation is *severe* if many types of equipment cannot be used, if the equipment cannot be used more than 3 months a year, or if the use of equipment severely damages the roots of trees and the structure and stability of the soil. Limitation is severe on moderately steep and steep soils that are stony and have rock outcrops. It is also severe on wet bottom lands and low terraces in winter or early in spring.

*Seedling mortality.*—Even when healthy seedlings of a suitable tree are correctly planted or occur naturally in adequate numbers, some of them will not survive if characteristics of the soil are unfavorable.

Mortality is *slight* if not more than 25 percent of the planted seedlings die, or if trees ordinarily regenerate naturally in places where there are enough seeds. It is *moderate* if 25 to 50 percent of the seedlings die, or if trees do not regenerate naturally in numbers needed for adequate restocking. In some places, replanting to fill open spaces will be necessary. Mortality is *severe*, if more than 50 percent of the planted seedlings die, or if trees do not ordinarily reseed naturally in places where there are enough seeds. If mortality is severe, plant seedlings where the seeds do not grow, prepare special seedbeds, and use good methods of planting to insure a full stand of trees.

*Windthrow hazard.*—Soil characteristics affect the development of tree roots and the firmness with which the roots anchor the tree in the soil so that it resists the force of the wind. Root development may be restricted by a high water table or by an impermeable layer. The protection of surrounding trees also affects windthrow hazard. Knowing the degree of this hazard is important when choosing trees for planting and when planning release cuttings or harvest cuttings.

The windthrow hazard is *slight* if roots hold the tree firmly against a normal wind. Individual trees are likely to remain standing if protective trees on all sides are removed. The hazard is *moderate* if the roots develop enough to hold the tree firmly except when the soil is excessively wet and the wind velocity is very high. It is *severe* if rooting is not deep enough to give adequate stability. Individual trees are likely to be blown over if they are released on all sides.

*Erosion hazard.*—Woodland can be protected from erosion by choosing the kinds of trees, by adjusting the rotation age and cutting cycles, by carefully constructing and maintaining roads, trails, and landings, and by using special techniques in management.

Erosion hazard is rated according to the risk of erosion on well-managed woodland that is not protected by special practices. It is *slight* where a small loss of soil is expected. Generally, erosion is slight if slopes range from 0 to 2 percent and runoff is slow or very slow. The erosion hazard is *moderate* if there is a moderate loss of soil where runoff is not controlled and the vegetative cover is not adequate for protection. It is *severe* where steep slopes, rapid runoff, slow infiltration and permeability, and past erosion make the soil susceptible to severe erosion.

In the following pages the 12 woodland suitability groups of this county are described, and the soils in each group are listed.

#### WOODLAND SUITABILITY GROUP 1

In this group are well-drained soils that are mostly on low terraces and foot slopes. These soils have a medium-textured surface layer and subsoil and a very deep root zone. Their available moisture capacity is high. The soils are—

Armour silt loam, 0 to 2 percent slopes.
Armour silt loam, 2 to 5 percent slopes.
Armour silt loam, 2 to 5 percent slopes, eroded.
Armour silt loam, 5 to 12 percent slopes.
Armour silt loam, 5 to 12 percent slopes, eroded.
Armour cherty silt loam, 2 to 5 percent slopes.
Armour cherty silt loam, 5 to 12 percent slopes, eroded.
Armour cherty silt loam, 12 to 20 percent slopes, eroded.
Armour cherty silty clay loam, 5 to 12 percent slopes, severely eroded.
Armour silty clay loam, 5 to 12 percent slopes, severely eroded.
Culleoka flaggy loam, 12 to 20 percent slopes, eroded.
Culleoka flaggy loam, 20 to 30 percent slopes, eroded.
Culleoka silt loam, 5 to 12 percent slopes.
Culleoka silt loam, 12 to 20 percent slopes.
Culleoka silt loam, 12 to 20 percent slopes, severely eroded.
Culleoka silt loam, 20 to 35 percent slopes.
Culleoka silt loam, 20 to 35 percent slopes, severely eroded.
Dellrose cherty silt loam, 12 to 20 percent slopes.
Dellrose cherty silt loam, 20 to 30 percent slopes.
Dellrose cherty silt loam, 20 to 30 percent slopes, severely eroded.
Dellrose cherty silt loam, 30 to 40 percent slopes.
Dellrose cherty silt loam, 30 to 40 percent slopes, severely eroded.
Etowah silt loam, 2 to 5 percent slopes.
Etowah silt loam, 5 to 12 percent slopes, eroded.
Hagerstown silt loam, 2 to 5 percent slopes, eroded.
Hagerstown silt loam, 5 to 12 percent slopes, eroded.
Hermitage silt loam, 2 to 5 percent slopes.
Hermitage silt loam, 2 to 5 percent slopes, eroded.
Humphreys cherty silt loam, 2 to 5 percent slopes.
Humphreys cherty silt loam, 5 to 12 percent slopes, eroded.
Humphreys cherty silt loam, 12 to 20 percent slopes, eroded.
Humphreys silt loam, 2 to 5 percent slopes.
Humphreys silt loam, 5 to 12 percent slopes, eroded.
Maury silt loam, 0 to 2 percent slopes.
Maury silt loam, 2 to 5 percent slopes.
Maury silt loam, 2 to 5 percent slopes, eroded.
Maury silt loam, 5 to 12 percent slopes, eroded.
Maury silty clay loam, 5 to 12 percent slopes, severely eroded.

This group of fertile soils is well suited to trees. Plant competition ranges from moderate to severe. Although hardwood encroachment slows the initial growth of pines, it does not prevent their establishment. Site preparation and weeding are necessary to establish and maintain good stands. The steep slopes and seasonal wet periods limit the use of equipment and cause a moderate erosion hazard. Erosion can be controlled by seeding firebreaks and by carefully locating, constructing, and draining access roads. Windthrow is not a serious hazard on these soils. Individual trees can be expected to remain standing when released on all sides.

#### WOODLAND SUITABILITY GROUP 2

In this group are well drained or moderately well drained soils that are mostly on rolling and hilly uplands. These soils have a thin, medium-textured surface layer and a plastic clay subsoil. The root zone ranges from 2 to 4 feet, and the available moisture capacity is low. The soils are—

Ashwood silty clay loam, 2 to 5 percent slopes.
Ashwood silty clay loam, 5 to 12 percent slopes.
Ashwood silty clay loam, 12 to 20 percent slopes.
Braxton cherty silt loam, 2 to 5 percent slopes, eroded.
Braxton cherty silt loam, 5 to 12 percent slopes, eroded.
Braxton cherty silt loam, 12 to 20 percent slopes, eroded.
Fairmount silty clay loam, 2 to 10 percent slopes.
Hampshire silt loam, 2 to 5 percent slopes.
Hampshire silt loam, 2 to 5 percent slopes, eroded.
Hampshire silt loam, 5 to 12 percent slopes, eroded.
Hampshire silt loam, 12 to 20 percent slopes, eroded.
Hampshire-Colbert silt loams, 2 to 5 percent slopes, eroded.
Hampshire-Colbert silt loams, 5 to 12 percent slopes, eroded.
Hampshire-Colbert silt loams, 12 to 20 percent slopes, eroded.
Inman silt loam, 5 to 12 percent slopes.
Inman silt loam, 12 to 20 percent slopes.
Inman silt loam, 20 to 30 percent slopes.
Mimosa cherty silt loam, 5 to 12 percent slopes, eroded.
Mimosa cherty silt loam, 12 to 20 percent slopes, eroded.
Mimosa cherty silt loam, 20 to 30 percent slopes, eroded.
Mimosa silt loam, 2 to 5 percent slopes, eroded.
Mimosa silt loam, 5 to 12 percent slopes, eroded.
Mimosa silt loam, 12 to 20 percent slopes, eroded.
Talbott silty clay loam, 2 to 5 percent slopes, eroded.
Talbott silty clay loam, 5 to 12 percent slopes, eroded.

Plant competition does not prevent establishment of desirable trees on these soils, but it does delay natural regeneration and initial growth. Weeding is advisable in natural stands to eliminate the culls and trees of low quality. On the steeper slopes the use of logging equipment is limited, and there is a hazard of erosion. Consequently, adequate drainage is required for logging roads. Seedlings die because of the low moisture supply and the heavy subsoil.

All soils in this group except the Talbott soils produce a heavy, natural growth of black locust. Black walnut grows well on Mimosa, Hampshire, and Braxton soils.

#### WOODLAND SUITABILITY GROUP 3

The soils in this group are clayey and severely eroded. These soils on uplands have a root zone ranging from 1 to 4 feet in depth and a very low available moisture capacity. The soils are—

Braxton cherty silty clay loam, 5 to 12 percent slopes, severely eroded.
Braxton cherty silty clay loam, 12 to 20 percent slopes, severely eroded.
Hampshire silty clay loam, 5 to 12 percent slopes, severely eroded.
Hampshire silty clay loam, 12 to 20 percent slopes, severely eroded.
Hampshire-Colbert silty clay loams, 5 to 12 percent slopes, severely eroded.
Hampshire-Colbert silty clay loams, 12 to 20 percent slopes, severely eroded.
Inman silty clay loam, 5 to 12 percent slopes, severely eroded.
Inman silty clay loam, 12 to 20 percent slopes, severely eroded.
Inman silty clay loam, 20 to 30 percent slopes, severely eroded.
Mimosa cherty silty clay, 10 to 20 percent slopes, severely eroded.
Mimosa cherty silty clay, 20 to 30 percent slopes, severely eroded.
Mimosa silty clay, 10 to 20 percent slopes, severely eroded.
Talbott silty clay, 2 to 5 percent slopes, severely eroded.
Talbott silty clay, 5 to 12 percent slopes, severely eroded.

Plant competition is moderate on these soils, and in some places, blackjack oak and other hardwoods of low quality invade and slow the growth of desirable trees. Weeding, therefore, is desirable. Logging equipment is difficult to operate because the soils are slick when wet and are broken by a few outcrops of bedrock. The low available moisture capacity and clayey surface layer make seedling mortality a problem. On these slowly permeable soils, runoff is high, and, consequently, the hazard of erosion is severe on the steeper slopes. To prevent further damage by erosion, special care is required in establishing new stands and in managing existing ones. Because these soils are shallow to limestone, the growth of roots is restricted and windthrow is likely.

#### WOODLAND SUITABILITY GROUP 4

The soils in this group are on rolling and steep upland sites that are studded with outcrops of limestone. Between the rocks the soil material is fine textured and slowly permeable. The root zone is shallow, and available moisture capacity is very low. The soils are—

Mimosa very rocky soils, 20 to 40 percent slopes.
Talbott very rocky soils, 2 to 15 percent slopes.
Mimosa and Ashwood very rocky soils, 5 to 20 percent slopes.
Rockland.

Plant competition is moderate on these soils and may delay the growth and establishment of stands. On the Mimosa and the Ashwood very rocky soils, black locust invades pine plantings. Therefore, it is advisable to weed natural stands and new plantings. The very low available moisture capacity, the fine-textured surface layer, and shallow root zone cause severe seedling mortality. Equipment limitations and the erosion hazard are also severe on these steep, rough, rocky soils.

#### WOODLAND SUITABILITY GROUP 5

The soils in this group are moderately well drained and have a fragipan or compact layer at a depth of about 2 feet. They are medium textured and friable above the fragipan but are slowly permeable and poorly aerated below it. These soils have a moderately low available moisture capacity. The soils are—

Captina silt loam, phosphatic, 0 to 2 percent slopes.
Captina silt loam, phosphatic, 2 to 5 percent slopes.
Captina silt loam, phosphatic, 2 to 5 percent slopes, eroded.
Captina silt loam, phosphatic, 5 to 12 percent slopes, eroded.
Dickson silt loam, 2 to 5 percent slopes.
Donerail silt loam, 2 to 5 percent slopes.
Donerail silt loam, 2 to 5 percent slopes, eroded.
Donerail silt loam, 5 to 12 percent slopes, eroded.
Donerail silt loam, concretionary, 2 to 5 percent slopes, eroded.
Donerail silt loam, concretionary, 5 to 12 percent slopes, eroded.
Mercer silt loam, 2 to 5 percent slopes, eroded.

Because plant competition is a problem, weeding is necessary in the natural stands and new plantings. In wet periods, logging is difficult. The shallow root zone and the fragipan restrict the growth of roots and cause a moderate windthrow hazard. The low available moisture capacity and the fine-textured surface layer contribute to seedling mortality. The soils in this group, however, are better than average for growing upland oaks, yellow-poplar, and black walnut. Erosion is a moderate hazard and is aggravated by logging and other operations that disturb the soil, especially in wet periods.

#### WOODLAND SUITABILITY GROUP 6

These cherty soils, on rolling to steep uplands, are shallow to moderately deep and are well drained to excessively drained. Their available moisture capacity is good on east and north slopes but is very low on ridgetops and on south and west slopes. The soils are—

Baxter cherty silt loam, 5 to 12 percent slopes.
Baxter cherty silt loam, 12 to 20 percent slopes.
Baxter cherty silt loam, 12 to 20 percent slopes, eroded.
Baxter cherty silt loam, 20 to 30 percent slopes.
Baxter cherty silty clay loam, 5 to 12 percent slopes, severely eroded.
Baxter cherty silty clay loam, 12 to 20 percent slopes, severely eroded.
Bodine cherty silt loam, 5 to 12 percent slopes.
Bodine cherty silt loam, 12 to 20 percent slopes.
Bodine cherty silt loam, 20 to 45 percent slopes.
Frankstown cherty silt loam, 5 to 12 percent slopes.
Frankstown cherty silt loam, 12 to 20 percent slopes.
Sulphura cherty silt loam, 12 to 20 percent slopes.
Sulphura cherty silt loam, 20 to 50 percent slopes.
Sulphura cherty silt loam, 20 to 50 percent slopes, severely eroded.

Most of these soils have been left in trees. The soils are well suited to hardwoods, including yellow-poplar, upland oaks, black walnut, and black cherry. Weeding is required in natural stands, and release work is needed in the pine plantings. Sassafras and hickory invade the new plantings. Because of the steep slopes, equipment limitations are moderate. The erosion hazard ranges from slight to moderate. Therefore, special care should be taken in locating roads, firebreaks, and trails, and in performing logging operations. Shallowness to chert beds and limestone rocks cause a windthrow hazard. Seedling mortality is moderate on these droughty, cherty soils.

#### WOODLAND SUITABILITY GROUP 7

The soils in this group are well drained and are mainly on uplands. They have a surface layer that ranges from 7 to 16 inches in thickness and a subsoil that is medium textured. Their root zone is moderately deep, and their available moisture capacity is moderate to moderately high. The soils are—

Hicks silt loam, 2 to 5 percent slopes, eroded.
Hicks silt loam, 5 to 12 percent slopes, eroded.
Hicks silty clay loam, 5 to 12 percent slopes, severely eroded.
Mountview silt loam, 2 to 5 percent slopes.
Mountview silt loam, 5 to 12 percent slopes, eroded.
Mountview silt loam, shallow, 2 to 5 percent slopes.
Mountview silt loam, shallow, 2 to 5 percent slopes, eroded.
Mountview silt loam, shallow, 5 to 12 percent slopes.
Mountview silt loam, shallow, 5 to 12 percent slopes, eroded.
Mountview silt loam, shallow, 5 to 12 percent slopes, severely eroded.
Mountview silt loam, shallow, 12 to 20 percent slopes.
Mountview silt loam, shallow, 12 to 20 percent slopes, eroded.
Stiversville clay loam, 5 to 12 percent slopes, severely eroded.
Stiversville clay loam, 12 to 20 percent slopes, severely eroded.
Stiversville silt loam, 2 to 5 percent slopes, eroded.
Stiversville silt loam, 5 to 12 percent slopes, eroded.
Stiversville silt loam, 12 to 20 percent slopes, eroded.

Black locust, yellow-poplar, black walnut, and other hardwoods grow well on these soils. Loblolly pine is also suitable (fig. 29). Plant competition is moderate. Although it does not prevent establishment of preferred trees, it may slow initial growth and delay adequate stocking. In natural stands weeding is needed to eliminate low-quality oaks and other undesirable trees. The hazard of erosion is moderate on the steep slopes.

*Figure 29.*—A 6-year-old stand of loblolly pine on severely eroded Mountview soil along a highway.

#### WOODLAND SUITABILITY GROUP 8

In this group are well drained and moderately well drained soils on bottom lands. These soils are silt loam, loam, or fine sandy loam to a depth of 3 feet or more. They have a very deep root zone and a very high available moisture capacity. The soils are—

Egam silt loam, phosphatic.
Greendale cherty silt loam, 2 to 12 percent slopes.
Greendale silt loam, 2 to 5 percent slopes.
Huntington cherty silt loam, phosphatic.
Huntington silt loam, local alluvium.
Huntington silt loam, phosphatic.
Lindside silt loam.
Lindside silt loam, phosphatic.
Lindside cherty silt loam.
Lindside cherty silt loam, phosphatic.
Sees silty clay loam.
Sequatchie loam, phosphatic.

Plant competition is moderate on these soils because they are highly fertile, are very high in available moisture capacity, and are suited to many kinds of native hardwoods. Weeding is therefore needed. To establish cottonwood, site preparation and cultivation are required. Equipment limitations occur during wet periods in the spring, fall, and winter.

#### WOODLAND SUITABILITY GROUP 9

In this group are black, wet soils on bottom lands. These fine-textured, slowly permeable soils are often waterlogged and ponded in winter and spring. The soils are—

Dunning silt loam, phosphatic.
Lanton silt loam, phosphatic.

Seasonal wetness limits logging operations on these soils and the use of standard logging equipment. If equipment is used during these wet periods, it may damage soil structure and stability as well as tree roots. Elimination of culls and undesirable trees improves existing stands. Soil erosion and windthrow are not problems on these soils.

#### WOODLAND SUITABILITY GROUP 10

Melvin silt loam, phosphatic, is the only soil in this woodland suitability group. This poorly drained soil on bottom lands is medium textured to a depth of 3 feet or more, and it is often waterlogged by flooding and seepage in winter and spring.

Weeding is necessary to control plant competition. The use of equipment is limited mainly by wetness. Also, the soil must be drained if cottonwood is planted.

#### WOODLAND SUITABILITY GROUP 11

In this group are light-colored, gray soils that are poorly drained and somewhat poorly drained. These soils have a slowly permeable, dense subsoil. In winter and spring they are very wet and often ponded, and in summer they are very dry. Their root zone is shallow, and their available moisture capacity is variable. The soils are—

Dowellton silt loam, 2 to 5 percent slopes.
Robertsville silt loam, phosphatic.
Taft silt loam, 0 to 8 percent slopes.
Taft silt loam, phosphatic.

The wooded areas of these soils are in pure and mixed stands of sweetgum, bottom-land oaks, and other water-tolerant trees, but the soils are suited to many kinds of trees. Logging operations are generally confined to dry weather because of the ponding in winter and spring. In natural stands weeding is necessary to eliminate culls and undesirable trees. Windthrow is a moderate hazard in natural stands if trees are released on all sides.

#### WOODLAND SUITABILITY GROUP 12

This group is made up of miscellaneous land types that vary widely in soil characteristics, in limitations, and in suitability for trees. The land types are—

Gullied land.
Made land.
Mine pits and dumps.
Mine land, reclaimed.

Logging is difficult in many places because the terrain is rough. Seedling mortality is a problem because of the low available moisture capacity, the hazard of erosion, the low fertility, and other limitations.

## Managing Soils for Wildlife and Fish[3]

This subsection describes the food and cover needed by the wildlife in Williamson County, groups soils according to their suitability for wildlife, and describes these groups. A table rates specified plants according to their suitability to the wildlife soil groups and as food for listed kinds of wildlife.

Additional information and technical guidance in establishing and maintaining habitats for wildlife and fish can be obtained from the staff of the U.S. Soil Conservation Service (SCS), which assists the local soil and water conservation district. The SCS maintains up-to-date technical guides for each important kind of wildlife and fish and for each significant food or cover plant. It also can assist in soil and water conservation that will increase wildlife.

Hunting and fishing are important forms of recreation in Williamson County. More game and fish can be encouraged to live in the county if suitable practices are used in managing the soils, plants, and water. Managing soils for wildlife also helps to protect the soil and to conserve water.

[3] By FLOYD R. FESSLER, biologist, Soil Conservation Service.

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### *Food and cover needed by wildlife*

The kind of habitat needed by wildlife and fish varies according to the species. Some kinds of wildlife live in woodland, others in open farmland. Ducks and other wildlife require a watery habitat. Some eat only insects and small animals, others eat only vegetative foods, and some eat a combination of the two. Largemouth bass and bluegill prefer warm water, but trout require cold water.

Following is a summary of the needs of the more important kinds of wildlife and fish that live in Williamson County, or that can be supported there.

*Bobwhite (quail).*—Choice foods are acorns, seeds, and fruits. The quail also eat many insects. Their food must be close to sheltering vegetation for shade and for protection from predators and adverse weather.

*Deer.*—Deer live chiefly in wooded areas of 500 acres or more. They feed on the tender parts of grasses, herbs, shrubs, vines, and trees. Acorns, corn, soybeans, and similar food are also choice. Because deer drink water frequently, sources of water should not be more than 1 mile apart.

*Doves (mourning).*—These birds eat only the seeds of plants and do not eat insects, green leaves, or fruits. The seeds must be on open ground because doves do not scratch for food as do other birds. They drink water daily.

*Ducks.*—Wild ducks prefer their food covered with water, though they occasionally feed on dry land when flooded food is not available. The water should not be deeper than 15 inches for mallards, pintails, and other ducks that do not dive for their food.

*Geese.*—Wild geese feed on corn and other grains, and they graze clover, rye, ryegrass, wheat, and other green winter crops. These migatory birds use ponds, lakes, and other water for resting and drinking.

*Rabbits (cottontail).*—Rabbits need brushy areas interspersed with grass (fig. 30). They are the primary food of many kinds of predators and therefore need a brier-type cover for protection. Clovers, winter grains, or grasses near this cover provide attractive food for rabbits.

*Figure 30.*—**This multiflora rose fence provides good food and cover for wildlife.**

*Squirrels.*—These animals generally prefer wooded areas with a mixed stand of trees that bear acorns, nuts, fruits, and seeds. They also like corn. Squirrels nest in trees and prefer to use den holes in the trees for shelter and for raising their young.

*Turkey.*—Wild turkeys thrive only in wooded areas that are 1,000 acres or larger. They eat insects, acorns, grapes, seeds of grasses and pines, and, in winter and spring, green forage. These birds require water daily.

*Nongame birds.*—The foods of the many kinds of nongame birds in the county vary greatly. Several species eat nothing but insects, a few eat insects and fruits, and others eat insects as well as acorns, nut meats, and fruits.

*Fish.*—Warm-water ponds are needed for largemouth bass, bluegill, redear sunfish, and channel catfish. For bluegill and redear sunfish, the choice foods are mostly aquatic worms, insects, and insect nymphs and larvae. Small fish are essential food for bass and channel catfish.

The amount of fish food produced in ponds is directly related to the fertility of the water. This fertility is affected by the soils of the watershed and somewhat by the soils in the bottom of the pond. Most warm-water ponds need to be fertilized to eliminate troublesome water weeds and to increase fish production. The kind and amount of fertilizer should be adjusted according to the kind of soil. If the soils of a pond are phosphatic, only nitrogen is needed. All other kinds of soils require a fertilizer containing nitrogen, phosphate, and potash. Lime is needed in ponds on the Highland Rim. Supplementary feeding also increases fish production. Rainbow trout require cold-water ponds. These fish require water at a temperature not over 70° F. The ponds should not be fertilized, but the fish should be fed by supplementary feeding. The many large springs in the Highland Rim could supply the kind of water needed for cold-water ponds.

### *Wildlife suitability groupings*

The soils of Williamson County have been placed in 10 groups on the basis of their suitability as habitats for specified kinds of wildlife. These 10 wildlife suitability groups are described in the following pages. Table 4 rates the suitability of specified plants to the soils of each group. It also rates the suitability of each of these plants as food for birds and animals that live in the county or stop there when migrating. The plants listed in table 4 furnish some of the cover needed, but cover in the county is generally adequate or can be readily grown.

TABLE 4.—*Suitability of wildlife food plants to soil groups and*

[Absence of entry indicates plant may be eaten in only

| Plant | Suitability of plants to wildlife soil groups— | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Alfalfa | Marginal | Suited | Marginal | Not suited | Not suited | Not suited | Not suited | Not suited |
| Amaranth (pigweed) | Suited | Suited | Marginal | Not suited | Marginal | Marginal | Not suited | Not suited |
| Ash, green and white | Marginal | Marginal | Not suited | Marginal | Marginal | Not suited | Marginal | Marginal |
| Barley | Marginal | Suited | Marginal | Not suited | Marginal | Suited | Not suited | Not suited |
| Barnyard grass | Suited | Marginal | Not suited | Not suited | Not suited | Not suited | Suited | Suited |
| Beautyberry | Suited | Marginal | Not suited | Not suited | Not suited | Marginal | Marginal | Marginal |
| Beech | Marginal | Suited | Not suited | Not suited | Marginal | Not suited | Suited | Marginal |
| Blackberry | Suited | Suited | Marginal | Not suited | Not suited | Suited | Not suited | Not suited |
| Blackgum | Marginal | Marginal | Not suited | Not suited | Marginal | Marginal | Marginal | Marginal |
| Black locust | Not suited | Marginal | Not suited | Not suited | Marginal | Marginal | Not suited | Not suited |
| Bristlegrass | Marginal | Suited | Marginal | Not suited | Not suited | Suited | Not suited | Not suited |
| Browntop millet | Suited | Suited | Marginal | Not suited | Marginal | Marginal | Not suited | Not suited |
| Buckwheat | Suited | Suited | Not suited | Not suited | Marginal | Suited | Not suited | Not suited |
| Buttonclover and burclover (forage). | Suited | Suited | Marginal | Not suited | Marginal | Suited | Not suited | Not suited |
| Cherry, black | Suited | Suited | Not suited | Not suited | Not suited | Not suited | Suited | Marginal |
| Chufa | Suited | Not suited | Not suited | Not suited | Not suited | Not suited | Suited | Suited |
| Clover, crimson and white (forage). | Suited | Suited | Suited | Marginal | Marginal | Suited | Marginal | Marginal |
| Corn [4] | Suited | Suited | Not suited | Not suited | Not suited | Marginal | Not suited | Not suited |
| Cowpeas [4] | Suited | Suited | Not suited | Not suited | Not suited | Suited | Marginal | Marginal |
| Crabgrass | Suited | Suited | Suited | Not suited | Marginal | Suited | Not suited | Not suited |
| Croton, woolly | Suited | Suited | Marginal | Marginal | Not suited | Marginal | Not suited | Not suited |
| Dewberry | Marginal | Suited | Marginal | Not suited | Marginal | Suited | Not suited | Not suited |
| Dogwood | Not suited | Suited | Suited | Suited | Not suited | Suited | Not suited | Not suited |
| Elder | Suited | Marginal | Not suited | Not suited | Not suited | Marginal | Marginal | Suited |
| Elms | Marginal | Marginal | Marginal | Not suited | Marginal | Not suited | Marginal | Marginal |
| Farkleberry | Not suited | Not suited | Not suited | Not suited | Suited | Suited | Not suited | Not suited |
| Fescue | Suited | Suited | Suited | Marginal | Suited | Suited | Suited | Suited |
| Grapes, muscadine, fox and others. | Suited | Suited | Marginal | Marginal | Not suited | Suited | Not suited | Not suited |

See footnotes at end of table.

#### WILDLIFE SUITABILITY GROUP 1

Deep soils on bottom lands make up this group. These soils are well drained or moderately well drained and are medium textured to a depth of 30 inches or more. Their slopes are dominantly less than 5 percent. The soils are—

Egam soils.
Greendale soils.
Huntington soils.
Lanton soils.
Lindside soils.
Sequatchie soils.
Sees soils.

These soils are high in available moisture capacity and are easy to work. They produce high yields of many kinds of crops, especially summer annuals, and can be planted to row crops every year. Nearly all areas are next to or near permanent or intermittent streams.

#### WILDLIFE SUITABILITY GROUP 2

In this group are well-drained soils that have a deep root zone, a moderate to high available moisture capacity, and a medium-textured surface layer and subsoil. Crops grown on these soils respond well to management (fig. 31). The soils are—

Armour soils.
Culleoka soils.
Dellrose soils.
Etowah soils.
Hagerstown soils.
Hermitage soils.
Hicks soils.
Humphreys soils.
Maury soils.
Mine land, reclaimed.
Mountview soils.
Stiversville soils.

Slope is the main problem in using these soils. These soils can product high yields of all suited crops, but few areas are level enough for annual cultivation. Although dominant slopes range from 2 to 12 percent, some slopes are as much as 40 percent.

#### WILDLIFE SUITABILITY GROUP 3

This group is made up of clayey soils developed from limestone on uplands. Although dominant slopes are between 5 and 15 percent, a few short slopes along the deeper drains are steeper. Small, nearly flat areas occur on hilltops. These soils have a thin silty surface layer and a

*the preference of the wildlife species using the food*

**small amounts, or that its use by wildlife is unknown]**

| Suitability of plants to wildlife soil groups—Con. | | Suitability of plants as food for— | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Nongame birds | | |
| 9 | 10 | Bobwhite | Deer | Dove | Duck | Geese | Rabbit | Squirrel | Turkey | Fruit eaters [1] | Grain and seed eaters [2] | Nut and acorn eaters [3] |
| Not suited | Not suited | -------- | Choice | -------- | -------- | Choice | Choice | -------- | -------- | -------- | -------- | |
| Marginal | Not suited | Fair | -------- | Choice | -------- | -------- | -------- | -------- | -------- | -------- | Fair | |
| Marginal | Not suited | Choice | Fair | -------- | Fair | -------- | -------- | Fair | Fair | -------- | -------- | |
| Not suited | Not suited | Fair | Fair | Fair | Fair | Choice | Fair | Choice | Choice | -------- | Fair | |
| Suited | Not suited | -------- | -------- | Choice | Choice | Choice | -------- | -------- | -------- | -------- | Fair | |
| Suited | Not suited | Fair | Fair | -------- | -------- | -------- | -------- | -------- | -------- | Fair | Fair | |
| Suited | Not suited | Choice | -------- | -------- | Choice | -------- | -------- | Choice | Choice | -------- | -------- | Choice. |
| Suited | Suited | Choice | Fair | -------- | -------- | -------- | -------- | Choice | Choice | Choice | -------- | Choice. |
| Marginal | Not suited | Fair | Fair | -------- | -------- | -------- | -------- | Fair | Fair | Choice | -------- | |
| Not suited | Marginal | Fair | Fair | -------- | -------- | -------- | -------- | Fair | Fair | -------- | -------- | |
| Not suited | Marginal | Choice | Fair | Choice | Choice | -------- | -------- | -------- | -------- | -------- | Choice | |
| Marginal | Not suited | Choice | Fair | Choice | Choice | Fair | -------- | -------- | Choice | -------- | Choice | |
| Not suited | Not suited | Fair | Choice | Fair | Fair | -------- | -------- | -------- | Choice | -------- | Fair | |
| Not suited | Not suited | -------- | Choice | -------- | -------- | -------- | Choice | -------- | Choice | -------- | -------- | |
| Suited | Not suited | -------- | Fair | -------- | -------- | -------- | -------- | Choice | Fair | Choice | -------- | |
| Suited | Not suited | -------- | Choice | -------- | Choice | Choice | -------- | Choice | Choice | -------- | -------- | |
| Marginal | Not suited | -------- | Choice | -------- | Choice | Choice | -------- | Choice | Fair | Choice | -------- | |
| Suited | Not suited | Choice | Choice | Choice | Choice | Choice | Choice | Choice | Choice | -------- | Choice | Choice. |
| Marginal | Not suited | Choice | Choice | Fair | -------- | -------- | Fair | -------- | Choice | -------- | -------- | |
| Marginal | Marginal | -------- | -------- | Fair | -------- | -------- | Fair | -------- | Fair | -------- | Choice | |
| Not suited | Marginal | Choice | -------- | Choice | -------- | -------- | -------- | -------- | -------- | -------- | -------- | |
| Marginal | Marginal | Choice | Fair | -------- | -------- | -------- | Fair | Fair | Choice | Choice | -------- | Choice. |
| Not suited | Not suited | Choice | Choice | -------- | -------- | -------- | -------- | Fair | Choice | Choice | -------- | Fair. |
| Suited | Not suited | -------- | Choice | -------- | -------- | -------- | -------- | -------- | Fair | -------- | -------- | |
| Marginal | Not suited | -------- | Fair | -------- | -------- | -------- | -------- | Choice | Fair | -------- | Fair | |
| Not suited | Marginal | Fair | Fair | -------- | -------- | -------- | -------- | Fair | Fair | Choice | -------- | |
| Suited | Marginal | -------- | Fair | -------- | -------- | Fair | Fair | -------- | Fair | -------- | -------- | |
| Marginal | Marginal | -------- | Choice | -------- | -------- | -------- | -------- | Fair | Choice | Choice | -------- | |

TABLE 4.—*Suitability of wildlife food plants to soil groups and*

| Plant | Suitability of plants to wildlife soil groups— | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Greenbrier | Suited | Suited | Marginal | Marginal | Marginal | Suited | Not suited | Not suited |
| Hackberry | Suited | Marginal | Suited | Suited | Suited | Marginal | Not suited | Marginal |
| Hawthorn | Marginal | Marginal | Not suited | Not suited | Marginal | Marginal | Not suited | Not suited |
| Hazelnut | Suited | Marginal | Not suited | Marginal | Not suited | Marginal | Not suited | Marginal |
| Hickory | Suited | Suited | Marginal | Marginal | Suited | Marginal | Not suited | Not suited |
| Holly | Marginal | Marginal | Not suited | Marginal | Not suited | Marginal | Not suited | Not suited |
| Honeysuckle | Suited | Suited | Not suited | Not suited | Marginal | Suited | Not suited | Not suited |
| Huckleberry and blueberry. | Not suited | Not suited | Not suited | Not suited | Suited | Suited | Not suited | Not suited |
| Japanese millet | Suited | Not suited | Not suited | Not suited | Not suited | Marginal | Suited | Suited |
| Johnsongrass | Suited | Suited | Not suited | Not suited | Not suited | Marginal | Not suited | Marginal |
| Lespedeza, bicolor | Suited | Suited | Not suited | Marginal | Marginal | Marginal | Not suited | Not suited |
| Lespedeza, annual | Suited | Suited | Marginal | Marginal | Marginal | Suited | Marginal | Marginal |
| Lespedeza, sericea | Suited | Suited | Marginal | Not suited | Suited | Marginal | Not suited | Not suited |
| Lespedeza, wild | Suited | Suited | Marginal | Marginal | Suited | Suited | Not suited | Not suited |
| Magnolia | Marginal | Marginal | Not suited | Not suited | Marginal | Not suited | Not suited | Marginal |
| Maple | Marginal | Suited | Marginal | Not suited | Not suited | Marginal | Marginal | Not suited |
| Milk pea | Not suited | Not suited | Marginal | Marginal | Suited | Marginal | Not suited | Not suited |
| Mulberry | Suited | Suited | Not suited | Not suited | Not suited | Marginal | Not suited | Not suited |
| Oaks (acorns) | Suited | Suited | Marginal | Marginal | Suited | Marginal | Suited | Suited |
| Oats | Marginal | Suited | Marginal | Not suited | Marginal | Suited | Not suited | Not suited |
| Panicgrass | Marginal | Suited | Not suited | Marginal | Not suited | Marginal | Suited | Suited |
| Partridgepea | Not suited | Suited | Marginal | Marginal | Suited | Suited | Not suited | Not suited |
| Paspalum | Suited | Marginal | Not suited | Marginal | Not suited | Marginal | Suited | Suited |
| Pea vine (winter peas) | Suited | Suited | Marginal | Not suited | Marginal | Suited | Not suited | Not suited |
| Pecan | Suited | Suited | Not suited | Not suited | Not suited | Marginal | Marginal | Not suited |
| Persimmon | Marginal | Marginal | Not suited | Not suited | Marginal | Marginal | Marginal | Not suited |
| Pines, loblolly, shortleaf, and Virginia (seeds). | Not suited | Suited | Suited | Suited | Suited | Suited | Not suited | Not suited |
| Plums | Suited | Suited | Not suited | Not suited | Marginal | Suited | Not suited | Marginal |
| Pokeberry | Suited | Suited | Marginal | Marginal | Suited | Suited | Not suited | Marginal |
| Privet, common | Suited | Suited | Marginal | Marginal | Suited | Suited | Not suited | Marginal |
| Pyracantha | Marginal | Suited | Marginal | Marginal | Suited | Suited | Not suited | Not suited |
| Ragweed, common | Suited | Suited | Marginal | Not suited | Marginal | Suited | Not suited | Not suited |
| Ragweed, giant | Suited | Marginal | Not suited | Not suited | Not suited | Marginal | Not suited | Not suited |
| Redcedar | Not suited | Suited | Suited | Suited | Suited | Not suited | Not suited | Not suited |
| Rescuegrass (forage) | Marginal | Suited | Suited | Marginal | Marginal | Marginal | Not suited | Marginal |
| Rose, multiflora | Marginal | Suited | Marginal | Not suited | Suited | Suited | Not suited | Not suited |
| Rye | Marginal | Suited | Marginal | Not suited | Marginal | Suited | Not suited | Not suited |
| Ryegrass | Suited | Suited | Suited | Suited | Suited | Suited | Not suited | Marginal |
| Sassafras | Not suited | Suited | Marginal | Not suited | Not suited | Not suited | Not suited | Not suited |
| Serviceberry | Marginal | Suited | Suited | Marginal | Suited | Suited | Not suited | Not suited |
| Smartweed | Suited | Not suited | Not suited | Not suited | Not suited | Not suited | Suited | Suited |
| Sorghum, grain [4] [5] | Suited | Suited | Not suited | Not suited | Marginal | Suited | Marginal | Marginal |
| Soybeans [4] | Suited | Suited | Not suited | Not suited | Not suited | Suited | Marginal | Marginal |
| Sudangrass | Suited | Suited | Not suited | Not suited | Not suited | Marginal | Marginal | Marginal |
| Sumac | Suited | Suited | Suited | Suited | Suited | Suited | Not suited | Marginal |
| Sunflower | Suited | Suited | Suited | Marginal | Suited | Suited | Not suited | Not suited |
| Sweetgum | Marginal | Suited | Not suited | Not suited | Not suited | Not suited | Suited | Suited |
| Sycamore | Marginal | Marginal | Not suited | Not suited | Not suited | Not suited | Marginal | Not suited |
| Tickclover | Suited | Suited | Marginal | Marginal | Marginal | Suited | Not suited | Not suited |
| Tupelo | Marginal | Marginal | Not suited | Not suited | Not suited | Not suited | Marginal | Not suited |
| Vetch, hairy | Suited | Suited | Marginal | Not suited | Marginal | Not suited | Marginal | Marginal |
| Virginia creeper | Suited | Suited | Not suited | Not suited | Not suited | Marginal | Marginal | Suited |
| Walnut | Not suited | Suited | Suited | Suited | Suited | Not suited | Not suited | Not suited |
| Wheat | Marginal | Suited | Marginal | Not suited | Marginal | Suited | Not suited | Not suited |
| Yellow-poplar | Not suited | Suited | Not suited | Not suited | Suited | Suited | Not suited | Not suited |

[1] Fruit eaters common in the county are bluebird, catbird, and mockingbird.

[2] Grain and seed eaters common in the county are blackbird, cardinal, meadowlark, sparrow, and towhee.

[3] Nut and acorn eaters common in the county are bluejay, chickadee, grackle, and woodpecker.

*the preference of the wildlife species using the food*—Continued

| Suitability of plants to wildlife soil groups—Con. | | Suitability of plants as food for— | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Nongame birds | | |
| 9 | 10 | Bobwhite | Deer | Dove | Duck | Geese | Rabbit | Squirrel | Turkey | Fruit eaters [1] | Grain and seed eaters [2] | Nut and acorn eaters [3] |
| Marginal | Marginal | | Choice | | | | Choice | | Fair | Fair | | |
| Marginal | Marginal | Fair | Choice | | | | | Fair | Choice | Choice | | |
| Not suited | Marginal | | Fair | | | | | Fair | Fair | Fair | | |
| Suited | Marginal | | | | | | | Fair | Fair | Fair | | |
| Not suited | Not suited | | Fair | | | | | Choice | Fair | | | Choice. |
| Not suited | Not suited | | Fair | | | | | | | Fair | | |
| Marginal | Marginal | | Choice | | | | | | | Choice | | |
| Not suited | Marginal | Fair | Fair | | | | | Fair | Fair | Choice | | |
| | | | | | | | | | | | | |
| Suited | Not suited | | | Choice | Choice | Choice | | | | | Choice | |
| Marginal | Not suited | Fair | Fair | Choice | | | | | | | Choice | |
| Not suited | Not suited | Choice | Choice | | | | Fair | | | | | |
| Marginal | Marginal | Choice | Choice | | | | Fair | | Fair | | Fair | |
| Not suited | Marginal | | | | | | Fair | | | | | |
| Not suited | Marginal | | Fair | | | | Fair | | | | | |
| Not suited | Not suited | | Fair | | | | | Choice | Choice | Choice | | |
| Not suited | Not suited | | Choice | | | | | Fair | Fair | | | |
| Not suited | Marginal | Choice | | | | | | | | | | |
| Not suited | Not suited | Choice | Fair | | | | | Choice | Choice | Choice | | |
| Marginal | Suited | Choice | Fair | | | | | Choice | Choice | Choice | | |
| Not suited | Not suited | Fair | Choice | Choice | Fair | Choice | Choice | Choice | Choice | | Choice | |
| Suited | Marginal | Choice | Fair | Choice | Choice | Fair | Fair | | Choice | | Choice | |
| Not suited | Marginal | | | | | | | | | | | |
| Suited | Marginal | Choice | Fair | Choice | Choice | | | | Choice | | Choice | |
| Not suited | Not suited | | Fair | | | | Choice | | | | | |
| Marginal | Not suited | Choice | Fair | | | | | Choice | Choice | | | Choice. |
| Not suited | Marginal | | Fair | | | | | Fair | Choice | Fair | | |
| Not suited | Suited | Choice | | Choice | | | | Choice | Choice | | | Choice. |
| | | | | | | | | | | | | |
| Suited | Marginal | | Fair | | | | | | | Fair | | |
| Not suited | Not suited | Fair | Fair | Choice | | | | | Fair | Choice | | |
| Suited | Suited | Fair | Fair | | | | | | | Choice | | |
| Not suited | Marginal | | | | | | | | Choice | Choice | | |
| Not suited | Marginal | Choice | Fair | Choice | | | | | | | Choice | |
| Marginal | Not suited | | | | | | | | | | Choice | |
| Not suited | Marginal | | Fair | | | | | | | Choice | | |
| Marginal | Marginal | | Choice | | | Choice | Choice | | Choice | | | |
| Not suited | Marginal | | | | | | | | Fair | Choice | | |
| Not suited | Not suited | Choice | | | Fair | Fair | Fair | | Choice | | Fair | |
| Marginal | Marginal | | Choice | | | Choice | Choice | | Choice | | | |
| Not suited | Not suited | Fair | Choice | | | | | Fair | Fair | Choice | | |
| Marginal | Marginal | | Fair | | | | | | | Choice | | |
| Suited | Not suited | Fair | | Fair | Choice | | | | | | Fair | |
| Suited | Not suited | Choice | Choice | Choice | Choice | Choice | | Choice | Choice | | Choice | |
| Suited | Not suited | Choice | Choice | Fair | Choice | | Choice | | Choice | | | |
| Suited | Not suited | Choice | | Choice | Choice | | | Fair | | | Choice | |
| Marginal | Marginal | Fair | Choice | | | | Choice | | Fair | Choice | | |
| Marginal | Marginal | Choice | Choice | Choice | | | | | Fair | | Choice | Choice. |
| Suited | Not suited | Choice | Fair | Choice | | | | | Choice | | | Choice. |
| Not suited | Not suited | | Fair | | | | | | | | Fair | |
| Not suited | Marginal | Choice | Choice | | | | | Fair | | | | |
| Marginal | Not suited | | | | | | | Fair | | | | |
| Marginal | Not suited | Choice | Choice | | | | Fair | | Fair | | | |
| Suited | Marginal | | Fair | | | | | | Fair | Choice | | |
| Not suited | Not suited | | | | | | | Choice | | | | Choice. |
| Not suited | Not suited | Choice | Choice | Choice | | Choice | Choice | Choice | Choice | | Choice | |
| Not suited | Not suited | | | | | | | Choice | | | Fair | |

[4] If planted as a cultivated crop, the ratings apply only to those soils in capability classes I through IV.

[5] Grain sorghum is a choice food of most grain feeders, but it also attracts blackbirds, cowbirds, sparrows, and other unwanted birds. Grain sorghum also rots quickly in humid areas. These two factors limit the suitability of grain sorghum as a wildlife food.

*Figure 31.*—**Annual lespedeza growing along rail fence provides excellent food and cover for quail. Typical on Mountview soils.**

plastic clay subsoil. Bedrock generally is at a depth of 1 to 4 feet. In this group are—

Ashwood soils.
Braxton soils.
Fairmount soils.
Hampshire soils.
Hampshire-Colbert soils.
Inman soils.
Mimosa soils (except the very rocky ones).
Talbott soils (except the very rocky ones).

These soils are hard to work. Where the subsoil is exposed by erosion, the plow layer is sticky when wet and hard when dry. The capacity to supply moisture is moderate to low, and the root zone is too shallow for annual crops. Yields of summer annuals ordinarily are medium to low. Perennials and plants that make a large growth in spring are best suited.

#### WILDLIFE SUITABILITY GROUP 4

In this group are clayey soils with many outcrops of limestone. These soils are too rocky for cultivation, except that done with hand tools. The soil material between the outcrops is fine textured and slowly permeable. The soils are droughty and their response to management is low for most crops. In this group are—

Mimosa very rocky soils.
Mimosa and Ashwood very rocky soils.
Talbott very rocky soils.
Rockland.

Although some areas are in pasture, most areas are in trees or in bushes and weeds. Dominant slopes are between 5 and 30 percent.

#### WILDLIFE SUITABILITY GROUP 5

Cherty soils on hills and ridges are in this group. The gently sloping areas are generally small and are on ridgetops. The soils in this group are very droughty, especially on slopes facing south and west. They are low in natural fertility and are strongly acid. Response to management is moderate to low. In this group are—

Baxter soils.
Bodine soils.
Frankstown soils.
Sulphura soils.

Best suited plants are perennials and those that grow mostly in the spring when moisture is plentiful. Yields of summer annuals are ordinarily medium to low. Only the small, more nearly level patches on ridgetops are suitable for frequent cultivation. A large acreage of these soils is in forest.

#### WILDLIFE SUITABILITY GROUP 6

The soils in this group have a fragipan at about 2 feet below the surface. Above the pan the soils are friable and easy to keep in good tilth, but the pan is dense and slowly permeable. Consequently, the lower subsoil is waterlogged during rainy seasons. The dominant slopes are from 2 to 5 percent, but a few are as much as 12 percent, and there are a few small, nearly level areas. In this group are—

Captina soils.
Dickson soils.
Donerail soils.
Mercer soils.

These soils have a moderate available moisture capacity. They can be cultivated frequently and are well suited to nearly all crops grown in the county. The response to management is good.

#### WILDLIFE SUITABILITY GROUP 7

Melvin silt loam, phosphatic, is the only soil in this group. This poorly drained soil is on bottom lands, generally in areas that are likely to be flooded for short periods in winter and spring. Although the water table is close to the surface during much of winter and spring, it may drop to 5 or 6 feet below the surface in summer and fall. This soil is medium textured to a depth of 30 inches or more, and the subsoil is moderately permeable.

Excess water limits the kinds of crops that can grow on this soil. Summer annuals that do not require a long growing season produce good yields, and with adequate drainage, good yields of all summer annuals can be produced. Areas of 3 acres or more are suitable for growing food for wild ducks. These areas need to be flooded so that the ducks can eat the food grown.

#### WILDLIFE SUITABILITY GROUP 8

This group of poorly drained, gray soils are in nearly level areas or depressions. They have a silty, friable surface layer and a dense, slowly permeable subsoil. In winter and spring these soils are commonly very wet, and water stands on the surface for short periods. In the summer they dry out and are fairly droughty. They have a low available moisture capacity that is largely caused by the shallow root zone. In this group are—

Dowellton soils.
Robertsville soils.
Taft soils.

These soils are low in natural fertility, are strongly acid, and respond fairly well to management. They can be cultivated every year, but without better surface drainage, only water-tolerant plants can be grown. Areas of

3 acres or more are suitable for growing food and flooding it for wild ducks.

#### WILDLIFE SUITABILITY GROUP 9

Dunning silt loam, phosphatic, is the only soil in this group. This poorly drained, black soil is on nearly level bottom lands. The top 8 inches of the soil is medium textured, but the subsoil is clayey and slowly permeable. Most areas are likely to be flooded or ponded for short periods during winter and spring.

This soil is moderately high in natural fertility, and crops on it show a fair to good response to management. Unless better surface drainage is provided, only water-tolerant plants can be grown. These plants produce medium to high yields, and they can be grown annually.

#### WILDLIFE SUITABILITY GROUP 10

In this group are land types that are unsuitable for cultivation without major reclamation. The land types are—

Gullied land.
Mine pits and dumps.
Made land.

The Gullied land has deep gullies and is difficult to revegetate. The Mine pits and dumps are areas that have been mined for phosphate or for gravel for highway construction. Some of these mined areas have been smoothed over, but others consist of open pits and dumps. Because these areas are variable, each area must be studied before selecting plants suitable for revegetation.

## Use of Soils for Engineering Work[4]

This subsection contains soil test data and other information that can be used for engineering purposes. Most of the information is in tables. Data from tests on samples of seven extensive soil series in the county are given in table 5. Brief descriptions of all the soils and their physical properties are given in table 6. In table 7 the soils are rated according to their suitability for use in roads, farm ponds, agricultural drainage, and other engineering structures and practices.

### *Engineering applications*

The information in this report can be used by engineers to—

1. Make soil and land use studies that will aid in selecting and developing industrial, business, residential, and recreational sites.
2. Make preliminary estimates of the engineering properties of soils for use in planning agricultural drainage systems, farm ponds, irrigation systems, and diversion terraces.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting locations for highways and airports and in planning detailed investigations of the selected locations.
4. Locate probable sources of gravel and other construction materials.
5. Correlate performance of engineering structures with soil mapping units, and thus develop information that will be useful in designing and maintaining the structures.
6. Determine the suitability of soil units for cross-country movements of vehicles and construction equipment.
7. Supplement information obtained from other published maps and reports and from aerial photographs for the purpose of making maps and reports that can be used readily by engineers.
8. Develop other preliminary estimates for construction purposes pertinent to the particular area.

*This report will not eliminate the need for sampling and testing soils before specific engineering structures are designed and constructed. It should be used primarily in planning more detailed field investigations to determine the condition of soil in place at the proposed construction site. The depth of sampling must be considered a limiting factor, for excavations generally extend to much greater depths.*

Some of the terms used by the agricultural soil scientist may be unfamiliar to the engineer, and some words—for example, *soil*, *clay*, *silt*, *sand*, *topsoil*, and *aggregate*—may have special meanings in soil science. These terms are defined in the Glossary.

To make the best use of the soil map and the soil survey report, the engineers should know the physical properties of the soil materials and the condition of the soil in place. After testing the soil materials and observing the behavior of each soil in engineering structures and foundations, the engineer can develop design recommendations suited to each soil unit on the map.

### *Engineering test data*

Samples from the principal soil types of seven extensive soil series in the county were tested according to standard AASHO procedures (*1*) so that the soils could be evaluated for engineering purposes. The test data are given in table 5, beginning on page 78. Because the samples tested were generally obtained from depths of less than 6 feet, they do not represent materials that are encountered in earthwork at greater depths.

In the moisture-density (compaction) test, soil material is compacted into a mold several times with a constant compactive effort, each time at a successively higher moisture content. The density (unit weight) of the soil material increases as the moisture content increases until the optimum moisture content is reached. After that, the density decreases as the moisture content increases. The highest density obtained in the compaction test is termed *maximum-dry density*. Data on moisture and density are important in earthwork because, as a rule, optimum stability is obtained if the soil is compacted to about the maximum density when it is at approximately the optimum moisture content.

The results of the mechanical analysis may be used to determine the relative proportions of the particles of different sizes. These data, however, should not be used in naming soil textural classes, because the clay content was determined by the hydrometer method.

[4] DAVID L. ROYSTER, chief soils engineer, Materials and Testing Division, Tennessee State Highway Department, assisted in writing this subsection.

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

Table 5 also gives two engineering classifications for each soil sample. These classifications, based upon the liquid limit, the plasticity index, and the data obtained by mechanical analysis, are briefly described in the following subsection.

### *Engineering classification of soils*

Most highway engineers classify soil materials according to the system used by the American Association of State Highway Officials (AASHO) (*1*). In this system there are seven principal groups. They range from A–1, which consists of gravelly soils that are high in bearing capacity, to A–7, which consists of clay soils that have low bearing capacity when wet. Within each group the relative engineering value of the soil material is indicated by a group index number. These range from 0 for the best materials to 20 for the poorest. The group index number is shown in parentheses following the soil group symbol.

Some engineers prefer the Unified soil classification system (*17*). In this system, soil materials are identified as coarse grained (8 classes), fine grained (6 classes), or highly organic.

The classification of a soil material by either the AASHO or the Unified system identifies that soil material with regard to gradation and plasticity characteristics. The classification permits the engineer to rapidly appraise this soil material by comparing it with more familiar soils that have the same classification.

### *Engineering descriptions and physical properties*

Table 6, beginning on page 82, gives for each of the mapping units, some of the soil characteristics significant in engineering and the engineering classification of the soil materials in the principal horizons.

The depth to the seasonally high water table is based on field observations. Comparisons between depth to

TABLE 5.—*Engineering*

| Soil name and location | Parent material | Tennessee report No. | Depth | Horizon | Moisture-density[2] Maximum dry density | Moisture-density[2] Optimum moisture |
|---|---|---|---|---|---|---|
| | | | *Inches* | | *Lb. per cu. ft.* | *Percent* |
| Armour silt loam: | | | | | | |
| ½ mile north of Franklin (central concept) | Old alluvium. | 59 | 0 to 9 | Ap | 94 | 14 |
| | | 60 | 29 to 42 | B31 | 102 | 16 |
| | | 61 | 65 to 80+ | C | 102 | 18 |
| ½ mile north of Burwood (deep alluvium over fragipan). | Old alluvium. | 56 | 0 to 7 | Ap | 97 | 17 |
| | | 57 | 19 to 39 | B2 | 100 | 19 |
| | | 58 | 39 to 60 | B3m1 | 100 | 16 |
| 3 miles south of Leipers Fork along Bear Creek (cherty subsoil). | Alluvium and colluvium. | 50 | 0 to 10 | Ap | 88 | 20 |
| | | 51 | 23 to 34 | B22 | 98 | 17 |
| | | 52 | 34 to 72+ | C | 97 | 21 |
| Baxter cherty silt loam: | | | | | | |
| 1 mile south of Cheatham County line and 1½ miles northeast of New Hope (central concept). | Cherty limestone. | 35 | 0 to 6 | Ap | 93 | 17 |
| | | 36 | 15 to 43 | B2 | 85 | 26 |
| | | 37 | 58 to 80+ | C | 85 | 24 |
| 4 miles south of Craigfield and ¼ mile west of Sullivan's store (very cherty subsoil). | Cherty limestone. | 38 | 0 to 7 | Ap | 99 | 16 |
| | | 39 | 12 to 26 | B2 | 81 | 30 |
| | | 40 | 44 to 72+ | C | 94 | 24 |
| ¼ mile east of Right Lick Creek and 200 yards north of Greenbrier Church (intergrading to Bodine). | Cherty limestone. | 41 | 0 to 6 | Ap | 100 | 15 |
| | | 42 | 13 to 29 | B2 | 96 | 19 |
| | | 43 | 29 to 36 | C | 92 | 22 |
| Culleoka silt loam: | | | | | | |
| 2 miles south of Triune and 1 mile west of U.S. Highway No. 31A–41A on Patton Road (central concept). | Colluvium (sandy limestone interbedded with shale). | 8 | 0 to 5 | A1 | 94 | 18 |
| | | 9 | 16 to 42 | B2 | 96 | 20 |
| | | 10 | 59 to 76+ | C | 101 | 18 |
| 4 miles north of Triune (moderately deep over clay) | Colluvium over shale. | 11 | 0 to 11 | Ap | 98 | 16 |
| | | 12 | 11 to 20 | B2 | 102 | 16 |
| | | 13 | 28 to 73+ | C | 95 | 16 |

See footnotes at end of table.

bedrock and depth to the water table reveal that in some places the water table lies within the bedrock. This is possible in pervious sedimentary deposits and in cavernous limestone.

Permeability is estimated for uncompacted soil material. The estimates are based on structure and consistence, and on field observations and limited laboratory data.

Available water capacity, in inches per inch of soil depth, is an approximation of the capillary water when the soil is wet to field capacity. It is the amount of water held in the soil between 1/3 atmosphere and 15 atmospheres of tension. If a soil is at permanent wilting point, the amount of water listed in table 6 for each horizon will wet the horizon to a depth of 1 inch. Laboratory data on available water capacity are available for a few of the soils in Williamson County; for the other soils, estimates are based on data for similar soils.

Dispersion refers to how much and how fast the soil aggregates disintegrate when saturated with water. This property is estimated on the basis of soil structure and texture.

The shrink-swell potential indicates the change in volume to be expected when the moisture content changes. It is estimated primarily on the basis of the amount and type of clay. In general, soils classified as CH and A-7 have a high shrink-swell potential. Soils with low shrink-swell potential are clean sands and gravels (single-grain structure), soils that have small amounts of nonplastic to slightly plastic fines, and most other nonplastic to slightly plastic soils.

### *Features affecting engineering work*

Table, 7, beginning on page 104, lists for each mapping unit, suitability ratings for engineering practices and the soil characteristics that affect work on highways or in soil and water conservation. These features are generally not apparent to the engineer unless he has access to the results of a field investigation. They are, however, significant enough to influence construction practices.

The location of secondary roads in areas where the soils are sloping, moderately steep, or steep may be influenced by the depth to bedrock and the kind of bedrock. The engineer ascertains the kind of rock and how deep it is so that he knows how difficult evacuation will be. For all highways, he investigates the likelihood of slides and of seepage water along or through the bedrock. He considers the presence of poor material within or slightly below the subgrade. A layer of highly plastic clay, for example, impedes internal drainage and provides a poor

*test data* [1]

| Mechanical analysis [3] | | | | | | | | | | | Liquid limit | Plasticity index | Classification | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Estimated percentage discarded in field sampling | Percentage passing sieve —[4] | | | | | | Percentage smaller than —[4] | | | | | | AASHO [5] | Unified [6] |
| | 3-in. | ¾-in. | No. 4 (4.7 mm.) | No. 10 (2.0 mm.) | No. 40 (0.42 mm.) | No. 200 0.074 mm.) | 0.05 mm. | 0.02 mm. | 0.005 mm. | 0.002 mm. | | | | |
| *Larger than 3 in.* | | | | | | | | | | | | | | |
| ---------- | ------ | ------ | ------ | 100 | 98 | 91 | 87 | 65 | 27 | 16 | 34 | 6 | A-4(8) | ML. |
| ---------- | ------ | ------ | ------ | 100 | 98 | 84 | 80 | 66 | 37 | 30 | 33 | 8 | A-4(8) | ML-CL. |
| ---------- | ------ | 100 | 94 | 93 | 91 | 68 | 59 | 47 | 34 | 29 | 32 | 6 | A-4(7) | ML. |
| ---------- | ------ | ------ | 100 | 97 | 91 | 87 | 84 | 59 | 24 | 16 | 32 | 5 | A-4(8) | ML. |
| ---------- | ------ | 100 | 98 | 97 | 90 | 87 | 85 | 67 | 36 | 30 | 38 | 12 | A-6(9) | ML-CL. |
| ---------- | 100 | 99 | 95 | 90 | 79 | 76 | 72 | 59 | 33 | 25 | 35 | 12 | A-6(9) | ML-CL. |
| ---------- | ------ | 100 | 97 | 96 | 90 | 86 | 81 | 61 | 24 | 15 | 41 | 8 | A-5(8) | ML. |
| ---------- | 100 | 95 | 89 | 86 | 78 | 74 | 71 | 59 | 34 | 23 | 35 | 10 | A-4(8) | ML-CL. |
| ---------- | 100 | 78 | 59 | 55 | 45 | 41 | 40 | 34 | 22 | 23 | 41 | 14 | A-7-6(2) | GM-GC. |
| ---------- | 100 | 90 | 68 | 60 | 51 | 47 | 43 | 33 | 15 | 8 | 31 | 3 | A-4(2) | GM. |
| ---------- | 100 | 91 | 59 | 54 | 50 | 47 | 46 | 43 | 34 | 27 | 57 | 24 | A-7-5(8) | GM. |
| ---------- | 100 | 85 | 65 | 58 | 54 | 51 | 49 | 44 | 35 | 30 | 53 | 16 | A-7-5(6) | MH. |
| ---------- | 100 | 95 | 89 | 86 | 77 | 70 | 65 | 50 | 20 | 14 | 30 | 6 | A-4(7) | ML-CL. |
| ---------- | 100 | 83 | 76 | 75 | 70 | 66 | 64 | 62 | 56 | 52 | 83 | 41 | A-7-5(17) | MH. |
| 30 | ------ | 100 | 99 | 98 | 91 | 84 | 80 | 74 | 61 | 54 | 57 | 21 | A-7-5(16) | MH. |
| 5 | 100 | 85 | 76 | 71 | 64 | 59 | 56 | 44 | 19 | 14 | 31 | 5 | A-4(5) | ML. |
| 5 | 100 | 82 | 72 | 70 | 64 | 53 | 50 | 46 | 35 | 30 | 41 | 16 | A-7-6(6) | ML-CL. |
| 5 | 100 | 96 | 92 | 92 | 89 | 87 | 86 | 84 | 68 | 58 | 63 | 29 | A-7-5(20) | MH. |
| ---------- | ------ | ------ | ------ | 100 | 98 | 77 | 72 | 59 | 30 | 19 | 32 | 7 | A-4(8) | ML-CL. |
| ---------- | 100 | 90 | 81 | 80 | 77 | 36 | 34 | 32 | 25 | 22 | 32 | 12 | A-6(1) | SC. |
| ---------- | ------ | ------ | ------ | 100 | 96 | 85 | 82 | 73 | 50 | 35 | 44 | 14 | A-7-5(10) | ML. |
| ---------- | 100 | 99 | 96 | 95 | 92 | 72 | 64 | 47 | 28 | 17 | 34 | 9 | A-4(7) | ML-CL. |
| ---------- | ------ | ------ | 100 | 99 | 95 | 80 | 72 | 55 | 33 | 26 | 31 | 7 | A-4(8) | ML-CL. |
| ---------- | ------ | ------ | 100 | 99 | 92 | 80 | 65 | 50 | 37 | 30 | 39 | 10 | A4(8) | ML. |

TABLE 5.—*Engineering*

| Soil name and location | Parent material | Tennessee report No. | Depth | Horizon | Moisture-density [2] | |
|---|---|---|---|---|---|---|
| | | | | | Maximum dry density | Optimum moisture |
| | | | *Inches* | | *Lb. per cu. ft.* | *Percent* |
| Cullcoka loam: ½ mile south of Bethesda (shallow over sandy limestone). | Colluvium over Hermitage formation. | 24 | 0 to 2 | A1 | 90 | 20 |
| | | 25 | 7 to 20 | B2 | 106 | 16 |
| | | 26 | 45 to 73+ | D | 98 | 18 |
| Dunning silt loam: 2 miles northeast of Franklin and 300 yards east of Louisville and Nashville-Railroad along Spencer Creek (central concept). | Alluvium. | 1 | 0 to 10 | Ap | 97 | 17 |
| | | 2 | 19 to 39 | Cg1 | 106 | 15 |
| | | 3 | 39 to 62 | Cg2 | 95 | 20 |
| 4 miles south of Brentwood and 200 yards west of Wilson Pike along Little Harpeth River (poorly drained overwash). | Alluvium. | 44 | 0 to 8 | Ap | 92 | 19 |
| | | 45 | 15 to 44 | Cg2 | 100 | 20 |
| | | 46 | 44 to 72+ | Cg3 | 106 | 18 |
| Dunning silty clay loam: 6 miles east of Franklin and ¼ mile north of State Route 96 (heavy-textured surface). | Alluvium over limestone. | 4 | 0 to 7 | Ap | 93 | 20 |
| | | 5 | 15 to 26 | Cg1 | 108 | 14 |
| | | 6 | 33 to 51 | Cg3 | 101 | 21 |
| | | 7 | 51 to 80 | Cg4 | 102 | 21 |
| Lindside silt loam: ¼ mile southwest of Bethesda along Rutherford Creek (central concept). | Alluvium over limestone. | 20 | 0 to 10 | Ap | 98 | 16 |
| | | 21 | 10 to 20 | C1 | 104 | 16 |
| | | 22 | 26 to 46 | Cg2 | 108 | 16 |
| | | 23 | 46 to 74 | Cg3 | 102 | 20 |
| Lindside silty clay loam: 4 miles north of Franklin near Berry's Chapel (shallow alluvium). | Alluvium over limestone. | 33 | 0 to 11 | Ap | 95 | 18 |
| | | 34 | 11 to 29 | C | 100 | 16 |
| Lindside loam: 6 miles south of Franklin and ½ mile east of U.S. Highway No. 31 (coarse textured). | Alluvium over Hermitage formation. | 17 | 0 to 11 | Ap | 108 | 12 |
| | | 18 | 11 to 23 | Cl | 107 | 14 |
| | | 19 | 23 to 36 | Cg | 107 | 16 |
| Maury silt loam: ½ mile south of West Harpeth (Ortho) | Probably loess over limestone (Bigby formation). | 62 | 0 to 7 | Ap | 102 | 13 |
| | | 63 | 25 to 40 | B22 | 98 | 17 |
| | | 64 | 69 to 85 | B32 | 84 | 25 |
| 1 mile east of Spring Hill on Duplex Road (red, heavy-textured subsoil). | Probably loess over limestone (Bigby formation). | 53 | 0 to 7 | Ap | 97 | 15 |
| | | 54 | 18 to 36 | B21 | 88 | 28 |
| | | 55 | 59 to 75+ | C | 83 | 32 |
| 5 miles northeast of Franklin along road by Monsanto farm (sandy limestone in subsoil). | Sandy limestone. | 47 | 0 to 5 | Ap | 95 | 16 |
| | | 48 | 27 to 40 | B22 | 84 | 31 |
| | | 49 | 60 to 72+ | C | 76 | 37 |
| Mimosa cherty silt loam: 5 miles south of Franklin between U.S. Highways 431 and 31 (central concept). | Thin colluvium over argillaceous, phosphatic limestone. | 27 | 0 to 8 | Ap | 94 | 18 |
| | | 28 | 29 to 38 | B22 | 84 | 30 |
| | | 29 | 43 to 72+ | C | 93 | 27 |
| Halfway between Bethesda and Arno (thin cherty surface layer over deep clay). | Thin colluvium over argillaceous, phosphatic limestone. | 14 | 0 to 7 | Ap | 96 | 19 |
| | | 15 | 11 to 26 | B2 | 98 | 22 |
| | | 16 | 31 to 103+ | C2 | 95 | 22 |
| Mimosa cherty silty clay loam: 1½ miles east of U.S. Highway No. 431 and 1,000 yards north of Beech Creek (shallow clay to bedrock). | Colluvium over argillaceous, phosphatic limestone. | 30 | 0 to 4 | A1 | 81 | 25 |
| | | 31 | 7 to 12 | B2 | 83 | 32 |
| | | 32 | 12 to 19 | C | 80 | 25 |

[1] Tests performed by the Tennessee Department of Highways and Public Works in accordance with standard procedures of the American Association of State Highway Officials (AASHO). (*1*)

[2] Moisture-density according to AASHO Designation T 99-57, Method A (*1*). In this method, a 5.5-pound rammer and a 12-inch drop are used.

[3] Mechanical analyses according to the AASHO Designation T 88 (*1*). Results by this procedure may differ from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method, and the various grain-size fractions are calculated on the basis of all the material, including

*test data* [1]—Continued

| Mechanical analysis [3] | | | | | | | | | | | Liquid limit | Plasticity index | Classification | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Estimated percentage discarded in field sampling | Percentage passing sieve —[4] | | | | | | Percentage smaller than —[4] | | | | | | AASHO [5] | Unified [6] |
| | 3-in. | ¾-in. | No. 4 (4.7 mm.) | No. 10 (2.0 mm.) | No. 40 (0.42 mm.) | No. 200 0.074 mm.) | 0.05 mm. | 0.02 mm. | 0.005 mm. | 0.005 mm. | | | | |
| *Larger than 3 inches.* | | | | | | | | | | | | | | |
| | | 100 | 94 | 93 | 90 | 51 | 48 | 32 | 14 | 10 | 34 | [7] NP | A-4(3) | ML. |
| | | | | 100 | 99 | 80 | 65 | 47 | 31 | 24 | 29 | 7 | A-4(8) | ML-CL. |
| | | | | 100 | 96 | 75 | 60 | 43 | 32 | 27 | 37 | 10 | A-4(8) | ML. |
| | | 100 | 98 | 96 | 92 | 81 | 73 | 56 | 28 | 22 | 34 | 10 | A-4(8) | ML-CL. |
| | 100 | 89 | 69 | 61 | 59 | 49 | 40 | 29 | 21 | 18 | 40 | 18 | A-6(6) | GC. |
| | | 100 | 99 | 98 | 85 | 75 | 68 | 50 | 35 | 18 | 40 | 14 | A-6(10) | ML-CL. |
| | | | 100 | 98 | 93 | 83 | 76 | 63 | 27 | 18 | 44 | 10 | A-5(9) | ML. |
| | | 100 | 99 | 98 | 78 | 66 | 60 | 49 | 28 | 23 | 39 | 13 | A-6(7) | ML-CL. |
| | 100 | 99 | 91 | 87 | 76 | 56 | 52 | 41 | 28 | 22 | 37 | 13 | A-6(5) | ML-CL. |
| | | 100 | 99 | 98 | 94 | 84 | 80 | 70 | 43 | 34 | 51 | 23 | A-7-6(15) | MH-CH. |
| | | 100 | 98 | 86 | 77 | 68 | 66 | 57 | 37 | 34 | 55 | 32 | A-7-6(17) | CH. |
| | | 100 | 98 | 97 | 94 | 84 | 83 | 76 | 56 | 48 | 51 | 24 | A-7-6(16) | MH-CH. |
| | 100 | 97 | 59 | 48 | 40 | 32 | 31 | 27 | 22 | 18 | 52 | 23 | A-2-7(2) | GM-GC. |
| | | | | 100 | 99 | 85 | 74 | 52 | 27 | 20 | 37 | 11 | A-6(8) | ML-CL. |
| | | | | 100 | 98 | 81 | 76 | 53 | 33 | 24 | 33 | 11 | A-6(8) | ML-CL. |
| | 100 | 97 | 90 | 86 | 80 | 58 | 51 | 38 | 25 | 19 | 30 | 8 | A-4(5) | ML-CL. |
| | 100 | 85 | 60 | 55 | 50 | 38 | 34 | 29 | 23 | 19 | 44 | 20 | A-7-6(3) | GC. |
| | 100 | 98 | 96 | 94 | 82 | 59 | 51 | 39 | 24 | 17 | 37 | 9 | A-4(5) | ML. |
| 10 | 100 | 77 | 59 | 46 | 24 | 17 | 15 | 12 | 8 | 6 | 35 | 9 | A-2-4(0) | SM-SC. |
| | | 100 | 92 | 79 | 55 | 42 | 35 | 24 | 18 | 15 | 34 | 11 | A-6(2) | SM-SC. |
| | | | 100 | 98 | 90 | 63 | 53 | 38 | 19 | 14 | 26 | 4 | A-4(6) | ML-CL. |
| | | 100 | 97 | 86 | 49 | 32 | 27 | 18 | 12 | 8 | 30 | 5 | A-2-4(0) | SM. |
| | | 100 | 99 | 99 | 95 | 76 | 70 | 53 | 22 | 14 | 28 | 4 | A-4(8) | ML-CL. |
| | | | 100 | 99 | 97 | 77 | 74 | 65 | 44 | 38 | 44 | 16 | A-7-6(11) | ML-CL. |
| | | | | 100 | 95 | 54 | 51 | 48 | 43 | 40 | 51 | 15 | A-7-5(7) | MH. |
| | | | 100 | 99 | 92 | 76 | 70 | 48 | 18 | 13 | 31 | 4 | A-4(8) | ML. |
| | | | | 100 | 97 | 88 | 86 | 80 | 64 | 60 | 53 | 10 | A-5(11) | MH. |
| | | | | 100 | 98 | 79 | 77 | 75 | 68 | 64 | 64 | 18 | A-7-5(15) | MH. |
| | | | | 100 | 96 | 78 | 72 | 56 | 20 | 12 | 34 | 6 | A-4(8) | ML. |
| | | | | 100 | 94 | 72 | 69 | 65 | 54 | 48 | 54 | 18 | A-7-5(13) | MH. |
| | | | 100 | 98 | 93 | 74 | 72 | 68 | 62 | 58 | 66 | 24 | A-7-5(17) | MH. |
| 3 | 100 | 86 | 72 | 66 | 58 | 55 | 51 | 40 | 20 | 14 | 43 | 12 | A-7-5(5) | ML. |
| | | | 100 | 99 | 97 | 93 | 92 | 87 | 76 | 69 | 65 | 19 | A-7-5(16) | MH |
| | | | 100 | 99 | 94 | 84 | 82 | 73 | 60 | 53 | 53 | 15 | A-7-5(13) | MH. |
| 4 | 100 | 80 | 68 | 64 | 58 | 54 | 51 | 41 | 20 | 13 | 36 | 9 | A-4(4) | ML. |
| | | 100 | 99 | 98 | 94 | 91 | 90 | 84 | 57 | 45 | 47 | 20 | A-7-6(13) | ML-CL. |
| | 100 | 99 | 95 | 94 | 91 | 88 | 87 | 83 | 64 | 51 | 54 | 22 | A-7-5(16) | MH. |
| | 100 | 83 | 80 | 78 | 69 | 63 | 56 | 41 | 27 | 20 | 59 | 14 | A-7-5(10) | MH. |
| | | | 100 | 99 | 93 | 87 | 83 | 73 | 61 | 55 | 66 | 24 | A-7-5(18) | MH. |
| | | | 100 | 98 | 92 | 85 | 82 | 76 | 64 | 57 | 65 | 23 | A-7-5(17) | MH. |

that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method, and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soil.

[4] Based on sample as received in laboratory. Laboratory test data not corrected for amount discarded in field sampling.

[5] Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (Pt. 1, Ed. 8): The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes, AASHO Designation M 145-49 (*1*).

[6] Based on the Unified Soil Classification System, Technical Memorandum No. 3-357, Volume 1, Waterways Experiment Station, Corps of Engineers, March 1953 (*17*).

[7] NP=Nonplastic.

TABLE 6.—*Brief description of soils and*

| Map symbol | Soil | Depth to seasonally high water table | Depth to bedrock | Brief description of site and soil | Depth from surface (typical profile) | Classification |
|---|---|---|---|---|---|---|
| | | | | | | USDA textural class |
| | | *Feet* | *Feet* | | *Inches* | |
| AcB<br>AcC2<br>AcD2 | Armour cherty silt loam, 2 to 5 percent slopes.<br>Armour cherty silt loam, 5 to 12 percent slopes, eroded.<br>Armour cherty silt loam, 12 to 20 percent slopes, eroded. | 10 or more | 3 to 10 | Well-drained soils in old cherty alluvium or colluvium on upland toe slopes, fans, and stream terraces; alluvium or colluvium washed from soils derived from phosphatic limestone; underlain by limestone. | 0–10<br>10–60<br>60–90 | Cherty silt loam.<br>Cherty silty clay loam.<br>Clay |
| AmC3 | Armour cherty silty clay loam, 5 to 12 percent slopes, severely eroded. | 10 or more | 2 to 10 | Well-drained soil in old cherty alluvium or colluvium on upland toe slopes, fans, and stream terraces; alluvium or colluvium washed from soils derived from phosphatic limestone; underlain by limestone. | 0–50<br>50–80 | Cherty silty clay loam.<br>Clay |
| ArA<br>ArB<br>ArB2<br>ArC<br>ArC2 | Armour silt loam, 0 to 2 percent slopes.<br>Armour silt loam, 2 to 5 percent slopes.<br>Armour silt loam, 2 to 5 percent slopes, eroded.<br>Armour silt loam, 5 to 12 percent slopes.<br>Armour silt loam, 5 to 12 percent slopes, eroded. | 10 or more | 3 to 10 | Well-drained soils in old alluvium or colluvium on upland toe slopes, fans, and stream terraces; alluvium or colluvium washed from soils derived from phosphatic limestone; underlain by limestone. | 0–12<br>12–60<br>60–90 | Silt loam<br>Silty clay loam<br>Cherty silty clay loam or clay. |
| AtC3 | Armour silty clay loam, 5 to 12 percent slopes, severely eroded. | 10 or more | 2 to 10 | Well-drained soil in old alluvium or colluvium on upland toe slopes, fans, and stream terraces; alluvium or colluvium washed from soils derived from phosphatic limestone; underlain by limestone. | 0–50<br>50–80 | Silty clay loam<br>Cherty silty clay loam or clay. |
| AwB<br>AwC<br>AwD | Ashwood silty clay loam, 2 to 5 percent slopes.<br>Ashwood silty clay loam, 5 to 12 percent slopes.<br>Ashwood silty clay loam, 12 to 20 percent slopes. | 10 or more | 1 to 4 | Moderately well drained to somewhat poorly drained, shallow soils formed from phosphatic, clayey limestone in uplands; a few outcrops of limestone in places. | 0–8<br>8–48 | Silt loam<br>Clay |
| BaC<br>BaD<br>BaD2<br>BaE | Baxter cherty silt loam, 5 to 12 percent slopes.<br>Baxter cherty silt loam, 12 to 20 percent slopes.<br>Baxter cherty silt loam, 12 to 20 percent slopes, eroded.<br>Baxter cherty silt loam, 20 to 30 percent slopes. | 20 or more | 3 to 10 | Well-drained cherty soils formed from cherty limestone in uplands. | 0–10<br>10–24<br>24–72 | Cherty silt loam<br>Cherty silty clay loam.<br>Cherty clay |
| BcC3<br>BcD3 | Baxter cherty silty clay loam, 5 to 12 percent slopes, severely eroded.<br>Baxter cherty silty clay loam, 12 to 20 percent slopes, severely eroded. | 20 or more | 2 to 8 | Well-drained cherty soils formed from cherty limestone in uplands. | 0–18<br>18–60 | Cherty silty clay loam.<br>Cherty clay |
| BoC<br>BoD<br>BoE | Bodine cherty silt loam, 5 to 12 percent slopes.<br>Bodine cherty silt loam, 12 to 20 percent slopes.<br>Bodine cherty silt loam, 20 to 45 percent slopes. | 20 or more | 1½ to 10 | Well-drained to excessively drained cherty soils formed from cherty limestone in uplands. | 0–18<br>18–72 | Cherty silt loam<br>Coarse cherty silt loam. |

*their estimated physical properties*

| Classification—Continued | | Percentage passing— | | | Selected characteristics significant to engineering | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Unified | AASHO | No. 4 sieve | No. 10 sieve | No. 200 sieve | Perme-ability | Structure | Available water | Reaction (pH) | Dispersion | Shrink-swell potential |
| | | | | | *Inches per hour* | | *Inches per inch of depth* | | | |
| ML or CL | A-4 | 65–80 | 60–75 | 50–65 | 0. 8–2. 5 | Granular | 0. 10–0. 15 | 5. 6–6. 5 | Moderate | Low. |
| ML or CL | A-6 or A-7. | 70–85 | 65–80 | 55–70 | 0. 8–2. 5 | Blocky | 0. 10–0. 15 | 5. 1–6. 0 | Moderate | Moderate. |
| MH or CH | A-7 | 95–100 | 90–100 | 85–95 | 0. 2–0. 8 | Massive | 0. 10–0. 15 | 5–1–5. 5 | Low | High. |
| | | | | | | | | | | |
| ML or CL | A-6 or A-7. | 65–80 | 60–75 | 50–65 | 0. 8–2. 5 | Blocky | 0. 10–0. 15 | 5. 1–6. 0 | Moderate | Moderate. |
| MH or CH | A-7 | 95–100 | 90–100 | 85–95 | 0. 2–0. 8 | Massive | 0. 10–0. 15 | 5. 1–5. 5 | Low | High. |
| | | | | | | | | | | |
| ML or CL | A-4 | 90–100 | 85–100 | 75–95 | 0. 8–2. 5 | Granular | 0. 15–0. 20 | 5. 6–6. 5 | Moderate | Low. |
| ML or CL | A-6 or A-7. | 85–100 | 75–100 | 65–95 | 0. 8–2. 5 | Blocky | 0. 15–0. 20 | 5. 1–6. 0 | Moderate | Moderate. |
| CL, MH, or CH. | A-4, A-6, or A-7 | 65–100 | 60–100 | 50–95 | 0. 2–5. 0 | Blocky or massive. | 0. 10–0. 20 | 5. 1–5. 5 | Moderate to low. | Moderate to high. |
| | | | | | | | | | | |
| CL | A-6 or A-7. | 80–100 | 70–100 | 60–95 | 0. 8–2. 5 | Blocky | 0. 15–0. 20 | 5. 1–6. 0 | Moderate | Moderate. |
| CL, MH, or CH. | A-4, A-6, or A-7. | 65–100 | 60–100 | 50–95 | 0. 2–5. 0 | Blocky or massive. | 0. 10–0. 20 | 5. 1–5. 5 | Moderate to low. | Moderate to high. |
| | | | | | | | | | | |
| ML or CL | A-6 | 95–100 | 90–100 | 85–95 | 0. 2–0. 8 | Granular | 0. 10–0. 15 | 6. 1–7. 3 | Low | Moderate. |
| MH or CH | A-7 | 95–100 | 90–100 | 85–95 | <0. 2 | Blocky or massive. | 0. 05–0. 10 | 6. 1–7. 3 | Low | High. |
| | | | | | | | | | | |
| ML or CL | A-4 | 70–85 | 65–80 | 55–75 | 0. 8–2. 5 | Granular | 0. 15–0. 20 | 5. 1–6. 0 | Moderate | Low. |
| CL, CH, or MH. | A-7 | 75–90 | 70–85 | 60–75 | 0. 8–2. 5 | Blocky | 0. 10–0. 15 | 5. 1–5. 5 | Moderate | Moderate to high. |
| MH | A-7 | 60–75 | 55–70 | 50–85 | 0. 8–2. 5 | Blocky or massive. | 0. 05–0. 10 | 5. 1–5. 5 | Low | Moderate to high. |
| | | | | | | | | | | |
| GM or CL | A-4 or A-6. | 65–80 | 60–75 | 50–65 | 0. 8–2. 5 | Blocky | 0. 10–0. 15 | 5. 1–5. 5 | Moderate | Moderate. |
| MH or CH | A-6 or A-7. | 60–75 | 55–70 | 45–60 | 0. 8–2. 5 | Blocky or massive. | 0. 05–0. 10 | 5. 1–5. 5 | Low | Moderate to high. |
| GM | A-2 or A-4. | 50–70 | 45–65 | 35–55 | 2. 5–5. 0 | Granular | 0. 05–0. 10 | 5. 1–5. 5 | Low | Low. |
| GM or GC | A-2 | 30–45 | 25–40 | 20–35 | 2. 5–5. 0 | Blocky | 0. 05–0. 10 | 5. 1–5. 5 | Low | Low. |

TABLE 6.—*Brief description of soils and*

| Map symbol | Soil | Depth to seasonally high water table | Depth to bedrock | Brief description of site and soil | Depth from surface (typical profile) | Classification: USDA textural class |
|---|---|---|---|---|---|---|
| | | *Feet* | *Feet* | | *Inches* | |
| BrB2<br>BrC2<br>BrD2 | Braxton cherty silt loam, 2 to 5 percent slopes, eroded.<br>Braxton cherty silt loam, 5 to 12 percent slopes, eroded.<br>Braxton cherty silt loam, 12 to 20 percent slopes, eroded. | 10 or more | 3 to 6 | Well-drained cherty soils formed from phosphatic limestone in uplands; phosphatic limestone bedrock contains varying amounts of chert; few outcrops of limestone. | 0–8<br>8–24<br>24–48 | Cherty silt loam.<br>Cherty silty clay loam.<br>Clay. |
| BsC3<br>BsD3 | Braxton cherty silty clay loam, 5 to 12 percent slopes, severely eroded.<br>Braxton cherty silty clay loam, 12 to 20 percent slopes, severely eroded. | 10 or more | 2 to 6 | Well-drained cherty soils formed from phosphatic limestone in uplands; phosphatic limestone bedrock contains varying amounts of chert; few outcrops of limestone. | 0–20<br>20–40 | Cherty silty clay loam.<br>Clay. |
| CaA<br>CaB<br>CaB2<br>CaC2 | Captina silt loam, phosphatic, 0 to 2 percent slopes.<br>Captina silt loam, phosphatic, 2 to 5 percent slopes.<br>Captina silt loam, phosphatic, 2 to 5 percent slopes, eroded.<br>Captina silt loam, phosphatic, 5 to 12 percent slopes, eroded. | 1½ to 3 [1] | 3 to 10 | Moderately well drained soils with fragipan at a depth of 18 to 30 inches; in old general alluvium on stream terraces. | 0–10<br>10–24<br>24–48<br>48–72 | Silt loam.<br>Silty clay loam.<br>Silty clay loam.<br>Silty clay loam, clay, or gravelly silty clay loam. |
| CfD2<br>CfE2 | Culleoka flaggy loam, 12 to 20 percent slopes, eroded.<br>Culleoka flaggy loam, 20 to 30 percent slopes, eroded. | 20 or more | 2 to 8 | Well-drained to excessively drained, mostly steep soils in flaggy creep material from phosphatic, sandy limestone; creep generally overlies phosphatic, sandy limestone interbedded with shale. | 0–10<br>10–24<br>24–48 | Flaggy loam.<br>Flaggy clay loam.<br>Flaggy clay loam. |
| CkC<br>CkD<br>CkD3<br>CkE<br>CkE3 | Culleoka silt loam, 5 to 12 percent slopes.<br>Culleoka silt loam, 12 to 20 percent slopes.<br>Culleoka silt loam, 12 to 20 percent slopes, severely eroded.<br>Culleoka silt loam, 20 to 35 percent slopes.<br>Culleoka silt loam, 20 to 35 percent slopes, severely eroded. | 20 or more | 3 to 10 | Well-drained, mostly steep soils in creep material from soils derived from phosphatic, sandy limestone; creep generally overlies phosphatic, sandy limestone interbedded with shale. | 0–12<br>12–48<br>48–72 | Silt loam or loam.<br>Clay loam.<br>Flaggy clay loam. |
| DeD<br>DeE<br>DeE3<br>DeF<br>DeF3 | Dellrose cherty silt loam, 12 to 20 percent slopes.<br>Dellrose cherty silt loam, 20 to 30 percent slopes.<br>Dellrose cherty silt loam, 20 to 30 percent slopes, severely eroded.<br>Dellrose cherty silt loam, 30 to 40 percent slopes.<br>Dellrose cherty silt loam, 30 to 40 percent slopes, severely eroded. | 20 or more | 3 to 15 | Well-drained, steep, cherty soils in old colluvium overlying clayey, phosphatic limestone. | 0–14<br>14–60<br>60–80 | Cherty silt loam.<br>Cherty silty clay loam.<br>Clay or cherty clay. |

[1] Perched water table.

*their estimated physical properties*—Continued

| Classification—Continued | | Percentage passing— | | | Selected characteristics significant to engineering | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Unified | AASHO | No. 4 sieve | No. 10 sieve | No. 200 sieve | Perme-ability | Structure | Available water | Reaction (pH) | Dispersion | Shrink-swell potential |
| | | | | | *Inches per hour* | | *Inches per inch of depth* | | | |
| ML or CL | A–4 | 70–85 | 65–80 | 55–70 | 0.8–2.5 | Granular | 0.10–0.15 | 5.1–6.0 | Moderate | Low. |
| CL or CH | A–6 or A–7. | 80–95 | 75–90 | 65–85 | 0.2–0.8 | Blocky | 0.10–0.15 | 5.1–6.0 | Moderate | Moderate to high. |
| MH or CH | A–7 | 95–100 | 90–95 | 85–95 | 0.2–0.8 | Blocky or massive. | 0.10–0.15 | 5.1–6.0 | Low | High. |
| | | | | | | | | | | |
| CL or CH | A–6 or A–7. | 65–80 | 60–75 | 50–65 | 0.2–0.8 | Blocky | 0.10–0.15 | 5.1–6.0 | Moderate | Moderate to high. |
| MH or CH | A–7 | 95–100 | 90–95 | 85–95 | 0.2–0.8 | Blocky or massive. | 0.10–0.15 | 5.1–6.0 | Low | High. |
| | | | | | | | | | | |
| ML or CL | A–4 | 90–100 | 85–100 | 75–95 | 0.8–2.5 | Granular | 0.15–0.20 | 5.6–6.5 | Moderate | Moderate. |
| CL | A–6 | 95–100 | 90–100 | 80–95 | 0.8–2.5 | Blocky | 0.15–0.20 | 5.1–6.0 | Moderate | Moderate. |
| ML or CL | A–4 or A–6. | 85–100 | 80–100 | 70–95 | >0.2 | Massive | 0.10–0.15 | 5.1–6.0 | Low | Low to moderate. |
| CL, MH, CH, or GC. | A–2, A–4, A–6, or A–7. | 45–100 | 40–100 | 30–95 | <0.2–2.5 | Blocky or massive. | 0.10–0.15 | 5.1–6.0 | Moderate to low | Low to high. |
| | | | | | | | | | | |
| GM, ML | A–2 or A–4. | 50–70 | 45–65 | 35–55 | 0.8–2.5 | Granular | 0.10–0.15 | 5.1–6.0 | Moderate | Low. |
| GC or ML | A–4 or A–6. | 55–85 | 50–80 | 40–70 | 2.5–5.0 | Blocky | 0.10–0.15 | 5.1–5.5 | Moderate to low. | Low. |
| GC or ML | A–2 or A–4. | 40–65 | 35–60 | 25–50 | 2.5–5.0 | Blocky | 0.05–0.10 | 5.1–5.5 | Low | Low. |
| | | | | | | | | | | |
| ML | A–4 | 90–100 | 85–100 | 65–75 | 0.8–2.5 | Granular | 0.15–0.20 | 5.1–6.0 | Moderate | Low. |
| ML, CL, or SC. | A–4 or A–6. | 85–100 | 80–100 | 40–80 | 0.8–5.0 | Blocky | 0.15–0.20 | 5.1–5.5 | Moderate to high. | Moderate. |
| GC, CL, or MH. | A–2, A–4, or A–6. | 50–100 | 45–100 | 35–95 | 0.2–5.0 | Blocky or massive. | 0.05–0.15 | 5.1–5.5 | Low | Moderate to high. |
| | | | | | | | | | | |
| GM, ML, or CL. | A–2 or A–4. | 50–85 | 40–80 | 30–70 | 0.8–2.5 | Granular | 0.10–0.15 | 5.1–6.0 | Moderate | Low. |
| GC or CL | A–4 or A–6. | 60–90 | 55–85 | 45–75 | 0.8–2.5 | Blocky | 0.10–0.15 | 5.1–6.0 | Moderate | Moderate. |
| CH | A–7 | 85–100 | 80–95 | 75–90 | 0.2–0.8 | Blocky or massive. | 0.10–0.15 | 5.1–6.0 | Low | High. |

TABLE 6.—*Brief description of soils and*

| Map symbol | Soil | Depth to seasonally high water table | Depth to bedrock | Brief description of site and soil | Depth from surface (typical profile) | Classification |
|---|---|---|---|---|---|---|
| | | | | | | USDA textural class |
| | | *Feet* | *Feet* | | *Inches* | |
| DkB | Dickson silt loam, 2 to 5 percent slopes. | 2 to 3 [1] | 3 to 10 | Moderately well drained soil that has a fragipan and developed in a mantle of loess, 18 to 30 inches thick, that overlies weathered residuum of cherty limestone in uplands. | 0–8 | Silt loam |
| | | | | | 8–24 | Silty clay loam |
| | | | | | 24–48 | Silt loam or silty clay loam. |
| | | | | | 48–72 | Cherty silty clay. |
| DnB<br>DnB2<br>DnC2 | Donerail silt loam, 2 to 5 percent slopes.<br>Donerail silt loam, 2 to 5 percent slopes, eroded.<br>Donerail silt loam, 5 to 12 percent slopes, eroded. | 2 to 3 [1] | 3 to 8 | Moderately well drained to well drained soils with a fragipan and underlain by phosphatic limestone; formed from phosphatic limestone on uplands. | 0–10 | Silt loam |
| | | | | | 10–24 | Silty clay loam |
| | | | | | 24–48 | Silty clay loam or clay. |
| | | | | | 48–72 | Clay |
| DoB2<br>DoC2 | Donerail silt loam, concretionary, 2 to 5 percent slopes, eroded.<br>Donerail silt loam, concretionary, 5 to 12 percent slopes, eroded. | 2 to 3 [1] | 3 to 6 | Moderately well drained to well drained soils with a cemented hardpan; formed from phosphatic limestone or phosphatic, sandy limestone interbedded with shale. | 0–6 | Silt loam |
| | | | | | 6–18 | Silty clay loam |
| | | | | | 18–36 | Silty clay |
| | | | | | 36–60 | Clay or flaggy clay loam. |
| DsB | Dowellton silt loam, 2 to 5 percent slopes. | 1 to 2 | 2 to 6 | Poorly drained to somewhat poorly drained soil on uplands, generally in slight depressions; formed from clayey limestone; underlain by limestone. | 0–10 | Silt loam |
| | | | | | 10–48 | Clay |
| Du | Dunning silt loam, phosphatic. | 0 to 2 | 2 to 6 | Poorly drained to somewhat poorly drained, black soil on bottom land; formed in recent alluvium washed from soils derived mainly from phosphatic limestone; underlain by limestone. | 0–12 | Silt loam or silty clay loam. |
| | | | | | 12–60 | Silty clay loam or clay. |
| Eg | Egam silt loam, phosphatic. | 1 to 3 | 2 to 10 | Moderately well drained soil on bottom land in 16 to 30 inches of brown, well-drained recent alluvium that overlies dark, poorly drained, clayey alluvium; underlain by limestone. | 0–20 | Silt loam |
| | | | | | 20–72 | Silty clay loam or clay. |
| EtB<br>EtC2 | Etowah silt loam, 2 to 5 percent slopes.<br>Etowah silt loam, 5 to 12 percent slopes, eroded. | 10 or more | 3 to 10 | Deep, well-drained soils on high stream terraces; in places the subsoil contains strata of gravel, chert, sand, silt, and clay, particularly in the western part of the county; underlain by cherty limestone in western part and by limestone in eastern part. | 0–12 | Silt loam |
| | | | | | 12–48 | Silty clay loam |
| | | | | | 48–72 | Silty clay loam, clay, or gravelly silty clay loam. |

[1] Perched water table.

*their estimated physical properties*—Continued

| Classification—Continued | | Percentage passing— | | | Selected characteristics significant to engineering | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Unified | AASHO | No. 4 sieve | No. 10 sieve | No. 200 sieve | Permeability | Structure | Available water | Reaction (pH) | Dispersion | Shrink-swell potential |
| | | | | | *Inches per hour* | | *Inches per inch of depth* | | | |
| ML | A-4 | 95–100 | 95–100 | 85–95 | 0.8–2.5 | Granular | 0.15–0.20 | 5.1–6.0 | Moderate | Low. |
| ML or CL | A-4 or A-6. | 90–100 | 85–100 | 08–95 | 0.8–2.5 | Blocky | 0.15–0.20 | 5.1–5.5 | High | Moderate. |
| ML or CL | A-4 or A-6. | 85–100 | 80–100 | 70–90 | <0.2 | Massive | 0.10–0.15 | 5.1–5.5 | Low | Moderate. |
| MH or CH | A-4 or A-6. | 65–90 | 60–85 | 50–75 | 0.8–2.5 | Blocky or massive. | 0.10–0.15 | 5.1–5.5 | Low | Moderate to high. |
| | | | | | | | | | | |
| ML or CL | A-4 or A-6. | 95–100 | 90–100 | 85–95 | 0.8–2.5 | Granular | 0.15–0.20 | 5.1–6.0 | Moderate | Low. |
| CL | A-6 | 90–100 | 85–100 | 80–95 | 0.2–0.8 | Blocky | 0.15–0.20 | 5.1–5.5 | Moderate | Moderate. |
| CL or CH | A-6 or A-7. | 95–100 | 90–100 | 85–95 | <0.2 | Massive | 0.10–0.15 | 5.1–5.5 | Low | Moderate to high. |
| MH or CH | A-7 | 95–100 | 90–100 | 85–95 | 0.2–0.8 | Blocky or massive. | 0.10–0.15 | 5.1–5.5 | Low | High. |
| | | | | | | | | | | |
| ML or CL | A-4 or A-6. | 95–100 | 90–95 | 80–95 | 0.8–2.5 | Granular | 0.15–0.20 | 5.1–6.0 | Moderate | Moderate. |
| CL or CH | A-6 or A-7. | 90–100 | 85–95 | 75–95 | 0.2–0.8 | Blocky | 0.15–0.20 | 5.1–5.5 | Moderate | Moderate. |
| MH or CH | A-6 or A-7. | 65–90 | 60–80 | 50–70 | <0.2 | Massive | 0.10–0.15 | 5.1–5.5 | Low | Moderate to high. |
| ML, MH, or CH. | A-4, A-6, or A-7. | 75–100 | 70–100 | 60–95 | 0.2–2.5 | Blocky or massive | 0.10–0.15 | 5.1–5.5 | Low to moderate. | Moderate to high. |
| ML or CL | A-4 or A-6. | 95–100 | 90–100 | 85–100 | 0.8–2.5 | Granular | 0.15–0.20 | 5.1–6.0 | Low | Moderate. |
| CH | A-7 | 95–100 | 90–100 | 85–95 | <0.2 | Massive or blocky. | 0.10–0.15 | 5.6–7.3 | Low | High. |
| | | | | | | | | | | |
| ML, CL, or MH. | A-4 or A-6. | 95–100 | 90–100 | 80–100 | 0.8–2.5 | Granular | 0.15–0.20 | 5.6–7.3 | Low to moderate. | Moderate. |
| MH, CH, or CL. | A-6 or A-7. | 90–100 | 85–100 | 55–75 | 0.2–2.5 | Granular or blocky. | 0.10–0.20 | 6.6–7.3 | Moderate to low. | Moderate to high. |
| | | | | | | | | | | |
| ML or CL | A-4 or A-6. | 95–100 | 90–100 | 85–100 | 0.8–2.5 | Granular | 0.15–0.20 | 5.6–6.5 | Moderate | Moderate. |
| MH or CH | A-7 | 90–100 | 85–100 | 75–95 | 0.2–0.8 | Blocky or massive. | 0.10–0.15 | 6.1–7.3 | Low | High. |
| | | | | | | | | | | |
| ML or CL | A-4 | 95–100 | 90–100 | 85–95 | 0.8–2.5 | Granular | 0.15–0.20 | 5.1–6.0 | Moderate | Low. |
| CL or MH | A-6 or A-7. | 90–100 | 85–100 | 75–95 | 0.8–2.5 | Blocky | 0.15–0.20 | 5.1–5.5 | Moderate | Moderate. |
| GC, CL, MH, or CH. | A-2, A-4, A-6, or A-7. | 50–100 | 45–100 | 35–95 | 0.2–2.5 | Blocky or massive. | 0.10–0.15 | 5.1–5.5 | Moderate to low. | Moderate to high. |

TABLE 6.—*Brief description of soils and*

| Map symbol | Soil | Depth to seasonally high water table | Depth to bedrock | Brief description of site and soil | Depth from surface (typical profile) | Classification |
|---|---|---|---|---|---|---|
| | | | | | | USDA textural class |
| | | *Feet* | *Feet* | | *Inches* | |
| FaC | Fairmount silty clay loam, 2 to 10 percent slopes. | 6 or more | 1 to 3 | Moderately well drained to well drained, shallow soil on uplands; formed from clayey limestone; outcrops of limestone are common. | 0–6 | Silt loam or silty clay loam. |
| | | | | | 6–24 | Clay |
| FrC | Frankstown cherty silt loam, 5 to 12 percent slopes. | 20 or more | 2 to 4 | Moderately deep, well-drained, cherty soils on narrow, winding ridgetops in uplands; underlain by cherty limestone and shale. | 0–10 | Cherty silt loam |
| FrD | Frankstown cherty silt loam, 12 to 20 percent slopes. | | | | 10–24 | Cherty silty clay loam. |
| | | | | | 24–48 | Very cherty silty clay loam. |
| GrC | Greendale cherty silt loam, 2 to 12 percent slopes. | 2 to 6 | 3 to 6 | Moderately deep to deep, well drained to moderately well drained soil in recent cherty alluvium in narrow, V-shaped valleys along small streams of the Highland Rim; underlain by cherty limestone or shale. | 0–30 | Cherty silt loam |
| | | | | | 30–48 | Very cherty silty clay loam. |
| GsB | Greendale silt loam, 2 to 5 percent slopes. | 3 or more | 3 to 6 | Moderately deep to deep, well-drained soil in recent local alluvium washed from soils of the Highland Rim that were derived largely from loess and some cherty limestone; underlain by residuum of cherty limestone. | 0–30 | Silt loam |
| | | | | | 30–60 | Cherty silty clay loam. |
| Gu | Gullied land. | 6 or more | 2 to 10 | Mostly soils that have variable profile characteristics and are dissected by a close network of moderately deep to deep gullies; generally on uplands. | | |
| HaB2 | Hagerstown silt loam, 2 to 5 percent slopes, eroded. | 5 or more | 2 to 6 | Moderately deep to deep, well-drained soils formed from limestone on uplands; few outcrops of limestone in places. | 0–10 | Silt loam |
| | | | | | 10–36 | Silty clay loam |
| HaC2 | Hagerstown silt loam, 5 to 12 percent slopes, eroded. | | | | 36–60 | Clay |
| HbB | Hampshire silt loam, 2 to 5 percent slopes. | 5 or more | 2 to 6 | Moderately deep to deep, mostly well-drained soils formed on uplands from clayey, phosphatic limestone or phosphatic, sandy limestone interbedded with shale; a few outcrops of limestone in places. | 0–8 | Silt loam |
| HbB2 | Hampshire silt loam, 2 to 5 percent slopes, eroded. | | | | 8–16 | Silty clay loam or clay. |
| HbC2 | Hampshire silt loam, 5 to 12 percent slopes, eroded. | | | | 16–48 | Clay |
| HbD2 | Hampshire silt loam, 12 to 20 percent slopes, eroded. | | | | | |

*their estimated physical properties*—Continued

| Classification—Continued | | Percentage passing— | | | Selected characteristics significant to engineering | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Unified | AASHO | No. 4 sieve | No. 10 sieve | No. 200 sieve | Perme-ability | Structure | Available water | Reaction (pH) | Dispersion | Shrink-swell potential |
| | | | | | *Inches per hour* | | *Inches per inch of depth* | | | |
| MH, CH, or CL. | A–6 or A–7. | 95–100 | 95–100 | 90–100 | 0. 2–0. 8 | Granular | 0. 10–0. 15 | 5. 6–6. 0 | Moderate | Moderate to high. |
| CH | A–7 | 90–100 | 90–100 | 85–100 | <0. 2 | Blocky or massive. | 0. 10–0. 15 | 6. 1–7. 3 | Low | High. |
| GM, ML, or CL. | A–4 | 65–90 | 60–85 | 45–75 | 0. 8–2. 5 | Granular | 0. 10–0. 15 | 5. 1–6. 0 | Moderate | Low. |
| GC or ML | A–4 | 55–80 | 50–75 | 40–65 | 0. 8–5. 0 | Granular or blocky. | 0. 10–0. 15 | 5. 1–5. 5 | Moderate | Low. |
| GC, ML, or CL. | A–2 or A–4. | 40–65 | 35–60 | 25–50 | 0. 8–5. 0 | Blocky or massive. | 0. 05–0. 10 | 5. 1–5. 5 | Low | Low. |
| GM or ML | A–2 or A–4. | 50–80 | 45–75 | 30–65 | 2. 5–5. 0 | Granular | 0. 10–0. 15 | 5. 1–5. 5 | Moderate | Low. |
| GM or ML | A–2 or A–4. | 35–65 | 30–60 | 20–50 | 2. 5. 5–0 | Blocky or massive. | 0. 05–0. 15 | 5. 1–5. 5 | Low | Low. |
| ML or CL | A–4 | 90–100 | 85–95 | 75–90 | 0. 8–2. 5 | Granular | 0. 15–0. 20 | 5. 1–5. 5 | Moderate | Low. |
| GM or CL | A–2, A–4, or A–6. | 45–65 | 40–60 | 30–50 | 0. 8–2. 5 | Blocky | 0. 10–0. 15 | 5. 1–5. 5 | Moderate to low. | Low. |
| ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | |
| ML or CL | A–4 | 95–100 | 90–100 | 85–95 | 0. 8–2. 5 | Granular | 0. 15–0. 20 | 5. 1–6. 0 | Moderate | Low. |
| CL or CH | A–6 or A–7. | 95–100 | 95–100 | 85–95 | 0. 2–2. 5 | Blocky | 0. 10–0. 15 | 5. 1–5. 5 | Moderate to high. | Moderate. |
| CL or CH | A–7 | 95–100 | 90–100 | 85–95 | 0. 2–0. 8 | Blocky or massive. | 0. 10–0. 15 | 5. 1–5. 5 | Moderate to low. | High. |
| ML or CL | A–4 or A–6. | 95–100 | 90–100 | 80–95 | 0. 8–2. 5 | Granular | 0. 10–0. 15 | 5. 1–6. 0 | Moderate | Low. |
| CL or CH | A–6 or A–7. | 90–100 | 85–95 | 75–90 | 0. 2–0. 8 | Blocky | 0. 10–0. 15 | 5. 1–6. 0 | Moderate to low. | Moderate to high. |
| CH | A–7 | 85–100 | 80–100 | 70–95 | 0. 2–0. 8 | Massive | 0. 10–0. 15 | 5. 6–7. 3 | Low | High. |

TABLE 6.—*Brief description of soils and*

| Map symbol | Soil | Depth to seasonally high water table | Depth to bedrock | Brief description of site and soil | Depth from surface (typical profile) | Classification |
|---|---|---|---|---|---|---|
| | | | | | | USDA textural class |
| | | *Feet* | *Feet* | | *Inches* | |
| HcC3 | Hampshire silty clay loam, 5 to 12 percent slopes, severely eroded. | 5 or more | 1½ to 6 | Moderately deep to deep, mostly well-drained soils formed on uplands from clayey, phosphatic limestone or phosphatic, sandy limestone interbedded with shale; a few outcrops of limestone in places. | 0–10 | Silty clay loam or clay. |
| HcD3 | Hampshire silty clay loam, 12 to 20 percent slopes, severely eroded. | | | | 10–40 | Clay |
| HeB2 | Hampshire-Colbert silt loams, 2 to 5 percent slopes, eroded. | 10 or more | 1½ to 5 | Shallow to deep, well-drained, clayey soils on uplands at or just below the transition zone between the inner and outer Central Basin; outcrops of limestone common. | 0–10 | Silt loam |
| HeC2 | Hampshire-Colbert silt loams, 5 to 12 percent slopes, eroded. | | | | 10–48 | Clay |
| HeD2 | Hampshire-Colbert silt loams, 12 to 20 percent slopes, eroded. | | | | | |
| HhC3 | Hampshire-Colbert silty clay loams, 5 to 12 percent slopes, severely eroded. | 10 or more | 1½ to 5 | Shallow to deep, well-drained, clayey soils on uplands at or just below the transition zone between the inner and outer Central Basin; outcrops of limestone common. | 0–6 | Silty clay |
| HhD3 | Hampshire-Colbert silty clay loams, 12 to 20 percent slopes, severely eroded. | | | | 6–36 | Clay |
| HmB | Hermitage silt loam, 2 to 5 percent slopes. | 6 or more | 2 to 6 | Moderately deep to deep, well-drained soils that are on toe slopes and fans and have washed from soils derived from limestone; underlain by limestone. | 0–8 | Silt loam |
| HmB2 | Hermitage silt loam, 2 to 5 percent slopes, eroded. | | | | 8–36 | Silty clay loam |
| | | | | | 36–48 | Silty clay loam or clay. |
| HnB2 | Hicks silt loam, 2 to 5 percent slopes, eroded. | 15 or more | 2 to 4 | Shallow to moderately deep, well-drained soils on narrow ridgetops; formed from phosphatic, sandy limestone interbedded with shale; small fragments of sandy limestone common on the surface and increase in quantity and size with depth. | 0–6 | Silt loam or loam. |
| HnC2 | Hicks silt loam, 5 to 12 percent slopes, eroded. | | | | 6–36 | Silty clay loam or clay loam. |
| HoC3 | Hicks silty clay loam, 5 to 12 percent slopes, severely eroded. | 15 or more | 1½ to 3 | Shallow to moderately deep, well-drained soil on narrow ridgetops; formed from phosphatic, sandy limestone interbedded with shale; small fragments of sandy limestone common on the surface and increase in quantity and size with depth. | 0–30 | Silty clay loam or clay loam. |

*their estimated physical properties*—Continued

| Classification—Continued | | Percentage passing— | | | Selected characteristics significant to engineering | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Unified | AASHO | No. 4 sieve | No. 10 sieve | No. 200 sieve | Perme-ability | Structure | Available water | Reaction (pH) | Dispersion | Shrink-swell potential |
| | | | | | *Inches per hour* | | *Inches per inch of depth* | | | |
| CL or CH | A-6 or A-7. | 90-100 | 85-95 | 75-90 | 0. 2-0. 8 | Blocky | 0. 10-0. 15 | 5. 1-6. 0 | Moderate to low. | Moderate to high. |
| CH | A-7 | 85-100 | 80-100 | 70-95 | 0. 2-0. 8 | Massive | 0. 10-0. 15 | 5. 6-7. 3 | Low | High. |
| ML or CL | A-6 | 95-100 | 95-100 | 85-100 | 0. 8-2. 5 | Granular | 0. 10-0. 15 | 5. 6-6. 5 | Moderate | Moderate. |
| CH | A-7 | 95-100 | 95-100 | 90-100 | <0. 2 | Massive | 0. 10-0. 15 | 5. 6-6. 5 | Low | High. |
| CH | A-7 | 95-100 | 95-100 | 85-100 | 0. 2-0. 8 | Granular or blocky. | 0. 10-0. 15 | 5. 6-6. 5 | Low | High. |
| CH | A-7 | 95-100 | 95-100 | 90-100 | <0. 2 | Massive | 0. 10-0. 15 | 5. 5-6. 5 | Low | High. |
| ML or CL | A-4 | 95-100 | 95-100 | 85-95 | 0. 8-2. 5 | Granular | 0. 15-0. 20 | 5. 1-6. 0 | Moderate | Low. |
| CL | A-4 or A-6. | 95-100 | 95-100 | 85-95 | 0. 8-2. 5 | Blocky | 0. 10-0. 15 | 5. 1-5. 5 | Moderate | Moderate. |
| CL | A-6 or A-7. | 95-100 | 90-100 | 80-100 | 0. 2-2. 5 | Blocky or massive. | 0. 10-0. 15 | 5. 1-5. 5 | Moderate to low. | Moderate to high. |
| ML | A-4 | 85-100 | 80-95 | 70-90 | 0. 8-5. 0 | Granular | 0. 10-0. 15 | 5. 1-6. 0 | Moderate | Low. |
| GC or CL | A-6 | 55-80 | 50-75 | 40-65 | 0. 8-5. 0 | Blocky | 0. 05-0. 15 | 5. 1-5. 5 | Moderate to high. | Moderate. |
| GC or CL | A-4 or A-6. | 60-90 | 55-85 | 45-75 | 0. 8-5. 0 | Blocky | 0. 05-0. 15 | 5. 1-5. 5 | Moderate to high. | Moderate. |

TABLE 6.—*Brief description of soils and*

| Map symbol | Soil | Depth to seasonally high water table | Depth to bedrock | Brief description of site and soil | Depth from surface (typical profile) | Classification |
|---|---|---|---|---|---|---|
| | | | | | | USDA textural class |
| | | *Feet* | *Feet* | | *Inches* | |
| HpB<br>HpC2<br>HpD2 | Humphreys cherty silt loam, 2 to 5 percent slopes.<br>Humphreys cherty silt loam, 5 to 12 percent slopes, eroded.<br>Humphreys cherty silt loam, 12 to 20 percent slopes, eroded. | 10 or more | 3 to 8 | Deep, well drained to moderately well drained, cherty soils on toe slopes and fans; washed from soils derived largely from cherty limestone; underlain by cherty limestone or shale. | 0–12 | Cherty silt loam. |
| | | | | | 12–48 | Cherty silty clay loam. |
| | | | | | 48–72 | Coarse cherty silty clay loam or cherty clay. |
| HrB<br>HrC2 | Humphreys silt loam, 2 to 5 percent slopes.<br>Humphreys silt loam, 5 to 12 percent slopes, eroded. | 6 or more | 3 to 10 | Moderately deep to deep soils on toe slopes and fans; washed from soils derived chiefly from loess overlying cherty limestone on the Highland Rim; underlain by cherty limestone. | 0–12 | Silt loam |
| | | | | | 12–36 | Silty clay loam |
| | | | | | 36–72 | Cherty silty clay loam or cherty silty clay. |
| Hs | Huntington cherty silt loam, phosphatic. | 2 or more | 3 to 8 | Deep, well-drained, cherty soil in depressions and along small drains of bottom lands; underlain by phosphatic limestone. | 0–10 | Cherty silt loam |
| | | | | | 10–60 | Cherty silt loam or cherty silty clay loam. |
| Ht | Huntington silt loam, local alluvium. | 2 to 5 or more. | 2 to 10 | Moderately deep to deep, well-drained soil in depressions and along small drains; underlain by limestone. | 0–10 | Silt loam |
| | | | | | 10–36 | Silt loam or silty clay loam. |
| | | | | | 36–48 | Gravelly silt loam or silty clay loam. |
| Hu | Huntington silt loam, phosphatic. | 3 to 10 or more. | 3½ to 10 | Deep, well-drained soil on bottom land; in some places contains strata of gravel, sand, silt, and clay in lower profile; underlain by phosphatic limestone. | 0–12 | Silt loam or loam. |
| | | | | | 12–80 | Silty clay loam or gravelly silt loam. |
| ImC<br>ImD<br>ImE | Inman silt loam, 5 to 12 percent slopes.<br>Inman silt loam, 12 to 20 percent slopes.<br>Inman silt loam, 20 to 30 percent slopes. | 10 or more | 1½ to 4 | Shallow, well-drained, phosphatic, clayey soils formed from sandy limestone and shale on uplands. | 0–6 | Silt loam |
| | | | | | 6–24 | Silty clay or clay. |
| InC3<br>InD3<br>InE3 | Inman silty clay loam, 5 to 12 percent slopes, severely eroded.<br>Inman silty clay loam, 12 to 20 percent slopes, severely eroded.<br>Inman silty clay loam, 20 to 30 percent slopes, severely eroded. | 10 or more | 1 to 3 | Shallow, well-drained, phosphatic, clayey soils formed from sandy limestone and shale on uplands. | 0–20 | Silty clay or clay. |
| La | Lanton silt loam, phosphatic. | 1 to 3 | 2 to 6 | Moderately well drained to somewhat poorly drained, dark soil on bottom lands; underlain by limestone. | 0–12 | Silt loam or silty clay loam. |
| | | | | | 12–60 | Silty clay loam or clay. |

*their estimated physical properties*—Continued

| Classification—Continued | | Percentage passing— | | | Selected characteristics significant to engineering | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Unified | AASHO | No. 4 sieve | No. 10 sieve | No. 200 sieve | Perme-ability | Structure | Available water | Reaction (pH) | Dispersion | Shrink-swell potential |
| | | | | | *Inches per hour* | | *Inches per inch of depth* | | | |
| GM or ML | A–4 | 55–80 | 50–75 | 40–65 | 2.5–5.0 | Granular | 0.10–0.15 | 5.1–6.0 | Moderate | Low. |
| GM, ML, or CL. | A–4 or A–6. | 50–75 | 45–70 | 35–60 | 0.8–2.5 | Blocky | 0.10–0.15 | 5.1–5.5 | Moderate to high. | Moderate to low. |
| GM, GC, ML, or CL. | A–2, A–4, or A–6. | 45–65 | 40–60 | 30–50 | 0.8–5.0 | Blocky or massive. | 0.05–0.15 | 5.1–5.5 | Low | Low. |
| | | | | | | | | | | |
| ML | A–4 | 90–100 | 85–100 | 75–95 | 0.8–2.5 | Granular | 0.15–0.20 | 5.1–6.0 | Moderate | Low. |
| ML or CL | A–4 or A–6. | 80–100 | 75–95 | 65–85 | 0.8–2.5 | Blocky | 0.15–0.20 | 5.1–5.5 | High | Moderate. |
| GM, GC, or CL. | A–2, A–4, or A–6. | 50–75 | 45–70 | 30–60 | 0.8–2.5 | Blocky or massive. | 0.10–0.15 | 5.1–5.5 | Low | Low to moderate. |
| | | | | | | | | | | |
| GM or ML | A–4 | 55–90 | 50–85 | 40–75 | 0.8–5.0 | Granular | 0.10–0.20 | 5.6–6.5 | Moderate | Low. |
| GM, ML, or CL. | A–4 or A–6. | 50–80 | 45–75 | 35–65 | 0.8–5.0 | Granular or blocky. | 0.10–0.15 | 5.6–6.5 | Moderate | Low. |
| | | | | | | | | | | |
| ML | A–4 | 95–100 | 90–100 | 80–100 | 0.8–2.5 | Granular | 0.15–0.20 | 5.6–7.3 | Moderate | Low. |
| ML or CL | A–4 or A–6. | 95–100 | 95–100 | 85–100 | 0.8–2.5 | Granular or blocky. | 0.15–0.20 | 5.6–7.3 | Moderate to high. | Low to moderate. |
| GM, ML, or CL. | A–4 or A–6. | 65–100 | 60–100 | 45–95 | 0.8–5.0 | Blocky | 0.10–0.20 | 5.6–7.3 | Moderate | Moderate. |
| | | | | | | | | | | |
| ML | A–4 | 95–100 | 90–100 | 80–95 | 0.8–2.5 | Granular | 0.15–0.20 | 5.6–7.3 | Moderate | Low. |
| GM, ML, or CL. | A–4 or A–6. | 80–100 | 75–100 | 65–90 | 0.8–5.0 | Granular or blocky. | 0.10–0.20 | 5.6–7.3 | Moderate to high. | Low to moderate. |
| | | | | | | | | | | |
| ML or CL | A–4 or A–6. | 85–100 | 80–100 | 70–95 | 0.2–0.8 | Granular | 0.10–0.15 | 5.1–6.0 | Moderate | Low to moderate. |
| MH or CH | A–7 | 75–100 | 70–100 | 60–90 | <0.2 | Blocky or massive. | 0.10–0.15 | 5.1–6.5 | Low | High. |
| | | | | | | | | | | |
| MH or CH | A–7 | 80–100 | 75–100 | 65–95 | <0.2 | Blocky or massive. | 0.10–0.15 | 5.1–6.5 | Low | High. |
| | | | | | | | | | | |
| ML or CL | A–6 or A–7. | 95–100 | 90–100 | 85–100 | 0.8–2.5 | Granular | 0.15–0.20 | 5.6–7.3 | Low to moderate. | Moderate to high. |
| CL, MH, or CH. | A–7 | 90–100 | 85–100 | 80–95 | 0.2–2.5 | Granular or blocky. | 0.10–0.20 | 6.6–7.3 | Moderate to low. | High. |

TABLE 6.—*Brief description of soils and*

| Map symbol | Soil | Depth to seasonally high water table | Depth to bedrock | Brief description of site and soil | Depth from surface (typical profile) | Classification: USDA textural class |
|---|---|---|---|---|---|---|
| | | *Feet* | *Feet* | | *Inches* | |
| Lc | Lindside cherty silt loam. | 0 to 3 | 2 to 10 | Moderately deep to deep, moderately well drained soil in depressions along small drains and on first bottoms of the Highland Rim; underlain by cherty limestone or shale. | 0–20<br>20–48 | Cherty silt loam.<br>Cherty silt loam or cherty silty clay loam. |
| Ld | Lindside cherty silt loam, phosphatic. | 0 to 3 | 2 to 10 | Moderately deep to deep, moderately well drained soil in depressions along small drains and on first bottoms; underlain by phosphatic limestone. | 0–30<br>30–48 | Cherty silt loam.<br>Cherty silt loam or silty clay. |
| Ln | Lindside silt loam. | 0 to 3 | 2 to 10 | Moderately deep to deep, moderately well drained soil in depressions along small drains and on first bottoms of the Highland Rim and inner Central Basin; underlain by cherty limestone or limestone. | 0–24<br>24–60 | Silt loam.<br>Silt loam, silty clay loam, or cherty silt loam. |
| Lp | Lindside silt loam, phosphatic. | 0 to 3 | 2 to 10 | Moderately deep to deep, moderately well drained soil in depressions along small drains and on first bottoms; underlain by limestone. | 0–40<br>40–60 | Silt loam or loam.<br>Silt loam or silty clay. |
| Ma | Made land. | Variable | Variable | Areas filled with earth, trash, or both, and smoothed; mostly earth fills made in leveling or landscaping building sites near towns. | -------- | ---------------- |
| MbA<br>MbB<br>MbB2<br>MbC2 | Maury silt loam, 0 to 2 percent slopes.<br>Maury silt loam, 2 to 5 percent slopes.<br>Maury silt loam, 2 to 5 percent slopes, eroded.<br>Maury silt loam, 5 to 12 percent slopes, eroded. | 10 or more | 3 to 8 | Deep, well-drained soils on uplands of the outer Central Basin; formed from phosphatic limestone; underlain by phosphatic limestone. | 0–10<br>10–30<br>30–60 | Silt loam.<br>Silty clay loam.<br>Silty clay or clay. |
| McC3 | Maury silty clay loam, 5 to 12 percent slopes, severely eroded. | 10 or more | 2 to 6 | Deep, well-drained soil on the uplands of the outer Central Basin; formed from phosphatic limestone; underlain by phosphatic limestone. | 0–20<br>20–48 | Silty clay loam.<br>Silty clay or clay. |
| Me | Melvin silt loam, phosphatic. | 0 to 1½ | 3 to 10 | Poorly drained soil in depressions and along small drains on first bottoms; underlain, in most places, by limestone. | 0–24<br>24–60 | Silt loam.<br>Silty clay loam or silty clay. |

[1] Perched water table.

*their estimated physical properties*—Continued

| Classification—Continued | | Percentage passing— | | | Selected characteristics significant to engineering | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Unified | AASHO | No. 4 sieve | No. 10 sieve | No. 200 sieve | Perme-ability | Structure | Available water | Reaction (pH) | Dispersion | Shrink-swell potential |
| | | | | | *Inches per hour* | | *Inches per inch of depth* | | | |
| GM or ML | A-4 | 55–90 | 50–85 | 40–75 | 0. 8–5. 0 | Granular | 0. 10–0. 15 | 5. 6–6. 0 | Moderate | Low. |
| GM, ML, or CL. | A-4 or A-6. | 50–75 | 45–70 | 35–60 | 0. 8–5. 0 | Blocky or massive. | 0. 10–0. 15 | 5. 6–6. 0 | Moderate | Low to moderate. |
| GM or ML | A-4 | 60–80 | 55–75 | 45–65 | 0. 8–5. 0 | Granular | 0. 10–0. 15 | 5. 6–7. 3 | Moderate | Low. |
| GM, ML, or CL. | A-4 or A-6. | 55–100 | 50–95 | 40–85 | 0. 2–2. 5 | Blocky or massive. | 0. 10–0. 15 | 5. 6–7. 3 | Moderate | Moderate. |
| ML or CL | A-4 or A-6. | 90–100 | 85–100 | 75–90 | 0. 8–2. 5 | Granular | 0. 15–0. 20 | 5. 6–6. 5 | Moderate | Low. |
| GC, ML, or CL. | A-4, A-6, or A-7. | 55–70 | 50–65 | 40–60 | 0. 8–2. 5 | Blocky or massive. | 0. 10–0. 20 | 5. 6–6. 5 | Moderate to low. | Low to moderate. |
| ML or CL | A-4 or A-6. | 95–100 | 90–100 | 80–95 | 0. 8–2. 5 | Granular | 0. 15–0. 20 | 5. 6–7. 3 | Moderate | Low. |
| ML or CL | A-6 or A-7. | 90–100 | 85–100 | 75–95 | 0. 2–2. 5 | Blocky or massive. | 0. 10–0. 20 | 5. 6–7. 3 | Moderate to low. | Moderate to high. |
| ------------ | ------------ | -------- | -------- | -------- | -------- | ------------ | ------------ | ---------- | ------------ | |
| ML or CL | A-4 or A-6. | 95–100 | 90–100 | 80–95 | 0. 8–2. 5 | Granular | 0. 15–0. 20 | 5. 6–6. 5 | Moderate | Low. |
| CL or MH | A-6 or A-7. | 95–100 | 95–100 | 70–90 | 0. 8–2. 5 | Blocky | 0. 10–0. 15 | 5. 1–5. 5 | Moderate | Moderate. |
| CL, MH, or CH. | A-7 | 85–100 | 80–100 | 70–95 | 0. 2–0. 8 | Blocky or massive. | 0. 10–0. 15 | 5. 1–5. 5 | Moderate to low. | High. |
| CL | A-6 or A-7. | 90–100 | 85–100 | 75–95 | 0. 8–2. 5 | Blocky | 0. 10–0. 15 | 5. 1–6. 0 | Moderate | Moderate. |
| CL, MH, or CH. | A-7 | 85–100 | 80–100 | 70–95 | 0. 2–0. 8 | Blocky or massive. | 0. 10–0. 15 | 5. 1–5. 5 | Moderate to low. | High. |
| ML | A-4 | 95–100 | 90–100 | 80–95 | 0. 8–5. 0 | Granular | 0. 15–0. 20 | 5. 6–7. 3 | Moderate | Low. |
| CL | A-6 or A-7. | 80–100 | 75–100 | 65–95 | 0. 2–2. 5 | Blocky or massive. | 0. 10–0. 15 | 5. 6–7. 3 | Moderate to low. | Moderate to high. |

689-560—64——7

TABLE 6.—*Brief description of soils and*

| Map symbol | Soil | Depth to seasonally high water table | Depth to bedrock | Brief description of site and soil | Depth from surface (typical profile) | Classification |
|---|---|---|---|---|---|---|
| | | | | | | USDA textural class |
| | | *Feet* | *Feet* | | *Inches* | |
| MfB2 | Mercer silt loam, 2 to 5 percent slopes, eroded. | 1 to 3 [1] | 2 to 6 | Moderately well drained soil on the uplands of the inner Central Basin; compact fragipan or heavy clay layer at a depth of 15 to 30 inches; underlain by limestone. | 0–6<br>6–24<br>24–40<br>40–48 | Silt loam<br>Silty clay loam<br>Silty clay loam or silty clay.<br>Clay |
| MhC2<br>MhD2<br>MhE2 | Mimosa cherty silt loam, 5 to 12 percent slopes, eroded.<br>Mimosa cherty silt loam, 12 to 20 percent slopes, eroded.<br>Mimosa cherty silt loam, 20 to 30 percent slopes, eroded. | 15 or more | 2 to 6 | Well-drained, phosphatic soils on uplands of the outer Central Basin; formed from phosphatic, clayey limestone; upper 8 to 16 inches contains angular chert fragments and is largely creep materials from nearby cherty soils; few outcrops of phosphatic limestone bedrock in places. | 0–10<br>10–48 | Cherty silt loam<br>Clay |
| MkD3<br>MkE3 | Mimosa cherty silty clay, 10 to 20 percent slopes, severely eroded.<br>Mimosa cherty silty clay, 20 to 30 percent slopes, severely eroded. | 15 or more | 1½ to 5 | Well-drained, phosphatic soils on uplands of the outer Central Basin; formed from phosphatic, clayey limestone; upper 8 to 16 inches contains angular chert fragments and is largely creep materials from nearby cherty soils; few outcrops of phosphatic limestone bedrock in places. | 0–6<br>6–40 | Cherty silty clay.<br>Clay |
| MlB2<br>MlC2<br>MlD2 | Mimosa silt loam, 2 to 5 percent slopes, eroded.<br>Mimosa silt loam, 5 to 12 percent slopes, eroded.<br>Mimosa silt loam, 12 to 20 percent slopes, eroded. | 10 or more | 2 to 6 | Well-drained, phosphatic soils on uplands of the outer Central Basin; formed from clayey, phosphatic limestone; few outcrops of phosphatic limestone in places. | 0–8<br>8–60 | Silt loam<br>Clay |
| MmD3 | Mimosa silty clay, 10 to 20 percent slopes, severely eroded. | 10 or more | 1½ to 5 | Well-drained, phosphatic soil on uplands of the outer Central Basin; formed from clayey, phosphatic limestone; few outcrops of phosphatic limestone in places. | 0–6<br>6–48 | Silty clay or silty clay loam.<br>Clay |
| MnE | Mimosa very rocky soils, 20 to 40 percent slopes. | 10 or more | 0 to 5 | Soils with outcrops of phosphatic limestone covering from 10 to 50 percent of the surface; soil material between outcrops ranges from a few inches to several feet in thickness and is mostly clay. | | |

[1] Perched water table.

*their estimated physical properties*—Continued

| Classification—Continued | | Percentage passing— | | | Selected characteristics significant to engineering | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Unified | AASHO | No. 4 sieve | No. 10 sieve | No. 200 sieve | Permeability | Structure | Available water | Reaction (pH) | Dispersion | Shrink-swell potential |
| | | | | | *Inches per hour* | | *Inches per inch of depth* | | | |
| ML or CL | A-4 or A-6. | 95–100 | 90–100 | 80–95 | 0. 8–2. 5 | Granular | 0. 10–0. 15 | 5. 1–6. 0 | Moderate | Moderate. |
| CL | A-6 or A-7. | 95–100 | 95–100 | 85–95 | 0. 8–2. 5 | Blocky | 0. 10–0. 15 | 5. 1–6. 0 | Moderate to high. | Moderate. |
| MH or CH | A-7 | 95–100 | 95–100 | 85–100 | <0. 2 | Blocky or massive. | 0. 10–0. 15 | 5. 1–6. 0 | Low | Moderate to high. |
| CH | A-7 | 95–100 | 95–100 | 90–100 | <0. 2–0. 8 | Massive | 0. 10–0. 15 | 5. 1–6. 0 | Low | High. |
| ML | A-4 or A-7. | 65–90 | 60–85 | 50–75 | 0. 8–2. 5 | Granular | 0. 10–0. 15 | 5. 1–6. 5 | Moderate | Low. |
| MH or CH | A-7 | 95–100 | 90–100 | 85–100 | <0. 2 | Blocky or massive. | 0. 10–0. 15 | 5. 1–7. 3 | Low | High. |
| CL, MH, or CH. | A-4, A-6, or A-7. | 60–90 | 55–85 | 45–75 | 0. 2–0. 8 | Blocky | 0. 10–0. 15 | 5. 1–6. 0 | Moderate to low. | Moderate to high. |
| MH or CH | A-7 | 95–100 | 90–100 | 85–100 | <0. 2 | Blocky or massive. | 0. 10–0. 15 | 5. 1–7. 3 | Low | High. |
| ML or CL | A-4 or A-6. | 95–100 | 90–100 | 80–95 | 0. 8–2. 5 | Granular | 0. 10–0. 15 | 5. 6–6. 5 | Moderate | Low. |
| MH or CH | A-7 | 95–100 | 95–100 | 85–100 | <0. 2 | Blocky or massive. | 0. 10–0. 15 | 5. 1–7. 3 | Low | High. |
| CL, MH, or CH. | A-6 or A-7. | 90–100 | 85–100 | 75–95 | 0. 2–0. 8 | Blocky | 0. 10–0. 15 | 5. 1–6. 0 | Moderate to low. | Moderate to high. |
| MH or CH | A-7 | 95–100 | 95–100 | 85–100 | <0. 2 | Blocky or massive. | 0. 10–0. 15 | 5. 1–7. 3 | Low | High. |
| ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | |

TABLE 6.—*Brief description of soils and*

| Map symbol | Soil | Depth to seasonally high water table | Depth to bedrock | Brief description of site and soil | Depth from surface (typical profile) | Classification |
|---|---|---|---|---|---|---|
| | | | | | | USDA textural class |
| | | *Feet* | *Feet* | | *Inches* | |
| MoD | Mimosa and Ashwood very rocky soils, 5 to 20 percent slopes. | 10 or more | 0 to 5 | Soils with otcrops of phosphatic limestone covering from 10 to 50 percent of the surface; soil material between outcrops ranges from a few inches to several feet in thickness and is mostly clay. | | |
| Mp | Mine pits and dumps. | Variable | Variable | Excavations, open pits, and uneven dumps of waste material, mostly from phosphate strip mining; included are limestone quarry dumps, city dumps, and small excavations for road fill. | | |
| Mr | Mine land, reclaimed. | Variable | Variable | Mostly leveled or smoothed excavations and dumps originally made in strip mining for phosphate; material consists mainly of clay and limestone fragments; outcrops of limestone common. | | |
| MsB<br>MsC2 | Mountview silt loam, 2 to 5 percent slopes.<br>Mountview silt loam, 5 to 12 percent slopes, eroded. | 20 or more | 3 to 10 | Deep, well-drained soils on uplands of the Highland Rim; in 20 to 40 inches of loess overlying cherty clay; underlain by cherty limestone. | 0–14<br>14–36<br>36–72 | Silt loam<br>Silty clay loam<br>Cherty clay |
| MvB<br>MvB2<br>MvC<br>MvC2<br>MvC3<br>MvD<br>MvD2 | Mountview silt loam, shallow, 2 to 5 percent slopes.<br>Mountview silt loam, shallow, 2 to 5 percent slopes, eroded.<br>Mountview silt loam, shallow, 5 to 12 percent slopes.<br>Mountview silt loam, shallow, 5 to 12 percent slopes, eroded.<br>Mountview silt loam, shallow, 5 to 12 percent slopes, severely eroded.<br>Mountview silt loam, shallow, 12 to 20 percent slopes.<br>Mountview silt loam, shallow, 12 to 20 percent slopes, eroded. | 20 or more | 2 to 10 | Moderately deep, well-drained soils on uplands of the Highland Rim; in 12 to 20 inches of loess overlying cherty silt loam or cherty clay; few angular chert fragments on the surface and throughout loess mantle; underlain by cherty limestone. | 0–8<br>8–20<br>20–72 | Silt loam<br>Silty clay loam<br>Coarse cherty silt loam or cherty clay. |
| Rb | Robertsville silt loam, phosphatic. | 0 to 2 | 3 to 10 | Poorly drained soil on level stream terraces; fragipan or heavy clay at a depth of 15 to 30 inches; underlain by limestone. | 0–10<br>10–20<br>20–60 | Silt loam<br>Silt loam, silty clay loam, or clay.<br>Silty clay or clay. |

See footnote at end of table.

*their estimated physical properties*—Continued

| Classification—Continued | | Percentage passing— | | | Selected characteristics significant to engineering | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Unified | AASHO | No. 4 sieve | No. 10 sieve | No. 200 sieve | Perme-ability | Structure | Available water | Reaction (pH) | Dispersion | Shrink-swell potential |
| | | | | | *Inches per hour* | | *Inches per inch of depth* | | | |
| ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | |
| ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | |
| ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | |
| ML | A-4 | 95–100 | 90–100 | 80–95 | 0. 8–2. 5 | Granular | 0. 15–0. 20 | 5. 1–6. 0 | Moderate | Low. |
| CL | A-6 or A-7. | 95–100 | 95–100 | 85–95 | 0. 8–2. 5 | Blocky | 0. 15–0. 20 | 5. 1–5. 5 | High | Low to moderate |
| GC, CL, or MH. | A-4, A-6, or A-7. | 50–70 | 45–65 | 35–55 | 0. 8–2. 5 | Blocky or massive. | 0. 10–0. 15 | 5. 1–5. 5 | Low | Moderate. |
| ML | A-4 | 85–100 | 80–100 | 70–95 | 0. 8–2. 5 | Granular | 0. 10–0. 15 | 5. 1–6. 0 | Moderate | Low. |
| CL | A-6 or A-7. | 95–100 | 85–100 | 75–95 | 0. 8–2. 5 | Blocky | 0. 10–0. 15 | 5. 1–5. 5 | High | Moderate. |
| GM, GC, CL, or MH. | A-2, A-4, or A-6. | 40–65 | 35–60 | 25–50 | 0. 8–5. 0 | Blocky or massive. | 0. 05–0. 15 | 5. 1–5. 5 | Low | Low to moderate. |
| ML or CL | A-4 or A-6. | 95–100 | 95–100 | 85–95 | 0. 8–2. 5 | Granular | 0. 15–0. 20 | 5. 1–6. 0 | Moderate | Low. |
| CL, MH, or CH. | A-6 or A-7. | 95–100 | 95–100 | 90–100 | 0. 2–0. 8 | Blocky or massive. | 0. 10–0. 15 | 5. 1–6. 0 | Moderate to low. | Moderate to high. |
| MH or CH | A-7 | 95–100 | 95–100 | 95–100 | <0. 2 | Massive | 0. 05–0. 10 | 5. 1–6. 0 | Low | High. |

TABLE 6.—*Brief description of soils and*

| Map symbol | Soil | Depth to seasonally high water table | Depth to bedrock | Brief description of site and soil | Depth from surface (typical profile) | Classification |
|---|---|---|---|---|---|---|
| | | | | | | USDA textural class |
| | | *Feet* | *Feet* | | *Inches* | |
| Rc | Rockland. | Variable | 0 to 3 | Outcrops of rock occupy 50 to more than 90 percent of the surface; rocks are mostly limestone, but areas of shale and cherty limestone are included. | | |
| Sc | Sees silty clay loam. | 2 to 4 or more. | 3 to 6 | Dark, moderately well drained to somewhat poorly drained, clayey soil in old local alluvium or colluvium that washed from soils derived from phosphatic limestone; underlain by limestone. | 0–12 | Silty clay loam |
| | | | | | 12–60 | Silty clay or clay. |
| Se | Sequatchie loam, phosphatic. | 3 to 8 or more. | 4 to 10 | Deep, well-drained, sandy soil on low stream terraces; underlain by limestone or sandy limestone interbedded with shale. | 0–60 | Loam |
| | | | | | 60–80 | Clay |
| SrC3 | Stiversville clay loam, 5 to 12 percent slopes, severely eroded. | 15 or more | 2 to 4 | Deep to moderately deep, well-drained soils on uplands of the outer Central Basin; formed from phosphatic, sandy limestone interbedded with shale; sandy fragments on surface and throughout profile generally increase in size and amount with depth; underlain by interbedded sandy limestone and shale. | 0–20 | Silty clay loam or clay loam. |
| SrD3 | Stiversville clay loam, 12 to 20 percent slopes, severely eroded. | | | | 20–40 | Clay loam |
| StB2 | Stiversville silt loam, 2 to 5 percent slopes, eroded. | 15 or more | 2½ to 5 | Deep to moderately deep, well-drained soils on uplands of the outer Central Basin; formed from phosphatic, sandy limestone interbedded with shale; sandy fragments on surface and throughout profile generally increase in size and amount with depth; underlain by interbedded sandy limestone and shale. | 0–8 | Silt loam |
| StC2 | Stiversville silt loam, 5 to 12 percent slopes, eroded. | | | | 8–24 | Silty clay loam or clay loam. |
| StD2 | Stiversville silt loam, 12 to 20 percent slopes, eroded. | | | | 24–48 | Clay loam |
| SuD | Sulphura cherty silt loam, 12 to 20 percent slopes. | 20 or more | 1½ to 2 | Shallow, excessively drained soils formed from shale; thin layer of cherty creep on the surface; outcrops of shale common on steeper slopes; underlain by shale. | 0–8 | Cherty silt loam. |
| SuE | Sulphura cherty silt loam, 20 to 50 percent slopes. | | | | 8–30 | Shaly silt loam |
| SuE3 | Sulphura cherty silt loam, 20 to 50 percent slopes, severely eroded. | | | | | |

[1] Perched water table.

*their estimated physical properties*—Continued

| Classification—Continued | | Percentage passing— | | | Selected characteristics significant to engineering | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Unified | AASHO | No. 4 sieve | No. 10 sieve | No. 200 sieve | Permeability | Structure | Available water | Reaction (pH) | Dispersion | Shrink-swell potential |
| | | | | | *Inches per hour* | | *Inches per inch of depth* | | | |
| CL or CH | A-6 or A-7. | 95-100 | 95-100 | 85-100 | 0. 2-0. 8 | Granular | 0. 10-0. 15 | 5. 6-6. 5 | Moderate | Moderate to high. |
| CH | A-7 | 95-100 | 95-100 | 90-100 | <0. 2 | Blocky or massive. | 0. 10-0. 15 | 5. 6-7. 3 | Low | High. |
| | | | | | | | | | | |
| ML | A-4 | 90-100 | 85-100 | 65-75 | 2. 5-5. 0 | Granular | 0. 15-0. 20 | 5. 1-6. 0 | High | Low. |
| CL, MH, or CH. | A-6 or A-7. | 95-100 | 90-100 | 80-95 | 0. 2-2. 5 | Blocky or massive. | 0. 10-0. 15 | 5. 1-5. 5 | Moderate to low. | Moderate to high. |
| | | | | | | | | | | |
| CL | A-4 or A-6. | 85-100 | 80-100 | 70-90 | 0. 8-5. 0 | Blocky | 0. 10-0. 15 | 5. 1-6. 0 | Moderate to high. | Moderate. |
| CL | A-4 or A-6. | 65-80 | 60-75 | 50-65 | 2. 5-5. 0 | Blocky | 0. 10-0. 15 | 5. 1-5. 5 | Moderate to high. | Moderate. |
| | | | | | | | | | | |
| ML | A-4 | 90-100 | 85-100 | 75-95 | 0. 8-5. 0 | Granular | 0. 15-0. 20 | 5. 1-6. 0 | Moderate | Low. |
| CL | A-4 or A-6. | 80-100 | 75-95 | 65-85 | 0. 8-5. 0 | Blocky | 0. 10-0. 15 | 5. 1-5. 5 | Moderate to high. | Moderate. |
| CL | A-4 or A-6. | 65-80 | 60-75 | 50-65 | 2. 5-5. 0 | Blocky | 0. 10-0. 15 | 5. 1-5. 5 | Moderate to high. | Moderate. |
| | | | | | | | | | | |
| GM or ML | A-2 or A-4. | 50-85 | 45-80 | 30-65 | 2. 5-5. 0 | Granular | 0. 05-0. 10 | 5. 1-6. 0 | Moderate | Low. |
| GM or ML | A-2, A-4, or A-6. | 45-85 | 40-80 | 30-70 | 0. 8-5. 0 | Blocky | 0. 05-0. 10 | 5. 1-6. 0 | Moderate | Low. |

TABLE 6.—*Brief description of soils and*

| Map symbol | Soil | Depth to seasonally high water table | Depth to bedrock | Brief description of site and soil | Depth from surface (typical profile) | Classification |
|---|---|---|---|---|---|---|
| | | | | | | USDA textural class |
| | | *Feet* | *Feet* | | *Inches* | |
| TaB | Taft silt loam, 0 to 8 percent slopes. | 1½ to 3 [1] | 3 to 10 | Moderately well drained to somewhat poorly drained soil that has a fragipan and is on stream terraces, toe slopes, and fans; underlain by cherty limestone and shale. | 0–8 | Silt loam or cherty silt loam. |
| | | | | | 8–24 | Silty clay loam or cherty silty clay loam. |
| | | | | | 24–48 | Cherty silt loam or cherty silty clay loam. |
| | | | | | 48–72 | Cherty silty clay loam or cherty silty clay. |
| Tb | Taft silt loam, phosphatic. | 0 to 3 | 3 to 10 | Somewhat poorly drained soil on level to nearly level stream terraces; fragipan is at a depth of 16 to 30 inches; underlain by limestone. | 0–10 | Silt loam |
| | | | | | 10–20 | Silty clay loam or silty clay. |
| | | | | | 20–60 | Silty clay or clay. |
| TfB3 | Talbott silty clay, 2 to 5 percent slopes, severely eroded. | 10 or more | 1½ to 5 | Moderately deep to deep, well-drained, clayey soils on uplands of the inner Central Basin; few chert fragments on the surface and throughout profile in places; many outcrops of limestone bedrock. | 0–6 | Silty clay |
| TfC3 | Talbott silty clay, 5 to 12 percent slopes, severely eroded. | | | | 6–48 | Clay |
| TsB2 | Talbott silty clay loam, 2 to 5 percent slopes, eroded. | 10 or more | 2 to 5 | Moderately deep to deep, well-drained, clayey soils on uplands of the inner Central Basin; few chert fragments on the surface and throughout profile in places; many outcrops of limestone bedrock. | 0–8 | Silty clay loam or silt loam. |
| TsC2 | Talbott silty clay loam, 5 to 12 percent slopes, eroded. | | | | 8–60 | Clay or silty clay. |
| TvD | Talbott very rocky soils, 2 to 15 percent slopes. | | | Soils broken by outcrops of limestone that occupy 10 to 50 percent of the surface area; soil material between the outcrops ranges from a few inches to several feet in thickness and is mostly clay. | | |

[1] Perched water table.

*their estimated physical properties*—Continued

| Classification—Continued | | Percentage passing— | | | Selected characteristics significant to engineering | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Unified | AASHO | No. 4 sieve | No. 10 sieve | No. 200 sieve | Perme-ability | Structure | Available water | Reaction (pH) | Dispersion | Shrink-swell potential |
| | | | | | *Inches per hour* | | *Inches per inch of depth* | | | |
| ML | A-4 | 75–100 | 70–90 | 60–80 | 0. 8–2. 5 | Granular | 0. 15–0. 20 | 5. 1–6. 0 | Moderate | Low. |
| ML or CL | A-4 or A-6. | 80–100 | 75–95 | 65–85 | 0. 8–2. 5 | Blocky | 0. 10–0. 15 | 5. 1–5. 5 | Moderate to high. | Moderate to low. |
| ML or CL | A-4 or A-6. | 65–85 | 60–80 | 50–70 | <0. 2 | Massive | 0. 10–0. 15 | 5. 1–5. 5 | Low | Low to moderate. |
| GM, GC, or CL. | A-2, A-4, or A-6. | 45–75 | 40–70 | 30–60 | 0. 2–2. 5 | Blocky or massive. | 0. 05–0. 10 | 5. 1–5. 5 | Moderate to low. | Low to moderate. |
| ML or CL | A-4 or A-6. | 95–100 | 95–100 | 85–95 | 0. 8–2. 5 | Granular | 0. 15–0. 20 | 5. 1–6. 0 | Moderate | Moderate. |
| CH | A-6 or A-7. | 95–100 | 95–100 | 90–100 | 0. 2–0. 8 | Blocky or massive. | 0. 10–0. 15 | 5. 1–6. 0 | Low | High. |
| CH | A-7 | 95–100 | 95–100 | 90–100 | <0. 2 | Massive | 0. 10–0. 15 | 5. 1–6. 0 | Low | High. |
| CH | A-7 | 95–100 | 90–100 | 80–100 | 0. 2–0. 8 | Granular or blocky. | 0. 10–0. 15 | 5. 1–6. 0 | Moderate to low. | High. |
| CH | A-7 | 95–100 | 95–100 | 90–100 | <0. 2 | Blocky or massive. | 0. 10–0. 15 | 5. 1–5. 5 | Low | High. |
| CL or CH | A-6 or A-7. | 95–100 | 90–100 | 80–100 | 0. 2–0. 8 | Granular | 0. 10–0. 15 | 5. 1–6. 0 | Moderate | Moderate to high. |
| CH | A-7 | 95-100 | 95–100 | 90–100 | <0. 2 | Blocky or massive. | 0. 10–0. 15 | 5. 1–5. 5 | Low | High. |
| ------------ | ---------- | -------- | -------- | -------- | ---------- | ------------ | ------------ | ---------- | ------------ | |

689-560—64——8

TABLE 7.—*Engineering*

| Soil series and map symbols | Suitability for— Winter grading | Road subgrade | Road fill | Suitability as source of— Topsoil | Sand and gravel | Soil features affecting— Vertical alinement for highways: Materials |
|---|---|---|---|---|---|---|
| Armour (AcB, AcC2, AcD2, AmC3, ArA, ArB, ArB2, ArC, ArC2, AtC3). | Poor to fair | Poor to fair | Fair | Fair to good | Not suitable | Limestone bedrock; likely to slide in cut slopes. |
| Ashwood (AwB, AwC, AwD) | Poor | Poor | Poor | Not suitable | Not suitable | Shallow to limestone, which outcrops in places. |
| Baxter (BaC, BaD, BaD2, BaE, BcC3, BcD3). | Fair | Fair to poor | Fair | Poor | Not suitable | Stratified layers or bands of angular chert bedrock. |
| Bodine (BoC, BoD, BoE) | Fair to good | Fair | Good | Poor to not suitable. | Poor; poorly graded angular chert. | Shallow to stratified layers or bands of angular chert bedrock. |
| Braxton (BrB2, BrC2, BrD2, BsC3, BsD3). | Poor to fair | Poor to fair | Fair | Poor | Not suitable | Limestone bedrock, which outcrops in places. |
| Captina (CaA, CaB, CaB2, CaC2). | Poor | Poor | Poor | Fair to good | Not suitable | Silty in upper 2 feet |
| Culleoka (CfD2, CfE2, CkC, CkD, CkE, CkE3). | Fair | Fair | Good | Fair to good | Not suitable | Subject to sliding in cut slopes because 2 to more than 6 feet of creep overlies clayey residuum; underlying material is sandy limestone interbedded with shale. |
| Dellrose (DeD, DeE, DeE3, DeF, DeF3). | Fair | Poor to fair | Good | Fair | Not suitable | Subject to sliding in cut slopes. |
| Dickson (DkB) | Poor | Poor | Poor | Fair | Not suitable | Stratified layers or bands of angular chert bedrock below 3 feet. |
| Donerail (DnB, DnB2, DnC2, DoB2, DoC2). | Not suitable | Poor | Poor | Poor to fair | Not suitable | Limestone and sandy limestone interbedded with shale bedrock at 3 to 8 feet. |

See footnotes at end of table.

*interpretations of soils*

| Soil features affecting—Continued | | | | | |
|---|---|---|---|---|---|
| Vertical alinement for highways—Con. | Farm ponds | | Agricultural drainage | Irrigation | Terraces and diversions [1] |
| Drainage | Reservoir area | Embankment | | | |
| Low terraces subject to occasional overflow; possible seepage at 3 to 4 feet in colluvial positions. | Possible excess seepage through stratified beds of chert, gravel, or sand in terraces; underlying limestone cavernous in places. | Fair to good stability. | (2) | (3) | (4). |
| Seepage likely; slowly permeable subsoil. | Shallow to limestone bedrock; limestone cavernous in places. | Clayey soil; poor stability and hard to compact. | Slowly permeable, clayey subsoil; seepage in places. | Low available water-holding capacity and shallow root zone. | Shallow to bedrock, which outcrops in places; clayey subsoil. |
| Good drainage | Excess seepage because of permeable substratum. | Fair to good stability. | (2) | Moderately low available water-holding capacity. | (4). |
| Good drainage | Excess seepage because of permeable substratum. | Fair to good stability. | (2) | Low available water-holding capacity and rapid permeability; shallow root zone; predominantly steep slopes. | Shallow to cherty limestone bedrock. |
| Subsoil moderately slow in permeability. | Limestone bedrock cavernous in places; shallow to bedrock, which outcrops in places. | Poor to fair stability. | (2) | Moderate to moderately low available water-holding capacity. | Outcrops of limestone bedrock in places; clayey subsoil. |
| Perched water table above fragipan at 18 to 30 inches during long wet periods. | Fragipan at 18 to 30 inches; in some places stratified gravel, sand, and clay in lower horizons. | Fair stability | Perched water table above fragipan during wet periods. | Fragipan limits root zone to upper 2 feet. | (4). |
| Seepage near base of steep slopes. | Rapidly permeable substratum; flagstones in lower horizons and throughout soil in places. | Good to fair stability. | (2) | Predominantly steep slopes. | (4). |
| Seepage over underlying clayey residuum or bedrock. | Underlying limestone cavernous in places; seepage along underlying clayey residuum. | Good stability | (2) | Predominantly steep slopes. | (4). |
| Perched water table above fragipan at 18 to 30 inches during long wet periods. | Fragipan at 18 to 30 inches; excess seepage because of permeable substratum; possible seepage along fragipan. | Fair stability; likely to slide on steep banks. | Perched water table above fragipan during long wet periods. | Pan limits root zone to upper 2 feet. | (4). |
| Perched water table above fragipan or cemented hardpan at 18 to 36 inches during long wet periods. | Fragipan or cemented hardpan at 18 to 30 inches; permeable substratum in places; bedrock cavernous in places. | Fair stability | Perched water table above pan during wet periods; slowly permeable clayey subsoil in places. | Pan limits root zone to upper 2 feet. | (4). |

TABLE 7.—*Engineering interpretations*

| Soil series and map symbols | Suitability for— | | | Suitability as source of— | | Soil features affecting— |
|---|---|---|---|---|---|---|
| | Winter grading | Road subgrade | Road fill | Topsoil | Sand and gravel | Vertical alinement for highways: Materials |
| Dowellton (DsB) | Not suitable | Poor | Poor | Poor | Not suitable | Very fine textured material; plastic clay subsoil in all places; limestone bedrock at 2 to 6 feet. |
| Dunning (Du) | Not suitable | Poor | Poor | Poor | Not suitable | Limestone bedrock at 3 to 6 feet. |
| Egam (Eg) | Not suitable | Poor | Poor to fair | Poor to fair | Not suitable | Bedrock at 2 to 10 feet in places. |
| Etowah (EtB, EtC2) | Fair to poor | Fair to poor | Fair | Fair to good | Not suitable | Limestone bedrock at 3 to 10 feet. |
| Fairmount (FaC) | Poor | Poor | Poor | Poor to not suitable. | Not suitable | Shallow to limestone bedrock; outcrops in places. |
| Frankstown (FrC, FrD) | Fair to good | Fair to good | Good | Poor to fair | Not suitable | Layers of soil material interspersed between bands of chert at 2 to 3 feet. |
| Greendale (GrC, GsB) | Poor to fair | Poor to fair | Fair to good | Good to fair | Not suitable | Limestone bedrock at 3 to 6 feet. |
| Gullied land (Gu) | Not suitable | Poor to fair | Poor to fair | Poor | Not suitable | Bedrock, outcrops of bedrock, and possible slippage in colluvial soil material. |
| Hagerstown (HaB2, HaC2) | Poor to fair | Poor | Poor to fair | Fair | Not suitable | Limestone bedrock; outcrops in places. |
| Hampshire (HbB, HbB2, HbC2, HbD2, HcC3, HcD3). | Poor to fair | Poor | Poor to fair | Poor | Not suitable | Limestone or sandy limestone interbedded with shale bedrock; outcrops in places. |
| Hampshire-Colbert complex (HeB2, HeC2, HeD2, HhC3, HhD3). | Poor to fair | Poor | Poor | Poor | Not suitable | Limestone bedrock; outcrops in places. |
| Hermitage (HmB, HmB2) | Poor to fair | Fair to poor | Fair to good | Fair to good | Not suitable | Subject to slides in cut slopes. |

See footnotes at end of table.

*of soils*—Continued

| Soil features affecting—Continued | | | | | |
|---|---|---|---|---|---|
| Vertical alinement for highways—Con. | Farm ponds | | Agricultural drainage | Irrigation | Terraces and diversions [1] |
| Drainage | Reservoir area | Embankment | | | |
| High water table in depressions. | Limestone bedrock cavernous in places. | Very clayey material; difficult to compact. | Slowly permeable clay subsoil; high water table and seepage in depressions. | Poorly drained in depressions, and low available water-holding capacity in other places. | Nearly level. |
| Seasonally high water table; slowly permeable clayey subsoil; subject to occasional flooding. | Underlying limestone cavernous in places. | Very clayey material; difficult to compact. | Seasonally high water table; slowly permeable subsoil; subject to flooding. | Poorly drained | Level to nearly level. |
| Seasonally high water table; slowly permeable lower subsoil; subject to occasional flooding. | Underlying limestone cavernous in places. | Fair to poor stability. | Seasonally high water table; slowly permeable subsoil; subject to flooding. | (3) | Level to nearly level. |
| Good drainage | Excess seepage in places because of stratified beds of gravel. | Fair stability | (2) | (3) | (4). |
| Seepage during long wet periods; slowly permeable clay subsoil. | Shallow to limestone bedrock; limestone cavernous in places. | Very clayey material; difficult to compact. | (2) | Low available water-holding capacity. | Shallow to bedrock, which outcrops in places; clayey subsoil. |
| Good drainage | Excess seepage in most places because of permeable soil material and substratum. | Fair to good stability. | (2) | Chert content reduces the available water-holding capacity. | (4). |
| Seasonally high water table and seepage at 1½ to 2 feet in places; subject to flooding that deposits sediments. | Excess seepage in most places because of permeable soil material and substratum. | Fair to good stability. | (2) | Chert in places causes rapid permeability and reduces available water-holding capacity. | Level to nearly level in depressions, and narrow, V-shaped valleys. |
| Variable | Shallow to bedrock, which outcrops in places; bedrock may be cavernous in places; excess silting. | Variable soil material. | (2) | Not suitable | Dissected by close network of moderately deep to deep gullies. |
| Possible seepage over bedrock; slowly permeable clayey subsoil. | Shallow to bedrock, which outcrops in places; limestone bedrock. | Clayey subsoil material has fair stability but is difficult to compact. | (2) | (3) | Outcrops of limestone bedrock in places; clay subsoil. |
| Possible seepage over bedrock; slowly permeable clayey subsoil. | Shallow to limestone bedrock, which outcrops in places; limestone is cavernous in places. | Clayey subsoil material has fair stability but is difficult to compact. | (2) | Slowly permeable subsoil; moderately low to low available water-holding capacity. | Outcrops of bedrock in places; clayey subsoil. |
| Seepage over limestone bedrock; slowly permeable clayey subsoil. | Shallow to bedrock, which outcrops in places; bedrock is cavernous in places. | Clayey subsoil material has fair stability but is difficult to compact. | (2) | Slowly permeable clayey subsoil and moderately low to low available water-holding capacity. | Outcrops of bedrock in places; clayey subsoil. |
| Possible seepage over underlying clayey residuum or bedrock. | Underlying limestone is cavernous in places. | Fair to good stability. | (2) | (3) | (4). |

TABLE 7.—*Engineering interpretations*

| Soil series and map symbols | Suitability for— | | | Suitability as source of— | | Soil features affecting— |
|---|---|---|---|---|---|---|
| | Winter grading | Road subgrade | Road fill | Topsoil | Sand and gravel | Vertical alinement for highways: Materials |
| Hicks (HnB2, HnC2, HoC3) | Poor to fair | Fair | Fair | Fair | Not suitable | Shallow to sandy limestone interbedded with shale. |
| Humphreys (HpB, HpC2, HpD2, HrB, HrC2). | Poor to fair | Poor to fair | Fair to good | Fair to good | Not suitable | Stratified layers or bands of chert and, in places, shale; indurated layer or fragipan at 2 to 3 feet in places. |
| Huntington (Hs, Ht, Hu) | Not suitable to poor. | Fair | Fair to good | Good | Not suitable | Limestone at 2 to 10 feet. |
| Inman (ImC, ImD, ImE, InC3, InD3, InE3). | Fair | Poor to fair | Fair | Poor | Not suitable | Shallow to interbedded sandy limestone and shale bedrock. |
| Lanton (La) | Not suitable | Poor | Poor | Poor | Not suitable | Limestone at 2 to 6 feet |
| Lindside (Lc, Ld, Ln, Lp) | Not suitable | Poor | Fair to good | Fair to good | Not suitable | Limestone at 2 to 10 feet. |
| Made land (Ma) | Not suitable | Variable | Variable | Variable | Not suitable | Bedrock and, in some places, buried debris. |
| Maury (MbA, MbB, MbB2, MbC2, McC3). | Poor to fair | Poor to fair | Fair | Fair | Not suitable | Limestone bedrock at 3 to 8 feet. |
| Melvin (Me) | Not suitable | Poor | Poor | Poor to fair | Not suitable | Underlain by limestone |
| Mercer (MfB2) | Poor | Poor | Poor | Poor to fair | Not suitable | Limestone bedrock; fragipan or heavy plastic clay at 15 to 30 inches. |
| Mimosa (MhC2, MhD2, MhE2, MkD3, MkE3, MlB2, MlC2, MlD2, MmD3). | Poor to fair | Poor | Poor to fair | Poor to not suitable. | Not suitable | Limestone bedrock; outcrops in places. |

See footnotes at end of table.

*of soils*—Continued

| Soil features affecting—Continued | | | | | |
|---|---|---|---|---|---|
| Vertical alinement for highways—Con. | Farm ponds | | Agricultural drainage | Irrigation | Terraces and diversions [1] |
| Drainage | Reservoir area | Embankment | | | |
| Good drainage | Shallow and excess seepage because of rapidly permeable substratum. | Fair to good stability. | (2) | Moderately low available water-holding capacity and rapidly permeable subsoil. | (4). |
| Possible seepage at 2 to 3 feet; permeable substratum. | Permeable substratum; excess seepage. | Fair to good stability. | (2) | (3) | (4). |
| Subject to occasional flooding and short periods of ponding. | Possible excess seepage because of stratified layers of gravel and sand, or because of caverns in underlying limestone. | Fair to good stability. | (2) | (3) | Level to nearly level. |
| Possible seepage over bedrock near base of steep slopes; slowly permeable clayey subsoil. | Shallow to interbedded sandy limestone and shale; possible excess seepage over and through bedrock. | Fair to good stability. | (2) | Low available water-holding capacity; slowly permeable subsoil. | Shallow to bedrock; clayey subsoil; predominantly steep slopes. |
| Seasonally high water table, slowly permeable clayey subsoil; subject to occasional flooding. | Underlying limestone is cavernous in places. | Poor stability and difficult to compact. | Seasonally high water table and slowly permeable subsoil; subject to flooding. | (3) | Level to nearly level. |
| Seasonally high water table, seepage at 2 to 3 feet; subject to occasional flooding or ponding. | Underlying limestone is cavernous in places; seepage through permeable subsoil. | Fair to good stability. | Seasonally high water table; subject to occasional flooding or ponding. | (3) | Level to nearly level. |
| Variable | Variable | Variable | Variable | Variable; generally not suitable. | Variable; generally not suitable. |
| Good drainage | Limestone bedrock; is cavernous in places; excess seepage in places because of rapidly permeable substratum. | Fair stability | (2) | (3) | (4). |
| Seasonally high water table saturates soil for long periods; subject to overflow; slowly permeable subsoil in most places. | Saturated for long periods; possible seepage over underlying limestone. | Mostly silt and clay; fair to poor stability. | Seasonally high water table saturates soil for long periods; subject to overflow and ponding. | Soil saturated for long periods; subject to flooding and ponding. | Level to nearly level. |
| Perched water table above fragipan or heavy plastic clay during long wet periods. | Limestone bedrock is cavernous in places; possible seepage along fragipan or clay layer. | Poor to fair stability. | Perched water table during long wet periods. | Fragipan restricts root growth to upper 2 feet. | (4). |
| Possible seepage over limestone bedrock; slowly permeable clayey subsoil. | Limestone bedrock is cavernous in places; and outcrops in places. | Fair to poor stability; clayey soil material. | (2) | Slowly permeable subsoil; moderately low to low available water-holding capacity. | Clayey subsoil; outcrops of limestone bedrock in places. |

TABLE 7.—*Engineering interpretations*

| Soil series and map symbols | Suitability for— | | | Suitability as source of— | | Soil features affecting— |
|---|---|---|---|---|---|---|
| | Winter grading | Road subgrade | Road fill | Topsoil | Sand and gravel | Vertical alinement for highways: Materials |
| Mimosa very rocky soils (MnE). | Poor | Poor | Poor | Poor | Not suitable | Shallow to limestone; outcrops of limestone cover 10 to 50 percent of surface. |
| Mimosa and Ashwood very rocky soils (MoD). | Poor | Poor | Poor | Poor | Not suitable | Shallow to limestone; outcrops of limestone cover 10 to 50 percent of surface. |
| Mine pits and dumps (Mp) | Not suitable | Poor | Poor to fair | Not suitable to poor. | Not suitable | Limestone or sandy limestone interbedded with shale bedrock; outcrops of bedrock, stones or boulders, and loose, uneven piles of soil material in places. |
| Mine land, reclaimed (Mr) | Not suitable | Poor | Poor to fair | Not suitable to poor. | Not suitable | Limestone or sandy limestone interbedded with shale bedrock; outcrops of bedrock, stones, or boulders in places. |
| Mountview (MsB, MsC2, MvB, MvB2, MvC, MvC2, MvC3, MvD, MvD2). | Fair | Poor to fair | Fair | Fair to good | Not suitable | Underlain by stratified layers or bands of chert. |
| Robertsville (Rb) | Not suitable | Poor | Poor | Poor | Not suitable | Underlain by limestone in most places; fragipan or heavy plastic subsoil is at 15 to 30 inches. |
| Rockland (Rc) | Poor to fair | Poor | Poor | Not suitable | Not suitable | Outcrops of limestone, shale, or chert cover 50 to more than 90 percent of the surface. |
| Sees (Sc) | Not suitable | Poor | Poor | Poor to not suitable. | Not suitable | Limestone at 3 to 6 feet. |
| Sequatchie (Se) | Poor | Fair; poor below 5 ft. | Fair to good; poor below 5 ft. | Good | Not suitable | Underlain by limestone or sandy limestone interbedded with shale; stratified layers of sand, silt, clay, or gravel in places. |
| Stiversville (SrC3, SrD3, StB2, StC2, StD2). | Poor to fair | Fair to good | Fair to good | Fair to good | Not suitable | Interbedded sandy limestone and shale bedrock at 2 to 5 feet. |

*of soils*—Continued

| Soil features affecting—Continued | | | | | |
|---|---|---|---|---|---|
| Vertical alinement for highways—Con. | Farm ponds | | Agricultural drainage | Irrigation | Terraces and diversions [1] |
| Drainage | Reservoir area | Embankment | | | |
| Possible seepage over limestone bedrock; slowly permeable clayey subsoil. | Shallow to bedrock; 10 to 50 percent of surface covered by outcrops; limestone bedrock is cavernous in places. | Clayey soil between rock outcrops. | (2) | Not suitable | Shallow, clayey subsoil; outcrops of limestone cover 10 to 50 percent of surface. |
| Possible seepage over limestone bedrock; slowly permeable clayey subsoil. | Shallow to bedrock; 10 to 50 percent of surface covered by outcrops; bedrock is cavernous in places. | Clayey soil between rock outcrops. | (2) | Not suitable | Shallow, clayey subsoil; outcrops of limestone cover 10 to 50 percent of surface. |
| Subject to ponding in places. | Limestone bedrock is cavernous in places. | Materials are variable. | Variable | Variable | Variable. |
| Subject to ponding in places. | Limestone bedrock is cavernous in places; excess seepage through permeable substratum. | Materials are variable. | Subject to ponding in places. | Clayey texture throughout retards infiltration. | Stones, boulders, and outcrops of limestone bedrock in places. |
| Good drainage | Permeable substratum; excess seepage. | Very silty in upper 2 or 3 feet; fair stability. | (2) | (3) | (4). |
| High water table; fragipan at 15 to 30 inches, or slowly permeable clay subsoil; subject to ponding in most places. | Very slowly permeable. | Mostly silt and clay; fair to poor stability. | High water table; fragipan at 15 to 30 inches, or slowly permeable clayey subsoil. | Poorly drained; low water-holding capacity. | Level to nearly level. |
| Variable; surface seepage in many places. | Limestone is cavernous. | Very little soil material. | (2) | Not suitable | Not suitable. |
| Seasonally high water table; slowly permeable clayey subsoil; subject to ponding and surface seepage in places during long wet periods. | Underlying limestone is cavernous in places; subsoil is slowly permeable. | Fair stability | Seasonally high water table and slowly permeable clayey subsoil; subject to ponding and surface seepage in places. | (3) | (4). |
| Subject to occasional overflow in most places; permeable throughout. | Underlying limestone is cavernous in places; permeable soil material; excess seepage. | Fair to good stability. | (2) | (3) | Predominantly level to nearly level. |
| Good drainage | Bedrock is cavernous in places; excess seepage through subsoil. | Fair to good stability. | (2) | (3) | (4). |

TABLE 7.—*Engineering interpretations*

| Soil series and map symbols | Suitability for— | | | Suitability as source of— | | Soil features affecting— |
|---|---|---|---|---|---|---|
| | Winter grading | Road subgrade | Road fill | Topsoil | Sand and gravel | Vertical alinement for highways: Materials |
| Sulphura (SuD, SuE, SuE3) | Fair to good | Poor to fair | Good | Poor | Not suitable | Shallow to shale bedrock; subject to slides in cut slopes. |
| Taft (TaB, Tb) | Not suitable | Poor | Poor | Poor | Not suitable | Underlain by limestone; fragipan at 16 to 30 inches. |
| Talbott (TfB3, TfC3, TsB2, TsC2). | Poor to fair | Poor | Poor to fair | Poor | Not suitable | Limestone bedrock; outcrops in places. |
| Talbott very rocky soils (TvD). | Poor to fair | Poor | Poor to fair | Poor | Not suitable | Limestone bedrock; outcrops of limestone cover 10 to 50 percent of the surface. |

[1] Suitable slope gradients are assumed.
[2] Soil has good natural drainage.

foundation. In some places, the clay layer is cut out before the pavement is constructed. This may not be feasible in low, flat, or poorly drained areas, and an embankment section is used so that the roadway can be built well above the clay layer. Boulders, flagstones, and stones are likely to cause grading problems.

Vertical alinement of roads is affected by poor drainage, a high water table, and flooding. Consequently, an embankment section is constructed on Melvin, Dunning, Captina, and other soils with excess water so that the roadway is above high water. In addition to these soils that have too much water, most of the soils on the bottoms and low stream terraces also need an embankment section because they are occasionally flooded. Interceptor ditches or underdrains may be needed where there is surface seepage, which is common at the base of slopes in deposits of local alluvium. The slumping or sliding of the overlying material may be a result of seepage in the backslopes of cuts. The depth to bedrock also affects vertical alinement.

In most of the county earthwork is difficult during long wet periods, but it is possible to excavate, haul, and compact the better drained, coarse-grained soil materials. The silty and clayey materials may absorb so much water during wet periods that they cannot be readily drained to the moisture content most favorable for proper compaction.

Also given in table 7 for each soil is a rating for the suitability of each soil as a source of material for subgrade and road fill. The most desirable materials generally are coarse grained and easily drained. Natural materials that are suitable for use in base courses and road fill are scarce in this county. The most suitable deposits are in the Baxter, Bodine, Culleoka, Dellrose, Frankstown, Sequatchie, and Stiversville soils. Suitable deposits also occur in the cherty Armour, Greendale, Huntington, Lindside, and Humphreys soils.

Chert gravel can be used economically for secondary and county roads, but normally it is not durable enough to be used in concrete structures or for base materials in primary roads. Crushed limestone is much more satisfactory, but in poor soil, chert can be used under suitable crushed limestone to decrease the amount required. Most natural deposits of chert are in the western part of the county, and resembling them there are some remnants of cherty deposits in the eastern two-thirds on the upper slopes and ridgetops of the higher hills. Limestone is plentiful and readily accessible throughout the central and eastern parts of the county.

Each soil listed in table 7 is rated as a source of topsoil and as a source of sand and gravel. Because the original surface layer of most soils in 7 inches thick or less and may even be absent, the rating as a source of topsoil generally refers to the material below the thin surface layer. The rating, however, applies to the entire soil profile in the Huntington, Lindside, and a few other young soils.

Soil features that affect conservation structures and practices are also given in table 7. The construction of farm ponds is impeded by permeable substrata, cavernous bedrock, and inadequate or insufficient embankment material. Stored water may be lost in soils that have permeable substratum near the surface or have underlying cavernous bedrock. In soils that are shallow over bedrock a small amount of fill material is available, and if the bedrock is cavernous limestone, the caverns are close to the surface.

*of soils*—Continued

| Soil features affecting—Continued | | | | | |
|---|---|---|---|---|---|
| Vertical alinement for highways—Con. | Farm ponds | | Agricultural drainage | Irrigation | Terraces and diversions [1] |
| Drainage | Reservoir area | Embankment | | | |
| Seepage over shale bedrock. | Shallow to shale bedrock. | Coarse textured, but fairly easy to compact. | (2) | Shallow soil; low available water-holding capacity. | Shallow to shale bedrock; predominantly steep slopes. |
| High or perched water table saturates soil above fragipan for long periods; subject to ponding in places; slowly permeable clayey subsoil. | Underlying limestone is cavernous in places; slowly permeable clayey subsoil. | Mostly silt and clay; poor to fair stability. | High or perched water table above fragipan at 16 to 30 inches; slowly permeable clayey subsoil. | Somewhat poorly drained. | Predominantly level to nearly level. |
| Seepage over limestone bedrock; slowly permeable clayey subsoil. | Shallow to bedrock; outcrops in places; bedrock is cavernous in places. | Clayey material; poor to fair stability. | (2) | Slowly permeable clayey subsoil and moderately low to low available water-holding capacity. | Outcrops of bedrock in places; clayey subsoil. |
| Surface seepage in places. | Outcrops of limestone bedrock cover 10 to 50 percent of surface. | Small amount of clayey soil between rocks. | (2) | Low available water-holding capacity; slowly permeable. | Outcrops of limestone bedrock cover 10 to 50 percent of surface. |

[3] Soil is well suited to irrigation.
[4] Soil has favorable properties for terraces and diversions.

### Planning engineering soil surveys

At many construction sites, major variations in the soil occur within the depth of the proposed excavation, and several kinds of soil may be found within a short distance. The soil maps and profile descriptions, as well as the engineering descriptions given in this subsection, should be used in planning detailed surveys of soils at construction sites. By using the information in the soil survey report, the soils engineer can take a minimum number of soil samples for laboratory testing and can make an adequate investigation at a minimum cost.

# Formation and Classification of Soils

Soil is the product of the integrated action of parent material, climate, living organisms, topography, and time. The characteristics of a soil, at any point on the earth, depend upon the combined influences of (1) the physical and mineralogical composition of the parent material, (2) the climate under which the soil material has accumulated, (3) the plant and animal life in and on the soil, (4) the relief, or lay of the land, and (5) the length of time these forces have acted upon the soil material.

The interrelations among these five factors of soil formation are complex, and none of the interrelationships are uniform over the face of the earth. As a result of the many different combinations of these factors, the effect of any one factor is difficult to isolate.

This section presents the outstanding morphological characteristics of the soils of Williamson County and relates them to the five factors of soil formation. The first part of this section deals with the environment in which the soils exist and the part environment has played in determining their morphology. The second part deals with the classification of soils. In the third part are chemical and mechanical analyses of some representative soils.

## Factors of Soil Formation

Williamson County is in the Interior Low Plateau physiographic province and is divided into two parts—the Central Basin, or Nashville Basin, and the Highland Rim (*2*). The eastern two-thirds of the county is in the Central Basin, and the western one-third is on the Highland Rim.

Climate and vegetation are factors of soil formation that are relatively uniform throughout the county. Parent material, relief, and time are the dominant factors that account for differences among the soils in the county.

### Parent material

The weathering of rock provides the parent material of soils. The character of the rock affects the kind of profile that develops and the degree of this development. In a few places the rock almost entirely determines the soil profile. In most places, however, the degree of profile development depends on the combined influence of the other soil-forming factors.

The parent materials of the soils in Williamson County are in two broad classes: (1) materials residual from weathering rocks; and (2) materials transported by water, wind, and gravity, or by combinations of these, and laid down as deposits of sand, silt, clay, and rock fragments. Residual materials are related directly to the underlying rocks from which they have weathered, and the transported materials are related directly to the soils or rocks from which they were moved.

In Williamson County the parent materials of the residual soils were derived largely from limestone and shale, but there is evidence that a thin layer of windblown silt has been deposited over the weathered residuum. This is especially evident on the Highland Rim. Geologically, the rock formations underlying the soils of the county are level bedded, are of sedimentary origin, and vary in age from the lower Ordovician to the Mississippian (*2*).

The rock formations of the Highland Rim are cherty limestone and shale that resist weathering. In this area most of the soils have developed in residuum from siliceous limestone and shale and in the loess mantle overlying residuum from cherty limestone (fig. 32). Parent material and relief were the dominant factors influencing the morphology of these soils.

*Figure 32.*—**The rock from which the cherty creep parent material of the Sulphura soils was derived.**

The Central Basin is underlain by relatively soluble limestone that is nearly free of chert. On the basis of the phosphate in the limestone formations, the Central Basin can be divided into two parts: (1) The outer Central Basin, which is medium to high in phosphate, and (2) the inner Central Basin, which is low in phosphate. In general, many of the soils in these two areas of the Central Basin have similar morphological characteristics. For example, the soils of the Maury and Hagerstown series have many similar profile characteristics. These soils differ chiefly in that the Maury soils are medium to high in phosphate and the Hagerstown soils are low in phosphate.

Transported parent materials are general alluvium and local alluvium, both of which can be young or old. Young alluvium had been deposited recently and consists of materials that have been changed little or none by the soil-forming processes. Old alluvium consists of materials that have been deposited long enough for the soil-forming processes to change them in varying degrees.

The sides and floors of the stream valleys in the county are mostly deposits of old and young general alluvium. Most of the alluvial materials have been washed from soils derived from limestone residuum. The Armour and Captina have developed on terraces in old general alluvium; the Huntington, Lindside, Egam, and other soils on the flood plains are developing in young general alluvium.

Local alluvium consists of soil materials that have been transported short distances by water, gravity, or a combination of both, and have been deposited along small drainageways, in sinkholes or depressions, and at the base of slopes. The Sees soil and the local alluvial phase of Huntington soils are examples of soils developed in young local alluvium that was derived from residuum of limestone. The Hermitage and Dellrose are examples of soils developed in old local alluvium.

### *Climate*

Climate directly affects the accumulation of parent material and the forming of soil horizons. It influences the rates at which rocks weather and minerals decompose, and it influences the processes of leaching, eluviation, and illuviation. Indirectly, climate controls the kinds of plants and animals that thrive in a particular region.

Williamson County has a warm, humid, temperate climate. The climate is relatively uniform throughout the county, but the moderate differences in elevation cause a slight variation in the number and severity of frosts. In general, precipitation is uniform throughout the county. Winters are moderate and summers are warm. The differences between average seasonal temperatures are not extreme. The soils are frozen to a shallow depth for only short periods during winter, and a temperature of 100° F. or above is not frequent during summer.

This kind of climate favors rapid physical and chemical processes that decompose rocks, minerals, and organic matter. The temperature and rainfall, especially, favor intensive leaching, eluviation, illuviation, and oxidation.

Many soil characteristics common to most of the mature soils in Williamson County are the result of the uniform action of climate on the soil material. These characteristics include the moderate to low content of organic matter, the small amount of bases, the strongly weathered parent materials, and the strongly oxidized soil. Strong oxidation is indicated by reddish, brownish, and yellowish colors.

The small local differences in climate, which are caused by variations of slope, aspect, and drainage, affect the formation of soils throughout the county. On the steeper slopes facing south and west, the average daily and annual temperatures are higher than those temperatures on slopes facing north and east. Because of the slightly higher temperatures, organic matter decays, or burns out, faster on the south and west slopes than it does on the north and east slopes. Consequently, the soils on the south and west slopes are slightly lighter colored, drier, and lower in organic-matter content. These differences resulting from differences in temperature are noticeable and of some practical significance, but they are of minor importance in accounting for major variations among the soils in the county.

Climate has greatly influenced many of the outstanding characteristics of the mature, well-drained soils of Williamson County, but the differences in climate are not enough to account for the broad differences among the soils.

### *Living organisms*

Living organisms, both plants and animals, are important in soil formation, chiefly in horizon differentiation, or the forming of horizons, and less in the accumulation of parent materials. Many of the gains, losses, transfers, and alterations within a soil are caused by, or influenced by, the organisms that live in and on the soil.

Plants largely determine the kinds and amounts of organic matter that go into a soil under normal conditions and the way in which the organic matter is added. Plants also play an important role in changes of the base status and in the leaching processes of a soil through the nutrient cycle. To a certain extent, plants also alter the soil microclimate.

Animals convert complex compounds into simpler forms, add their own bodies to the organic matter, and influence many of the physical properties of soils as a result of their activities.

All activities of living organisms in and on the soil do not contribute to profile development. In many profiles, horizons that have formed are mixed by plants and animals.

In general, the soils of Williamson County developed under a fairly uniform forest of hardwoods mixed with some cedar trees. Differences probably existed in the density of forest stands, in the relative proportion of species, and in the associated ground cover. These differences probably were not sufficient to justify the marked differences in the properties among the well-drained and well-developed soils of the county.

Most of the trees that grow in the county are deciduous and feed deeply on plant nutrients. These deciduous trees contain larger amounts of plant nutrients than coniferous trees, and they return larger amounts to the soil in fallen leaves and twigs. Thus, the vegetation has counteracted the leaching processes.

The plants and animals that live on a soil are its primary source of organic material. Most of this material accumulates on the surface and is acted upon by microorganisms, fungi, earthworms, and other forms of life, and by direct chemical reaction. The material is then mixed with the upper part of the mineral portion of the soil. Most soils of the county originally had a thin layer of organic material, in various stages of decomposition, on the surface and in the upper few inches of the surface layer or A horizon.

Organic materials decompose rather rapidly in Williamson County because of the temperature and moisture, the character of the organic material, and, presumably, the micropopulation. These factors, together with conditions favorable to leaching, have formed, in most of the soils, a thin A1 horizon that contains a moderate amount of organic matter, an A2 horizon that contains a relatively small amount, and a B horizon with a very small amount.

Little is known of how micro-organisms, fungi, insects, earthworms, and rodents influence the formation of the soils in the county, except that their activity is largely confined to the uppermost part of the soil material. Presumably, the environment is favorable for these organisms to thrive.

### *Relief*

Relief, or lay of the land, is determined mainly by the underlying bedrock, by the geologic history of the region, and by dissecting streams. Relief actually influences or modifies the other four soil-forming factors. Other things being equal, profiles are shallower and horizons are more alike in soils on steeper slopes than in soils on more nearly level slopes, and runoff, drainage, and erosion are greater. The exposure, or aspect, of a slope alters in varying degrees the microclimate and the kinds and amounts of living organisms in and on a soil.

The present relief of Williamson County is a result of the arching of the strata and the geologic erosion after the Cincinnati anticline formed. The lifting, the center of which is to the east of the county, hastened erosion; and after the resistant cherty limestones and shales of the Mississippian Age were removed, the more soluble underlying Ordivician limestones were also removed. Erosion along the anticline is still progressing, and the Central Basin is slowly being enlarged by the continuing retreat of the Highland Rim escarpment.

The Highland Rim was originally an old, high, undulating plateau. The uplifting of the Cincinnati anticline accounts for the Highland Rim in the county having 300 to 400 feet differences in elevation. The elevation of the Highland Rim ranges from about 1,200 feet in the eastern part of the county to about 800 feet in the western part. Slopes range from 2 to more than 40 percent. The steepest slopes, or roughest parts of the Highland Rim, are along the edge bordering the Central Basin, where dissecting streams have formed steep, rounded hills, spurs, and isolated hills that extend far out into the Basin.

The present surface of the Central Basin was formed by the erosion of a plain that originally coincided with the surface of the Highland Rim. The slopes of the Central Basin in Williamson County range from 0 to more than 30 percent, but most of this area is less dissected than the Highland Rim. Elevations of the Central Basin range from about 600 feet in the eastern part to about 900 feet in the western part.

Runoff is rapid on most of the steeper slopes, and soil materials are washed away almost as fast as they are formed. Consequently, climate and living organisms have influenced the formation of soils only slightly, and profiles with distinct, genetically related horizons have not developed.

In some level to gently sloping areas where the soil materials have been in place for a long time, internal and external drainage are slow and erosion has been slight. In these places the soils have developed characteristics that differentiate them from well-drained, well-developed soils of the same area, origin, and age.

Where alluvium has been in place for only a short time, most of the soils do not have well-defined, genetically related horizons.

### *Time*

The time required for soil to develop depends mainly on the combined influences of parent material, topography, climate, and living organisms. Generally, much more time is required for parent material to accumulate than for the different horizons to form. Less time is generally required for a soil to develop in humid, warm regions of luxuriant vegetation than is required in dry or cold regions of sparse vegetation. Also, less time is required if the parent material is coarse textured than if it is fine textured.

Soils vary considerably in age. The degree that horizons differ depends on the maturity of the soil. Generally, the older or more mature soils have thicker, more numerous genetically related horizons than have younger soils.

The soils of Williamson County range from very young to old. On first bottoms, in depressions, and along small drainageways, most of the soils are young. They consist of recent deposits that have weakly developed or undeveloped profiles. The soils are old or mature if they developed in parent materials that have been in place a long time and have reached an approximate state of equilibrium with their environment.

## Classification of Soils by Higher Categories

Differences among soils are local and regional and may be great or small, but the local differences are generally smaller than the regional differences. Although regional differences in soils are generally related to differences in climate and in the amount and activity of living organisms, in places regional differences reflect differences in parent materials, topography, or age. In the United States, soils are classified in the higher categories on the basis of their regional differences.

The natural classification of soils consists of six categories. Beginning at the highest the categories are (1) order, (2) suborder, (3) great soil group, (4) family, (5) series, and (6) type.

In the field, soils are classified in series, types, and phases, and are identified by kinds and numbers of horizons, texture and chemical composition of each horizon, and other characteristics. Attention has been given mostly to the classification of soils into types and series within counties or comparable areas and to subsequent grouping of series into great soil groups and orders.

The zonal, intrazonal, and azonal orders are in the highest category of the soil classification system (*15*). In the zonal order are soils that have well-developed characteristics reflecting the influence of climate and living organisms—the active factors of soil formation. In the intrazonal order are soils having characteristics that are more or less well-developed and that reflect the dominating influence of some local factor of parent material or relief over the normal effects of climate and living organisms. The azonal order consists of soils that lack well-developed characteristics because of youth, relief, or resistant parent materials.

A great soil group is made up of one or several groups of soil series with fundamental characteristics in common. Each group has its central concept and includes intergrades toward other great soil groups, but the dominant properties of each soil are those of the great soil group to which it belongs. There are varying numbers of great soil groups in each order, but only those represented by soils in Williamson County are discussed in the following pages.

In table 8 the soil series of the county are classified by order and great soil group, and some of the factors that have contributed to morphological differences are given.

TABLE 8.—*Soil series classified by order and great soil group and some factors that have contributed to their formation*

| Order, great soil group, and series | Distinguishing characteristics of the profile [1] | Drainage class | Parent material | Slope range | Degree of development [2] |
|---|---|---|---|---|---|
| Zonal order | | | | | |
| Red-Yellow Podzolic soils: | | | | | |
| Central concept— | | | | *Percent* | |
| Baxter | Brown cherty silt loam over firm, yellowish-red to red cherty clay; 3 to 10 feet to stratified beds of limestone bedrock. | Well drained | Residuum from cherty limestone. | 5 to 30 | Strong. |
| Braxton | Dark-brown cherty silt loam over yellowish-brown to reddish-brown, firm cherty silty clay loam to clay; 2 to more than 6 feet to phosphatic limestone bedrock. | Well drained | Residuum from phosphatic limestone with some chert. | 2 to 20 | Strong. |
| Colbert | Dark-brown silt loam over mottled yellowish-brown, grayish-brown, and olive-brown, firm, plastic clay; 16 inches to more than 5 feet to limestone bedrock. | Well drained and moderately well drained. | Residuum from argillaceous limestone. | 2 to 20 | Medium to strong. |

See footnotes at end of table.

TABLE 8.—*Soil series classified by order and great soil group and some factors that have contributed to their formation*—Con.

| Order, great soil group, and series | Distinguishing characteristics of the profile [1] | Drainage class | Parent material | Slope range | Degree of development [2] |
|---|---|---|---|---|---|
| Zonal order—Con. Red-Yellow Podzolic soils—Continued Central concept —Continued | | | | *Percent* | |
| Humphreys | Dark-brown to pale-brown silt loam over yellowish-brown, friable silty clay loam; cherty types are dominant; old local alluvium or colluvium 2 to more than 6 feet thick. | Well drained and moderately well drained. | Old local alluvium or colluvium from soils derived from loess and cherty limestone. | 2 to 20 | Medium. |
| Mountview | Grayish-brown silt loam over yellowish-brown, friable silty clay loam; 12 to 40 inches to cherty limestone residuum. | Well drained | Loess mantle overlying residuum from cherty limestone. | 2 to 20 | Medium to strong. |
| Talbott | Brown to dark-brown silty clay loam or silt loam over yellowish-red to reddish-yellow, firm and plastic clay; 2 to more than 6 feet to limestone bedrock. | Well drained | Residuum from argillaceous limestone. | 2 to 15 | Strong. |
| Grading toward Reddish-Brown Lateritic soils— | | | | | |
| Etowah | Dark-brown silt loam over reddish-brown to yellowish-red, friable silty clay loam; old alluvium 2 to more than 10 feet thick. | Well drained | Old general alluvium, with thin loess mantle in places. | 2 to 12 | Medium to strong. |
| Hagerstown | Dark-brown silt loam over strong-brown to reddish-brown, friable to firm silty clay loam or clay; 2 to more than 6 feet to limestone bedrock. | Well drained | Residuum from limestone | 2 to 12 | Strong. |
| Hermitage | Dark-brown silt loam over reddish-brown to yellowish-red, friable silty clay loam; old local alluvium or colluvium 18 inches to more than 6 feet thick. | Well drained | Old local alluvium or colluvium from soils derived from limestone. | 2 to 5 | Medium. |
| Maury | Dark-brown silt loam over reddish-brown, friable to firm silty clay loam or clay; 3 to more than 10 feet to phosphatic limestone bedrock. | Well drained | Old alluvium or residuum from phosphatic limestone; thin loess mantle in many places. | 0 to 12 | Strong. |
| Stiversville | Dark-brown silt loam over yellowish-brown to reddish-brown, friable silty clay loam or clay loam; 3 to more than 5 feet to sandy limestone interbedded with shale bedrock. | Well drained | Residuum from sandy limestone interbedded with shale. | 2 to 20 | Medium to strong. |
| Grading toward Planosols— | | | | | |
| Captina | Dark-brown to dark yellowish-brown silt loam over yellowish-brown silty clay loam; fragipan at depth of 18 to 36 inches. | Moderately well drained. | Old general stream alluvium from soils derived from phosphatic limestone. | 0 to 12 | Strong. |
| Dickson | Grayish-brown silt loam over yellowish-brown silt loam or silty clay loam; fragipan at depth of 18 to 36 inches. | Moderately well drained. | Loess mantle 18 to 36 inches thick over cherty limestone residuum. | 2 to 5 | Strong. |
| Donerail | Dark-brown silt loam over brown to reddish-brown silty clay loam; fragipan or compact, cemented layer at depth of 18 to 36 inches. | Moderately well drained. | Residuum from phosphatic limestone. | 2 to 12 | Strong. |
| Mercer | Brown to dark grayish-brown silt loam over yellowish-brown to reddish-yellow silty clay loam; fragipan or heavy, firm clay at depth of 15 to 30 inches. | Moderately well drained. | Residuum from limestone with probable thin alluvium on surface. | 2 to 5 | Strong. |

See footnotes at end of table.

TABLE 8.—*Soil series classified by order and great soil group and some factors that have contributed to their formation*—Con.

| Order, great soil group, and series | Distinguishing characteristics of the profile [1] | Drainage class | Parent material | Slope range | Degree of development [2] |
|---|---|---|---|---|---|
| Zonal order—Continued. | | | | | |
| Red-Yellow Podzolic sail: | | | | | |
| Gray-Brown Podzolic soils: | | | | | |
| Central concept— | | | | *Percent* | |
| Armour | Dark-brown silt loam over dark-brown to reddish-brown, friable silty clay loam; alluvium 2 to more than 10 feet thick. | Well drained | Old alluvium and colluvium from soils derived from phosphatic limestone and cherty limestone. | 0 to 20 | Medium. |
| Culleoka | Dark-brown silt loam or loam over brown to reddish-yellow, friable loam or clay loam; 14 inches to more than 5 feet thick. | Well drained | Colluvium or creep from soils derived from phosphatic sandy limestone interbedded with shale. | 5 to 35 | Weak. |
| Dellrose | Dark-brown cherty silt loam over yellowish-brown to reddish-brown, friable cherty silty clay loam; colluvium 2 to more than 6 feet thick over clayey residuum. | Well drained | Colluvium from soils derived from cherty limestone with phosphatic influence. | 12 to 40 | Weak. |
| Frankstown | Dark-brown to dark grayish-brown cherty silt loam over yellowish-brown, friable cherty silty clay loam; 18 to 40 inches over cherty limestone bedrock. | Well drained | Residuum from cherty limestone with phosphatic influence. | 5 to 20 | Weak. |
| Hampshire | Dark-brown silt loam over yellowish-brown clay; 2 to more than 4 feet to phosphatic limestone or interbedded sandy limestone and shale. | Well drained and moderately well drained. | Residuum from phosphatic limestone or interbedded phosphatic sandy limestone and shale. | 2 to 20 | Strong. |
| Hicks | Brown silt loam or loam over yellowish-brown loam, clay loam, or silty clay loam; 18 to more than 36 inches to bedrock. | Well drained and somewhat excessively drained. | Residuum from interbedded phosphatic sandy limestone and shale. | 2 to 12 | Medium. |
| Mimosa | Dark-brown silt loam over yellowish-brown firm, plastic clay; 2 to more than 6 feet to phosphatic limestone bedrock. | Well drained | Residuum from phosphatic limestone; thin cherty creep mantle in many places. | 2 to 40 | Strong. |
| Sees | Dark-brown to black silty clay loam over firm silty clay or clay that is mottled dark yellowish brown to very dark brown; alluvium-colluvium 2 to more than 6 feet thick. | Moderately well drained. | Old local alluvium or colluvium from soils derived from phosphatic limestone. | 0 to 5 | Medium. |
| Grading toward Alluvial soils— | | | | | |
| Greendale | Dark-brown to grayish-brown cherty silt loam over brown to yellowish-brown cherty silt loam; alluvium 18 inches to more than 5 feet thick; silt loam mapped separately. | Well drained and moderately well drained. | Local alluvium from soils derived from cherty limestone and loess. | 2 to 12 | Weak. |
| Sequatchie | Dark-brown loam over brown to yellowish-brown, friable fine sandy loam or sandy clay loam; alluvium 3 to more than 10 feet thick. | Well drained | Old general stream alluvium from soils derived from phosphatic sandy limestone interbedded with shale. | 0 to 5 | Weak to medium. |
| Grading toward Lithosols— | | | | | |
| Inman | Dark grayish-brown silt loam over brownish-yellow to reddish-yellow, firm, plastic silty clay; 18 to more than 40 inches to bedrock of interbedded sandy limestone and shale. | Well drained and excessively drained. | Residuum from interbedded phosphatic sandy limestone and shale. | 5 to 30 | Weak. |

See footnotes at end of table.

TABLE 8.—*Soil series classified by order and great soil group and some factors that have contributed to their formation*—Con.

| Order, great soil group, and series | Distinguishing characteristics of the profile [1] | Drainage class | Parent material | Slope range | Degree of development [2] |
|---|---|---|---|---|---|
| Intrazonal order | | | | | |
| Humic Gley soils: | | | | *Percent* | |
| Dunning | Very dark gray to black silt loam or silty clay loam over firm silty clay loam to clay that is mottled black, very dark gray, olive, and light gray; alluvium 2 to more than 10 feet thick. | Poorly drained and very poorly drained. | Alluvium from soils derived from phosphatic limestone. | 0 to 2 | Weak to medium. |
| Low-Humic Gley soils: | | | | | |
| Dowellton | Grayish-brown to dark-gray silt loam over very firm, plastic clay that is mottled gray, brown, yellow, olive, and red; 2 to more than 4 feet to limestone bedrock. | Poorly drained and somewhat poorly drained. | Residuum from argillaceous limestone; thin layer of local alluvium in places. | 2 to 5 | Strong. |
| Melvin | Dark-gray or dark grayish-brown silt loam over friable to firm silt loam or silty clay loam that is mottled gray, brown, and yellow; alluvium 20 inches to more than 10 feet thick. | Poorly drained | Alluvium from soils derived from limestone; phosphatic in most places. | 0 to 2 | Weak. |
| Planosols: | | | | | |
| Robertsville | Grayish-brown silt loam over (1) mottled gray, brown, and olive silt loam or silty clay loam with fragipan at 15 to 30 inches, or (2) highly mottled, very firm, plastic silty clay or clay. | Poorly drained and very poorly drained. | Old alluvium from soils derived chiefly from phosphatic limestone; some derived from loess and cherty limestone. | 0 to 2 | Strong. |
| Taft | Brown silt loam over light brownish-gray silty clay loam or silty clay; mottled gray, brown, and yellow compact fragipan at 16 to 30 inches. | Somewhat poorly drained. | Old alluvium from soils derived chiefly from phosphatic limestone; some derived from loess and cherty limestone. | 0 to 8 | Strong. |
| Rendzina soils: | | | | | |
| Ashwood | Black silt loam to silty clay loam over yellowish-brown, firm silty clay or clay; 10 inches to more than 4 feet to phosphatic limestone bedrock. | Well drained and moderately well drained. | Residuum from argillaceous phosphatic limestone. | 2 to 20 | Strong. |
| Fairmount | Very dark grayish-brown silty clay loam over firm, plastic clay that is mottled grayish brown, yellow, and olive brown; 10 inches to more than 3 feet to limestone bedrock. | Moderately well drained. | Residuum from argillaceous limestone. | 2 to 10 | Medium. |
| Azonal order | | | | | |
| Alluvial soils: | | | | | |
| Central concept— | | | | | |
| Egam | Brown to dark grayish-brown silt loam over black to very dark-gray silty clay loam or silty clay; brown overwash 15 to 30 inches thick; alluvium 2 to more than 6 feet thick. | Moderately well drained. | Alluvium from soils derived from phosphatic limestone. | 0 to 5 | Weak. |
| Huntington | Dark-brown silt loam over dark-brown to dark yellowish-brown, friable silt loam; alluvium 2 to more than 10 feet thick. Cherty types and phosphatic, nonphosphatic, and local alluvial phases mapped separately. | Well drained | Alluvium from soils derived chiefly from limestone. | 0 to 5 | Weak. |
| Lindside | Dark-brown silt loam over brown to grayish-brown, friable silt loam or light silty clay loam that is mottled light gray, yellow, and brown in lower part; alluvium 2 to more than 10 feet thick. | Moderately well drained. | Alluvium from soils derived chiefly from phosphatic limestone; some derived from cherty limestone and some from loess. | 0 to 5 | Weak. |

See footnotes at end of table.

TABLE 8.—*Soil series classified by order and great soil group and some factors that have contributed to their formation*—Con.

| Order, great soil group, and series | Distinguished characteristics of the profile [1] | Drainage class | Parent material | Slope range | Degree of development [2] |
|---|---|---|---|---|---|
| Azonal order—Con. Alluvial order—Con. Grading toward Humic Gley soils— | | | | *Percent* | |
| Lanton | Black to very dark grayish-brown silt loam over black to very dark gray silt loam, silty clay loam, or clay; alluvium 2 to more than 6 feet thick. | Moderately well drained and somewhat poorly drained. | Alluvium from soils derived chiefly from phosphatic limestone. | 0 to 5 | Weak. |
| Lithosols: | | | | | |
| Sulphura | Very dark grayish-brown cherty silt loam over dark-brown shaly silt loam or silty clay loam; 10 to 48 inches to shale bedrock. | Excessively drained. | Thin cherty creep from soils derived from cherty limestone over shaly residuum. | 12 to 50 | Weak. |
| Regosols: | | | | | |
| Bodine | Dark grayish-brown to yellowish-brown cherty silt loam over yellowish-brown to reddish-yellow cherty silt loam or silty clay loam; 18 inches to more than 5 feet over stratified layers of cherty limestone. | Well drained and excessively drained. | Residuum from cherty limestone. | 5 to 45 | Weak. |

[1] Soil profiles not materially affected by erosion.
[2] As measured by the number of genetic horizons and the degree of contrast between them.

### *Zonal order*

The soils in the zonal order were derived from parent material that has been in place a long time. These soils have not been influenced by extremes in relief or parent material. They are well-drained, well-developed soils that have formed under similar vegetation and climate. Although some of these soils were derived from different kinds of parent material, they have many properties in common. They reflect the influence of climate and living organisms, which are the active factors of soil formation.

The zonal soils of Williamson County are in the Red-Yellow Podzolic and the Gray-Brown Podzolic great soil groups.

#### RED-YELLOW PODZOLIC SOILS

This great soil group consists of well-developed, well-drained, acid soils that formed under forest in a warm-temperate, humid climate or tropical, humid climate. Undisturbed soils have a thin, organic covering (A0) and an organic-mineral horizon (A1) over a light-colored, bleached horizon (A2). The bleached horizon is underlain by a red, yellowish-red, or yellow more clayey horizon (B2). The parent material is more or less siliceous. Coarse, reticulate streaks or mottles of red, yellow, brown, and light gray are characteristic of the deep horizons where parent materials are thick (*14*).

The Red-Yellow Podzolic soils account for 30 percent of the total number of soils in the county and have the largest number of soil series.

In general, these soils have a low accumulation of organic matter, a thick eluviated zone, a thick and deep illuviated zone, a low cation-exchange capacity, and a low percentage of base saturation. They are medium to strongly acid. Their subsoil has a medium to strong, subangular blocky structure and colors of medium to high chroma. These properties are largely the result of (1) rapid decomposition of minerals and organic matter, (2) leaching, and (3) high rates of oxidation and hydration, all of which can be attributed to relatively high temperature and annual precipitation.

CENTRAL CONCEPT OF RED-YELLOW PODZOLIC SOILS.—Soil series that conform to the central concept of Red-Yellow Podzolic soils are the Baxter, Braxton, Colbert, Humphreys, Mountview, and Talbott.

*Baxter series:* In this series are well-drained soils that have developed on uplands in residuum weathered from cherty limestone. The content of chert in the solum ranges from 15 to 50 percent or more by volume. The depth to underlying strata of chert ranges from 3 to 10 feet. Slopes range from 5 to 30 percent, but the dominant slopes are between 5 and 20 percent. The Baxter soils are closely associated with the Mountview, Dickson, and Bodine soils.

Profile of Baxter cherty silt loam, 12 to 20 percent slopes, in a pasture of orchardgrass, fescue, and annual lespedeza:

Ap—0 to 6 inches, brown (10YR 5/3) cherty silt loam; weak, fine, granular structure; very friable; many fine roots; chert fragments range from ¼ to 3 inches across; strongly acid; gradual, smooth boundary.

A3—6 to 9 inches, yellowish-brown (10YR 5/4) cherty silt loam with few, fine and medium, faint mottles of strong brown (7.5YR 5/6); moderate, fine and medium, granular structure; friable; many fine roots; chert fragments, ¼ to 3 inches across; strongly acid; gradual, smooth boundary.

B1—9 to 15 inches, strong-brown (7.5YR 5/6) cherty silty clay loam with few, fine, distinct mottles of yellowish red (5YR 4/6) and red (2.5YR 4/8); moderate, medium, subangular blocky structure; friable; common fine roots; chert, ¼ to 3 inches across; strongly acid; gradual, smooth boundary.

B2—15 to 43 inches, red (2.5YR 4/6) cherty silty clay with common, fine and medium, distinct mottles of yellowish red (5YR 5/6), light yellowish brown (10YR 6/4), and strong brown (7.5YR 5/6); strong, medium, blocky structure; continuous clay films; firm; few fine roots; chert fragments, ½ to 4 inches across; strongly acid; gradual, smooth boundary.

B3—43 to 58 inches, mottled red (2.5YR 4/6), strong-brown (7.5YR 5/6), yellowish-red (5YR 5/6), and pale-brown (10YR 6/3) cherty silty clay; strong, medium, blocky structure; continuous clay films; firm chert fragments, ½ to 6 inches across; strongly acid; gradual, smooth boundary.

C—58 to 80 inches +, mottled red (2.5YR 4/6), yellowish-brown (10YR 5/6), strong-brown (7.5YR 5/6), and light yellowish-brown (10YR 6/4) clay, interspersed with stratified angular fragments of chert ranging from 2 to 10 inches across; massive (structureless); very firm; strongly acid.

*Braxton series*: In this series are well-drained soils that have a fine-textured subsoil. These soils have developed in residuum weathered from phosphatic limestone that contains some chert. The depth to bedrock ranges from 2 to more than 6 feet. Slopes are from 2 to 20 percent, but the dominant slopes are between 5 and 12 percent. The Braxton soils are closely associated with the Maury, Mimosa, and Hampshire soils.

Profile of Braxton cherty silt loam, 5 to 12 percent slopes, eroded, in field of alfalfa hay:

Ap—0 to 6 inches, dark-brown (10YR 3/3) cherty silt loam with weak, fine, granular structure; friable; many fine roots; slightly acid; clear, smooth boundary.

B1—6 to 8 inches, brown (7.5YR 4/4) cherty silty clay loam with few, medium, distinct mottles of dark brown (10YR 3/3); moderate, medium, subangular blocky structure; few patchy clay films; friable; common fine roots; few, small, rounded, dark-brown and black concretions; medium acid; gradual, smooth boundary.

B21—8 to 18 inches, brown (7.5YR 4/4) cherty silty clay; moderate, medium, subangular and blocky structure; continuous clay films; firm; few fine roots; common, small and medium, black concretions; strongly acid; gradual, smooth boundary.

B22—18 to 30 inches, yellowish-red (5YR 5/6) silty clay; moderate to strong angular and subangular blocky structure; continuous clay films; firm to very firm; few fine roots; few weathered fragments of chert and common, small, weathered fragments of sandy limestone; common, small and medium, black and dark-brown concretions; strongly acid; gradual, wavy boundary.

B3—30 to 38 inches. strong-brown (7.5YR 5/6) heavy silty clay with few, fine, distinct mottles of brown (10YR 4/3); strong, medium, subangular and angular blocky structure; continuous clay films; firm; few fragments of chert and many highly weathered fragments of sandy limestone; common, small and medium, black concretions; strongly acid; gradual, diffuse boundary.

C—38 to 45 inches +, yellowish-red (5YR 5/6) clay, with few, fine, distinct mottles of brown (7.5YR 4/4) and dark grayish brown (10YR 4/2); strong, medium and coarse, blocky structure to massive (structureless); continuous clay films; very firm; many highly weathered fragments of sandy limestone; common, small and medium, black concretions; strongly acid.

*Colbert series:* The soils in this series are well drained to moderately well drained and have developed in residuum weathered from argillaceous limestone. Bedrock is at a depth ranging from about 16 inches to 5 feet. Slopes range from 2 to 20 percent, but the dominant slopes are between 5 and 12 percent. In Williamson County, the Colbert soils are intricately associated with the Hampshire soils. They are not separated from the Hampshire soils in mapping but are mapped in a Hampshire-Colbert complex. The Colbert soils amount to about 40 percent of the complex. Other closely associated soils are Talbott, Fairmount, and Inman.

Profile of Colbert silt loam, 5 to 12 percent slopes, eroded, in a pasture of bluegrass, annual lespedeza, and hop clover:

Ap—0 to 5 inches, dark-brown (10YR 3/3) silt loam; weak, fine, granular structure; friable; many fine roots; few, small, weathered fragments of limestone and chert; slightly acid; clear, smooth boundary.

B21—5 to 10 inches, dark yellowish-brown (10YR 4/4) clay with many, fine and medium, distinct mottles of yellowish brown (10YR 5/6), dark brown (7.5YR 4/4), light olive brown (2.5Y 5/4), and grayish brown (10YR 5/2); strong, medium and coarse, blocky structure; thick, continuous clay films; firm; few fine roots; few, small, weathered fragments of limestone and chert; many, small and medium, black concretions; strongly acid; clear, smooth boundary.

B22—10 to 16 inches, mottled yellowish-brown (10YR 5/6), strong-brown (7.5YR 5/6), dark-brown (7.5YR 4/4), and grayish-brown (2.5Y 5/2) clay; strong, coarse, blocky structure; thick, continuous clay films; very firm; few fine roots; few, small, weathered fragments of limestone and chert; common, small, dark-brown, reddish-brown, and black concretions; medium acid; gradual, wavy boundary.

C1—16 to 27 inches, mottled strong-brown (7.5YR 5/8), yellowish-brown (10YR 5/4), light brownish-gray (2.5Y 6/2), and pale-brown (10YR 6/3) clay; massive (structureless); very firm and plastic; few weathered fragments of limestone; few, small, reddish-brown and black concretions; slightly acid; gradual, smooth boundary.

C2—27 to 39 inches, mottled yellowish-brown (10YR 5/6), pale-brown (10YR 6/3), light olive-brown (2.5Y 5/4), and grayish-brown (2.5Y 5/2) clay; massive (structureless); few, small, weathered fragments of limestone; many, small and medium, black concretions; neutral; abrupt, smooth boundary.

Dr—39 inches +, argillaceous limestone.

*Humphreys series:* In this series are well drained to moderately well drained soils that developed in old alluvium or colluvium on toe slopes and fans. The alluvium or colluvium ranges from 2 to more than 3 feet in thickness and consists of material washed mostly from soils that were derived from loess and cherty limestone. Cherty and noncherty types of Humphreys soils are mapped separately, but the cherty Humphreys soils are dominant. In places a weak, thin, incipient fragipan is present in the lower B horizon, generally at a depth below 30 inches. Slopes range from 2 to 20 percent, but the dominant slopes are between 5 and 12 percent. These soils are closely associated with the Bodine, Mountview, Greendale, Lindside, and Huntington soils.

Profile of Humphreys cherty silt loam, 5 to 12 percent slopes, eroded, in fescue pasture:

Ap—0 to 7 inches, dark-brown (10YR 3/3) cherty silt loam; weak, fine, granular structure; very friable; common fine roots; strongly acid; gradual, smooth boundary.

B1—7 to 15 inches, yellowish-brown (10YR 5/4) light cherty silty clay loam; weak, medium, subangular blocky structure; friable; few fine roots; strongly acid; gradual, smooth boundary.

B2—15 to 29 inches, yellowish-brown (10YR 5/6) cherty silty clay loam with few, fine, faint mottles of light yellowish brown (10YR 6/4) and strong brown (7.5YR 5/6); moderate, medium, subangular blocky structure; patchy clay films; friable; few fine roots; few, small, black concretions; strongly acid; gradual, smooth boundary.

B3—29 to 34 inches, strong-brown (7.5YR 5/6) cherty silty clay loam with common, fine and medium, distinct mottles of yellowish red (5YR 5/8) and brown (10YR 5/3); moderate, medium, subangular blocky structure; thick, patchy clay films; friable to firm; few, small, black concretions; strongly acid; gradual, smooth boundary.

C—34 to 39 inches +, mottled strong-brown (7.5YR 5/6), yellowish-red (5YR 5/6), and pale-brown (10YR 6/3) silty clay loam interspersed among angular fragments of chert; firm; chert is 50 to 60 percent of the horizon, by volume; strongly acid.

*Mountview series:* In this series are well-drained, moderately deep to deep soils that developed in loess over residuum from cherty limestone. The loess mantle ranges from 12 to 40 inches in thickness. Shallow phases are mapped separately in areas where the loess is less than 20 inches thick. Slopes range from 2 to 20 percent, but the dominant slopes are between 2 and 12 percent. The Mountview soils are closely associated with the Baxter, Bodine, Dickson, and Humphreys soils.

Profile of Mountview silt loam, 2 to 5 percent slopes, in fescue pasture:

Ap—0 to 7 inches, grayish-brown (10YR 5/2) silt loam; weak, fine, crumb structure; very friable; many fine roots; few, small, weathered fragments of chert; medium acid; clear, smooth boundary.

A3—7 to 12 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; very friable; many fine roots; few, small, weathered fragments of chert; medium acid; gradual, smooth boundary.

B1—12 to 18 inches, yellowish-brown (10YR 5/4) light silty clay loam; weak, medium, subangular blocky structure; friable; common fine roots; few, small, black and dark reddish-brown concretions; strongly acid; gradual, smooth boundary.

B2—18 to 28 inches, yellowish-brown (10YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; patchy clay films; friable; few fine roots; few, small, black and dark reddish-brown concretions; strongly acid; clear, smooth boundary.

B3—28 to 32 inches, yellowish-brown (10YR 5/6) cherty silty clay loam; common, fine and medium, distinct mottles of strong brown (7.5YR 5/6), pale brown (10YR 6/3), and light gray (10YR 7/2); moderate, medium, subangular blocky structure; continuous clay films; firm; chert is about 20 percent of horizon by volume; strongly acid; gradual, smooth boundary.

Bb—32 to 40 inches +, mottled yellowish-red (5YR 5/6), pale-brown (10YR 6/3), yellowish-brown (10YR 5/4), and light-gray (10YR 7/2) cherty silty clay; strong, blocky structure; continuous clay films; firm; strongly acid.

*Talbott series:* In this series are well-drained soils developed in residuum from argillaceous limestone. Although bedrock is generally at a depth of 2 to 6 feet, it outcrops in many places. Very rocky Talbott soils are mapped separately in areas where rock outcrops cover from 10 to 50 percent of the surface. Slopes are from 2 to 15 percent. The surface layer ranges from silt loam to silty clay loam but is dominantly silty clay loam. The Talbott soils are closely associated with the Hagerstown, Fairmount, Hermitage, and Mercer soils.

Profile of Talbott silty clay loam, 2 to 5 percent slopes, eroded, in a field of corn:

Ap—0 to 6 inches, brown (10YR 4/3) light silty clay loam; moderate, fine, granular structure; friable; many fine roots; strongly acid; clear, smooth boundary.

B1—6 to 9 inches, brown (7.5YR 4/4) heavy silty clay loam; few, fine and medium, distinct mottles of brown (10YR 4/3) and yellowish red (5YR 5/6); moderate, medium, subangular blocky structure; patchy clay films; friable to firm; common fine roots; few small fragments of chert; few, small, black concretions; strongly acid; clear, smooth boundary.

B2—9 to 23 inches, yellowish-red (5YR 4/8) clay with few, fine, distinct mottles of yellowish brown (10YR 5/6) in lower part; moderate to strong, medium, blocky structure; continuous clay films; firm and plastic; few fine roots; few, small, black concretions; strongly acid; clear, wavy boundary.

B3—23 to 40 inches, mottled yellowish-red (5YR 4/8), reddish-yellow (5YR 6/8), and yellowish-brown (10YR 6/3) clay; moderate to strong, medium, angular blocky structure; thick, continuous clay films; firm and plastic; common, small and medium, black concretions; common concretionary stains, particularly on ped surfaces; strongly acid; gradual, smooth boundary.

C—40 to 48 inches +, mottled reddish-yellow (7.5YR 6/8), yellowish-brown (10YR 5/6), light olive-brown (2.5Y 5/4), and light brownish-gray (2.5Y 6/2) clay; massive (structureless); very firm; many, black, concretionary stains between cracks; strongly acid.

RED-YELLOW PODZOLIC SOILS GRADING TOWARD REDDISH-BROWN LATERITIC SOILS.—The soils in the Maury, Etowah, Hagerstown, Hermitage, and Stiversville series have some properties of Reddish-Brown Lateritic soils but are dominantly of the Red-Yellow Podzolic group. They have dark-brown, granular Ap and A3 horizons and a friable silty clay to clay loam B horizon similar to that of the Reddish-Brown Lateritic soils. They lack the distinct A2 horizon that is characteristic of the Red-Yellow Podzolic soils. The B horizon, however, is not so red as that in Reddish-Brown Lateritic soils.

*Etowah series:* Well-drained soils on old high stream terraces make up this series. The soils have developed in old general alluvium that ranges from 2 to more than 10 feet in thickness. In places a thin loess mantle overlies the old alluvium. Slopes range from 2 to 12 percent. In some places these soils are closely associated with the Armour and Captina soils, but generally Etowah soils are on higher and older terraces and are associated with the soils of the uplands.

Profile of Etowah silt loam, 2 to 5 percent slopes, in fescue pasture.

Ap—0 to 6 inches, dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; gradual, smooth boundary.

A3—6 to 10 inches, dark yellowish-brown (10YR 4/4) silt loam; few, fine and medium, distinct mottles of strong brown (7.5YR 5/6); moderate, medium, granular structure; very friable; many fine roots; few small pebbles; few, small, black and dark-brown concretions; strongly acid; clear, smooth boundary.

B1—10 to 17 inches, brown (7.5YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; few, patchy clay films; friable; common fine roots; few small pebbles; few, small, black and dark reddish-brown concretions; strongly acid; gradual, smooth boundary.

B21—17 to 23 inches, brown (7.5YR 4/4) silty clay with common, fine and medium, distinct mottles of red (2.5YR 4/6), yellowish red (5YR 4/6), and pale brown (10YR 6/3); moderate, medium, subangular blocky structure; continuous clay films; friable; few fine roots; few, small and medium, black and dark reddish-brown concretions; strongly acid; gradual, smooth boundary.

B22—23 to 42 inches, red (2.5YR 4/6) silty clay with common, medium, distinct mottles of yellowish red (5YR 4/6), dark brown (7.5YR 4/4), and brown (10YR 5/3); moderate to strong, medium, blocky and subangular blocky structure; continuous clay films; friable; few small chert granules; few dark-brown and black concretions; strongly acid; gradual, smooth boundary.

B3—42 to 51 inches, mottled dark-red (10YR 3/6), yellowish-red (5YR 4/6), strong-brown (7.5YR 5/6), and light brownish-gray (10YR 6/2) clay; strong, medium and coarse, angular blocky structure; continuous clay films; firm; common chert gravel, ¼ to ½ inch across; strongly acid; clear, wavy boundary.

D—51 to 60 inches +, mottled dusky-red (10YR 3/4), red (2.5YR 4/6), yellowish-red (5YR 5/6), and gray (5YR 6/1) clay interspersed in waterworn chert gravel; firm; strongly acid.

*Hagerstown series*: In this series are well-drained soils that have developed on uplands in residuum weathered from limestone. Bedrock is at a depth of 2 to 6 feet. Slopes range from 2 to 12 percent, but the dominant slopes are between 2 and 5 percent. The Hagerstown soils are closely associated with the Talbott, Fairmount, Hermitage, and Mercer soils.

Profile of Hagerstown silt loam, 2 to 5 percent slopes, eroded, in fescue pasture:

Ap—0 to 6 inches, dark-brown (7.5YR 4/2) silt loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, smooth boundary.

B1—6 to 16 inches, yellowish-red (5YR 5/6) silty clay loam; weak, medium, subangular blocky structure; friable; common fine roots; few, small, black concretions; strongly acid; gradual, smooth boundary.

B21—16 to 25 inches, yellowish-red (5YR 4/6) silty clay; moderate, medium, subangular blocky structure; patchy clay films; friable; few fine roots; few, small, black and dark-brown concretions; strongly acid; gradual, smooth boundary.

B22—25 to 37 inches, yellowish-red (5YR 4/6) to red (2.5YR 4/6) heavy silty clay; moderate, medium, subangular blocky and blocky structure; continuous clay films; firm; few, small, black concretions; strongly acid; gradual, wavy boundary.

B3—37 to 45 inches +, yellowish-red (5YR 4/6) clay with common, distinct mottles of strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6); moderate to strong, medium, blocky and subangular blocky structure; continuous clay films; few, small, highly weathered fragments of limestone in lower part; strongly acid.

*Hermitage series*: The soils in this series are well drained and have developed in colluvium or old local alluvium that washed from soils derived from limestone. The colluvium or alluvium is 18 inches to more than 6 feet thick. Slopes range from 2 to 5 percent. The Hermitage soils are on toe slopes and fans and are closely associated with the Hagerstown, Talbott, and Mercer soils, and with the Huntington local alluvial soil.

Profile of Hermitage silt loam, 2 to 5 percent slopes, in field of annual lespedeza and johnsongrass hay:

Ap—0 to 6 inches, dark-brown (7.5YR 4/2) silt loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, smooth boundary.

A3—6 to 10 inches, brown (7.5YR 4/4) silt loam with few, faint mottles of yellowish red (5YR 4/6); moderate, fine and medium, granular structure; very friable; many fine roots; strongly acid; gradual, smooth boundary.

B1—10 to 15 inches, reddish-brown (5YR 4/4) silty clay loam; weak to moderate, medium, subangular blocky structure; friable; common fine roots; few, small, black concretions; strongly acid; gradual, smooth boundary.

B2—15 to 38 inches, yellowish-red (5YR 4/6) silty clay loam; moderate to medium, subangular blocky structure; few, patchy clay films; friable; few fine roots; few, small, black and dark-brown concretions; strongly acid; gradual, smooth boundary.

B3—38 to 48 inches +, yellowish-red (5YR 4/8–4/6) silty clay with common, fine and medium, distinct mottles of strong brown (7.5YR 5/6) and pale brown (10YR 6/3); moderate, medium, subangular blocky structure; patchy clay films; firm; few, small and medium, black concretions; strongly acid.

*Maury series:* The soils in this series are well drained and highly phosphatic. They have developed either in residuum from phosphatic limestone that was deposited in old fill in valleys or in high, old general alluvium from streams. In many places the upper part of these soils appears to contain a considerable amount of loess. The depth to underlying phosphatic limestone ranges from 5 to more than 10 feet. Slopes range from 0 to 12 percent but are dominantly 2 to 5 percent. The Maury soils are closely associated with the Armour, Hampshire, Braxton, and Mimosa soils.

Profile of Maury silt loam, 2 to 5 percent slopes, in a pasture of fescue and whiteclover:

Ap—0 to 8 inches, dark-brown (7.5YR 3/2) silt loam; weak, fine, granular structure; very friable; many fine roots; slightly acid; clear, smooth boundary.

A3—8 to 11 inches, dark-brown (7.5YR 4/4) heavy silt loam; in a few tongues and root channels, darker Ap material extends into upper part of this horizon; moderate, fine and medium, granular structure; friable; many fine roots; slightly acid; clear, wavy boundary.

B1—11 to 20 inches, reddish-brown (5YR 4/4) to dark-brown (7.5YR 4/4) light silty clay loam; weak, medium, subangular blocky structure; friable; common fine roots; few, small, rounded, black concretions; few worm channels; strongly acid; clear, wavy boundary.

B21—20 to 28 inches, reddish-brown (5YR 4/4) heavy silty clay loam; moderate, medium, subangular blocky structure; continuous clay films; friable to firm; few fine roots; common, small, rounded, black concretions; few, black, concretionary stains on ped surfaces; strongly acid; gradual, smooth boundary.

B22—28 to 39 inches, reddish-brown (5YR 4/4) heavy silty clay loam; weak to moderate, blocky structure; continuous clay films; friable to firm; few fine roots; common, small and medium, black concretions; few, small, black concretionary stains on ped surfaces; strongly acid; gradual, smooth boundary.

B23—39 to 54 inches, yellowish-red (5YR 4/6) to reddish-brown (5YR 4/4) silty clay; moderate, medium, blocky structure; continuous clay films; friable to firm; few fine roots; common, small and medium, black concretions; strongly acid; gradual, smooth boundary.

B24—54 to 64 inches, yellowish-red (5YR 4/6) silty clay; few, medium, distinct mottles of strong brown (7.5YR 5/6); moderate to strong, blocky structure; continuous clay films; firm; common, small, black concretions; few, black, concretionary stains on ped surfaces; strongly acid; clear, wavy boundary.

B31—64 to 80 inches, reddish-brown (5YR 4/4) silty clay with few, fine and medium, distinct mottles of light yellowish brown (10YR 6/4); weak, fine and medium, blocky structure; patchy clay films; friable to firm; many, small and medium, black concretions; common, black concretionary coats, 1 to 2 inches across, on ped surfaces; weathered chert fragments, 2 to 10 millimeters across; strongly acid; gradual, smooth boundary.

B32—80 to 96 inches +, yellowish-red (5YR 4/6) clay; moderate, medium, angular blocky structure; patchy clay films; firm; common, small and medium, black and dark reddish-brown concretions; few weathered chert fragments, 1 to 5 millimeters across; strongly acid.

*Stiversville series:* In this series are well-drained soils that developed on uplands in residuum weathered from phosphatic, sandy limestone interbedded with shale. The depth to bedrock ranges from 3 to 5 feet. In places all horizons contain fragments of highly weathered, sandy limestone, but the fragments are more common in the lower B and the C horizons. Slopes range from 2 to 20 percent but are dominantly 5 to 12 percent. The Stiversville soils are closely associated with the Culleoka, Hicks, Inman, and Armour soils.

Profile of Stiversville silt loam, 2 to 5 percent slopes, eroded, in cornfield:

Ap—0 to 6 inches, dark-brown (10YR 3/3) silt loam; weak, fine, granular structure; very friable; many fine roots; many worm and root channels; strongly acid; clear, wavy boundary.

A3—6 to 10 inches, dark yellowish-brown (10YR 3/4) silt loam with few, fine, faint mottles of brown (10YR 4/3); weak, fine, granular structure; very friable; many fine roots; few, small, weathered fragments of sandy limestone; many fine pores; many worm channels; strongly acid; clear, wavy boundary.

B1—10 to 19 inches, brown (7.5YR 4/4) heavy silt loam with common tongues of dark yellowish brown (10YR 3/4) extending through root and worm channels from horizon above; weak, fine and medium, subangular blocky structure; friable; common fine roots; few, small, black concretions; few, small, weathered fragments of sandy limestone; many fine pores; many worm and root channels; strongly acid; gradual, smooth boundary.

B21—19 to 27 inches, brown (7.5YR 4/4) light silty clay loam; weak to moderate, medium, subangular blocky structure; few patchy clay films; friable; common fine roots; few, small, black concretions; few, small, weathered fragments of sandy limestone; common root and worm channels; medium acid; clear, wavy boundary.

B22—27 to 34 inches, dark-brown (7.5YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; patchy clay films; friable; few fine roots; common weathered fragments of sandy limestone, ½ to 1 inch across; few, small, black concretions; medium acid; gradual, smooth boundary.

B3—34 to 41 inches, mottled dark-brown (7.5YR 4/4), brown (7.5YR 5/4), yellowish-brown (5YR 4/8), and pale-brown (10YR 6/3) silty clay; moderate, fine and medium, blocky structure; continuous clay films; friable to firm; few fine roots; many weathered fragments of sandy limestone, ½ to 2 inches across; common, small, black concretions; strongly acid; clear, smooth boundary.

C—41 to 45 inches, mottled brown (7.5YR 4/4) and reddish-brown (5YR 4/4) clay, interspersed among weathered fragments of sandy limestone, ½ to 5 inches across; fragments make up about 65 percent of horizon by volume; strongly acid; abrupt, smooth boundary.

Dr—45 inches +, stratified sandy limestone interbedded with shale.

RED-YELLOW PODZOLIC SOILS GRADING TOWARD PLANOSOLS.—Soils in the Captina, Dickson, Donerail, and Mercer series have a fragipan or a hard compact layer at 16 to 30 inches and, therefore, grade toward Planosols.

*Captina series:* The soils of the Captina series are moderately well drained and have a fragipan at a depth of 20 to 30 inches. They have developed in old alluvium on stream terraces. The alluvium ranges from 2 to 10 feet in thickness and consists of materials washed from soils derived chiefly from phosphatic limestone. Slopes range from 0 to 12 percent, but the dominant slopes are 2 to 5 percent. The Captina soils are closely associated with the Armour, Taft, and Robertsville soils.

Profile of Captina silt loam, phosphatic, 2 to 5 percent slopes, in field of annual lespedeza hay:

Ap—0 to 7 inches, dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; many fine roots; slightly acid; clear, smooth boundary.

A3—7 to 10 inches, dark yellowish-brown (10YR 4/4) silt loam; moderate, fine and medium, granular structure; friable; common fine roots; few, small, dark-brown to black concretions; medium acid; clear, smooth boundary.

B1—10 to 15 inches, yellowish-brown (10YR 5/4) silt loam; weak, medium, subangular blocky structure; friable; few fine roots; few, small, brown concretions; strongly acid; gradual, smooth boundary.

B21—15 to 20 inches, dark-brown (10YR 4/3) light silty clay loam with few, fine, faint mottles of yellowish brown (10YR 5/4); moderate, medium, subangular blocky structure; patchy clay films; friable; few fine roots; few, small, brown concretions; strongly acid; gradual, smooth boundary.

B22—20 to 24 inches, yellowish-brown (10YR 5/4) light silty clay loam with common, fine and medium, faint mottles of light yellowish brown (10YR 6/4); moderate, medium, subangular blocky structure; patchy clay films; friable; common, small, brown concretions; strongly acid; clear, smooth boundary.

B3m1—24 to 30 inches, pale-brown (10YR 6/3) silt loam with many, fine and medium, distinct mottles of yellowish brown (10YR 5/4); massive (structureless); very firm, compact, and hard; many, small, dark-brown concretions; strongly acid; gradual, smooth boundary.

B3m2—30 to 42 inches +, mottled light yellowish-brown (10YR 6/4), yellowish-red (5YR 4/8), strong-brown (7.5YR 5/6), and pale-brown (10YR 6/3) silty clay; massive (structureless); very firm, compact, and hard; many, small, dark-brown concretions; strongly acid.

*Dickson series:* The soils in this series are moderately well drained and have a fragipan. They are on the uplands of the Highland Rim, where they have developed in residuum from cherty limestone capped with loess. The loess ranges from 18 to 36 inches in thickness, and the fragipan is generally at or near the junction of the loess and the underlying cherty residuum. In places, between the loess and cherty residuum, there is a cemented, panlike layer of coastal-plain materials. This layer is 4 to 10 inches thick. Slopes range from 2 to 5 percent. The Dickson soils are closely associated with the Mountview, Baxter, and Greendale soils.

Profile of Dickson silt loam, 2 to 5 percent slopes, in pasture of fescue and whiteclover:

Ap—0 to 7 inches, grayish-brown (10YR 5/2) silt loam; weak, fine, crumb structure; very friable; many fine roots; strongly acid; clear, smooth boundary.

B1—7 to 12 inches, yellowish-brown (10YR 5/4) silt loam; weak, fine and medium, subangular blocky structure; friable; many fine roots; few, small, dark reddish-brown and black concretions; strongly acid; gradual, smooth boundary.

B2—12 to 20 inches, yellowish-brown (10YR 5/6) light silty clay loam; moderate, medium, subangular blocky structure; few patchy clay films; friable; few fine roots; few, small, dark reddish-brown concretions; strongly acid; gradual, smooth boundary.

B3—20 to 25 inches, mottled brown (10YR 5/6), light yellowish-brown (10YR 6/4), and light brownish-gray (10YR 6/2) heavy silt loam; moderate, medium, subangular blocky structure; firm; few angular fragments of chert, ½ to 2 inches across; strongly acid; clear, smooth boundary.

B3m—25 to 40 inches, mottled yellowish-brown (10YR 5/4), light-gray (10YR 6/1), and brown (10YR 4/4) silt loam; massive (structureless); very firm, hard, and compact; few chert fragments, increasing in size and amount with depth; strongly acid; clear, wavy boundary.

Bb—40 to 45 inches +, mottled yellowish-brown (10YR 5/4), dark reddish-brown (5YR 3/4), dark-brown (7.5YR 4/4), and gray (10YR 6/1) cherty silty clay; moderate to strong, medium and coarse, angular blocky structure; firm; strongly acid.

*Donerail series:* The soils of this series are moderately well drained and have a fragipan, or a compact, cemented hardpan. They have developed in residuum from phosphatic limestone. Bedrock is at a depth of 3 to 5 feet, and a fragipan, or cemented layer, is at a depth of 18 to 36 inches. A Donerail concretionary phase is mapped separately. Its pan is a cemented layer consisting of concretionary material that is high in iron, manganese, and phosphate. Slopes range from 2 to 12 percent. The Donerail soils are closely associated with the Maury, Hampshire, Mimosa, and Stiversville soils.

Profile of Donerail silt loam, 2 to 5 percent slopes, eroded, in a field of grain sorghum:

Ap—0 to 7 inches, dark-brown (10YR 3/3) silt loam; weak, fine, granular structure; very friable; many fine roots; few, small, black concretions; slightly acid; clear, smooth boundary.

A3—7 to 9 inches, brown (10YR 4/3) heavy silt loam with fine, faint mottles of brown (7.5YR 4/4); moderate, fine and medium, granular structure; friable; many fine roots; few, small, black concretions; medium acid; clear, smooth boundary.

B1—9 to 17 inches, brown (7.5YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; patchy clay films; friable; common fine roots; few, small, black and dark-brown concretions; strongly acid; gradual, smooth boundary.

B2—17 to 24 inches, reddish-brown (5YR 4/4) heavy silty clay loam with few, medium, distinct mottles of light yellowish brown (10YR 6/3) and brown (10YR 5/3); moderate, medium, subangular blocky structure; continuous clay films; firm; few fine roots; common, small, black and dark reddish-brown concretions; strongly acid; gradual, smooth boundary.

B3—24 to 27 inches, mottled reddish-brown (5YR 4/4), brown (10YR 4/3), pale-brown (10YR 6/3), and yellowish-brown (10YR 5/6) silty clay loam; moderate to strong, subangular blocky structure; continuous clay films; firm; common, black and dark-brown concretions; strongly acid; abrupt, smooth boundary.

B3m—27 to 40 inches +, mottled pale-brown (10YR 6/3), brown (10YR 4/3), and light-gray (2.5Y 7/2) silty clay loam; massive (structureless); very firm and compact; common, small, black, dark-brown, and dark reddish-brown concretions; strongly acid.

*Mercer series:* In this series are moderately well drained soils that occur on uplands and have a fragipan or a heavy clay layer in their subsoil. The Mercer soils have developed in limestone residuum, which in many places appears to be capped by more friable transported material. The depth to bedrock ranges from 2 to 6 feet. The fragipan or the very slowly permeable, plastic clay is at a depth of 15 to 30 inches. Slopes range from 2 to 5 percent. The Mercer soils are closely associated with the Talbott, Hagerstown, Fairmount, and Dowellton soils.

Profile of Mercer silt loam, 2 to 5 percent slopes, eroded, in a cornfield:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; many fine roots; few, small, black concretions; medium acid; clear, smooth boundary.

B2—6 to 17 inches, brown (7.5YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; patchy clay films; friable; few, small, black concretions; strongly acid; abrupt, smooth boundary.

B3m1—17 to 20 inches, strong-brown (7.5YR 5/6) silty clay with common, fine and medium, distinct mottles of brownish yellow (10YR 6/6) and olive brown (2.5Y 4/4); strong, blocky structure to massive (structureless); continuous clay films; very firm; common, small, black concretions; strongly acid; gradual, smooth boundary.

B3m2—20 to 28 inches, mottled brown (7.5YR 4/4), light olive-brown (2.5Y 5/4), light yellowish-brown (10YR 6/4), and reddish-yellow (5YR 6/6) silty clay; massive (structureless); very firm and compact; common, small and medium, black concretions; strongly acid; clear, wavy boundary.

C—28 to 40 inches +, mottled yellowish-red (5YR 5/6), red (2.5YR 4/8), brownish-yellow (10YR 6/6), and light yellowish-brown (2.5Y 6/4) clay; massive (structureless); firm to very firm; common, small, black concretions; strongly acid.

#### GRAY-BROWN PODZOLIC SOILS

The soils in this great soil group developed under forest vegetation in a temperate, humid climate. Undisturbed Gray-Brown Podzolic soils have a thin, organic horizon (A0) underlain by a dark-colored organic-mineral horizon (A1) and that, in turn, is underlain by a grayish-brown, leached horizon (A2). The B horizon is illuviated and is darker colored and higher in clay than the horizons above. The lower horizons are generally streaked or mottled with yellow, red, and gray, and are lighter colored with increasing depth (*15*).

About 25 percent of the total soils of the county are in the Gray-Brown Podzolic great soil group. This group contains the second largest number of soil series.

In general, most of these soils have small accumulations of organic matter on the surface and in the surface layer. The grayish-brown eluviated zone is relatively thick and is lighter colored than the illuviated zone. The B horizon generally has a blocky structure that impairs drainage in some places. Colors of the B horizon are of medium to low chroma. Most of these soils are a little more acid and more deeply leached than are some soils near the central concept of Gray-Brown Podzolic soils. They have been classified as Gray-Brown Podzolic soils because apparently they have higher cation-exchange capacities and a higher percentage of base saturation than the Red-Yellow Podzolic soils, and because their colors are predominantly of chroma 6 or less.

CENTRAL CONCEPT OF GRAY-BROWN PODZOLIC SOILS.—Soil series in Williamson County that conform to the central concept of the Gray-Brown Podzolic soils are the Armour, Culleoka, Dellrose, Frankstown, Hampshire, Hicks, Mimosa, and Sees.

*Armour series:* In this series are well-drained soils that developed in old alluvium or colluvium on stream terraces, toe slopes, and fans. The alluvium or colluvium ranges from 2 to 10 feet in thickness and consists of materials washed chiefly from soils derived from phosphatic limestone. Cherty or gravelly types are separated in mapping. Slopes range from 0 to 20 percent, but dominant slopes are 2 to 5 percent. The Armour soils are closely associated with the Captina, Maury, Mimosa, and Dellrose soils.

Profile of Armour silt loam, 2 to 5 percent slopes, in field of fescue and johnsongrass hay:

Ap—0 to 9 inches, dark-brown (10YR 3/3) silt loam; weak, fine, granular structure; very friable; many fine roots; common worm channels; slightly acid; clear, smooth boundary.

A3—9 to 13 inches, brown (7.5YR 4/4–5/4) silt loam; weak, fine, granular structure; friable; many fine roots; many fine pores; slightly acid; gradual, smooth boundary.

B1—13 to 21 inches, dark-brown (7.5YR 4/4) light silty clay loam; weak, fine and medium, subangular blocky structure; friable; common fine roots; few, small, black concretions; few worm channels; common fine pores; medium acid; clear, smooth boundary.

B2—21 to 29 inches, dark-brown (7.5YR 4/4) silty clay loam; weak, medium, subangular blocky structure; patchy clay films; friable; common fine roots; few, small, black concretions; few worm channels; medium acid; clear, smooth boundary.

B31—29 to 53 inches, dark-brown (7.5YR 4/4) to reddish-brown (5YR 4/4) light silty clay loam; weak, medium, subangular blocky structure; thin, continuous clay films; friable; few fine roots; few, small, black concretions; strongly acid; gradual, smooth boundary.

B33—53 to 65 inches, reddish-brown (5YR 4/4) light silty clay loam; few, medium, distinct mottles of light yellowish brown (10YR 6/4); weak, medium, subangular blocky structure; thin, continous clay films; friable; few, small, black concretions; strongly acid; clear, smooth boundary.

C—65 to 80 inches +, strong-brown (7.5YR 5/6) heavy silt loam; weak, medium, subangular blocky structure; friable; common, medium and coarse, irregularly shaped pockets of gray (N 6/0) very fine sand give mottled effect; strongly acid.

*Culleoka series*: In this series are well-drained soils that developed in colluvial or creep materials ranging from 14 inches to 6 feet in thickness. These materials moved down the slopes from soils derived from interbedded sandy limestone and shale. Flaggy types of Culleoka soils are mapped separately. In the surface and throughout the profile of the flaggy types, there are varying amounts of sandstone or fragments of sandy limestone that are 3 to 12 inches across. Slopes range from 5 to 35 percent, but the dominant slopes are more than 12 percent.

Profile of Culleoka silt loam, 20 to 35 percent slopes, in a wooded area:

A00—2 inches to 1 inch, forest litter of leaves and twigs.

A0—1 inch to 0, partly decomposed forest litter.

A1—0 to 5 inches, dark-brown (10YR 3/3) silt loam; weak, fine, crumb structure; very friable; many fine roots; few highly weathered fragments of sandy limestone, ¼ to 1 inch across; medium acid; clear, smooth boundary.

A3—5 to 8 inches, dark-brown (10YR 4/3) silt loam with common, fine and medium, faint mottles of yellowish brown (10YR 5/6); weak, fine, granular structure; very friable; many fine and medium tree roots; few weathered fragments of sandy limestone, ¼ to 1 inch across; medium acid; clear, smooth boundary.

B1—8 to 16 inches, brown (7.5YR 4/4) light silty clay loam; weak, medium, subangular blocky structure; friable; common medium and large tree roots; few weathered fragments of sandy limestone, ¼ inch to 2 inches across; strongly acid; gradual, smooth boundary.

B2—16 to 42 inches, brown (7.5YR 4/4) clay loam; moderate, medium, subangular blocky structure; few patchy clay films; friable; few medium and large tree roots; common weathered fragments of sandy limestone, 1 to 5 inches across; few, small, black concretions; strongly acid; gradual, smooth boundary.

B3—42 to 59 inches, brown (7.5YR 4/4) silty clay with common, fine and medium, distinct mottles of light olive brown (2.5Y 5/4), light yellowish brown (2.5Y 6/4), and dark reddish brown (5YR 3/4); moderate, medium, blocky and subangular blocky structure; continuous clay films; firm; few medium and large tree roots; few, small, black and dark-brown concretions; many weathered fragments of sandy limestone, 1 inch to 6 inches across; strongly acid; clear, smooth boundary.

C—59 to 76 inches +, mottled brown (10YR 4/3), light olive-brown (2.5Y 5/4), dark-red (10R 3/6), and reddish-brown (5YR 4/3) clay; massive (structureless); very firm; few fine tree roots; strongly acid.

*Dellrose series*: In this series are well-drained soils that developed in old cherty colluvium. The colluvium ranges from 2 to 6 feet in thickness and consists of materials sloughed or washed from soils derived chiefly from cherty limestone. In most places the colluvium contains a medium to large amount of phosphorus that came from the underlying phosphatic limestone. Slopes range from 12 to 40 percent but are dominantly 20 to 30 percent. The Dellrose soils are generally on steep slopes below the Bodine, Sulphura, and Frankstown soils and adjoining Mimosa and Armour soils.

Profile of Dellrose cherty silt loam, 20 to 30 percent slopes, in pasture of orchardgrass, fescue, and whiteclover;

Ap—0 to 7 inches, dark-brown (10YR 3/3) cherty silt loam; weak, fine, granular structure; very friable; many fine roots; slightly acid; gradual, smooth boundary.

A3—7 to 16 inches, dark-brown (10YR 4/3) cherty silt loam; weak, fine, granular structure; very friable; common fine roots; medium acid; gradual, smooth boundary.

B1—16 to 36 inches, dark yellowish-brown (10YR 4/4) to brown (7.5YR 4/4) light cherty silty clay loam; weak, fine and medium, subangular blocky structure; thin, patchy clay films; friable; common fine roots; few, small, black concretions; medium acid; gradual, smooth boundary.

B2—36 to 48 inches, brown (7.5YR 4/4) cherty silty clay loam with few, fine, distinct mottles of yellowish brown (10YR 5/4) and light brownish gray (10YR 6/2); moderate, medium, subangular blocky structure; patchy clay films; friable; few fine roots; few, small, black concretions; medium acid; clear, wavy boundary.

Bb—48 to 60 inches +, mottled light yellowish-brown (2.5Y 6/4), yellowish-brown (10YR 5/4), and strong-brown (7.5YR 5/6) clay; strong, blocky structure to massive (structureless); very firm and plastic; strongly acid.

*Frankstown series:* In the Frankstown series are well-drained soils that developed in residuum from cherty limestones. The cherty limestone consists of remnants of the Fort Payne chert formation, which overlies Chattanooga shale. Bedrock is at a depth of 18 to 40 inches, and slopes range from 5 to 20 percent. In most places the soils contain a moderate amount of phosphorus from the Chattanooga shale and underlying phosphatic limestone. The Frankstown soils are on narrow winding ridgetops and knobs above the Dellrose and Mimosa soils, which are on the steep side slopes.

Profile of Frankstown cherty silt loam, 5 to 12 percent slopes, in bermudagrass pasture:

Ap—0 to 6 inches, dark-brown (10YR 3/3) cherty silt loam; weak, fine, granular structure; very friable; many fine roots; medium acid; clear, smooth boundary.

A3—6 to 9 inches, brown (10YR 4/3) cherty silt loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; gradual, smooth boundary.

B2—9 to 24 inches, yellowish-brown (10YR 5/4) to brown (7.5YR 5/4) cherty silty clay loam; weak, medium, subangular blocky structure; friable; strongly acid; gradual, smooth boundary.

C—24 to 36 inches +, yellowish-brown (10YR 5/4) silty clay loam interspersed between stratified beds of angular chert; chert fragments, 2 to 10 inches across, make up about 60 percent of the horizon, by volume; strongly acid.

*Hampshire series:* Hampshire soils are well drained to moderately well drained and have a heavy clay subsoil. They have developed on uplands in phosphatic limestone or interbedded sandy limestone and shale residuum. Although bedrock is generally at a depth of 2 to 4 feet, in places there are a few outcrops. Slopes range from 2 to 20 percent, but the dominant slopes are 5 to 12 percent. The Hampshire soils are closely associated with the Maury, Stiversville, Braxton, Inman, and Talbott soils. In this county Hampshire soil is mapped in a complex with Colbert soil in areas where the two soils are so intricately mingled that it is impractical to map them separately.

Profile of Hampshire silt loam, 5 to 12 percent slopes, eroded, in fescue pasture:

Ap—0 to 6 inches, dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; many fine roots; medium acid; clear, smooth boundary.

B1—6 to 11 inches, strong-brown (7.5YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; patchy clay films; friable; common fine roots; few, small, dark-brown concretions; few, small, highly weathered fragments of sandy limestone and shale; strongly acid; gradual, smooth boundary.

B21—11 to 16 inches, strong-brown (7.5YR 5/6) silty clay with few, fine, distinct mottles of pale brown (10YR 6/3), and many peds coated with dark brown (7.5YR 4/4) and brown (7.5YR 5/4); moderate, medium, blocky structure; patchy clay films; firm; few, small, dark-brown concretions; few, small, weathered fragments of sandy limestone and shale; strongly acid; gradual, smooth boundary.

B22—16 to 29 inches, dark-brown (7.5YR 4/4) clay with common, fine and medium, distinct mottles of light brownish gray (10YR 6/2), strong brown (7.5YR 5/6), and yellowish red (5YR 4/6); strong, fine and medium, blocky structure; continuous clay films; firm; common, small, weathered fragments of sandy limestone and shale; strongly acid; gradual, smooth boundary.

B3—29 to 44 inches, mottled pale-brown (10YR 6/3), strong-brown (7.5YR 5/6), and yellowish-brown (10YR 5/6) clay; strong, medium, blocky structure; continuous clay films; very firm; common, small, weathered fragments of sandy limestone and shale; medium acid; gradual, wavy boundary.

C—44 to 60 inches +, mottled yellowish-brown (10YR 5/6), gray (10YR 6/1), strong-brown (7.5YR 5/6), and brownish-yellow (10YR 6/8) clay; massive (structureless); very firm and plastic; many weathered fragments of sandy limestone and shale; slightly acid to neutral.

*Hicks series:* The soils of this series are phosphatic and well drained to somewhat excessively drained. They have developed in residuum weathered from phosphatic, sandy limestone interbedded with shale. In some places fragments of sandy limestone and shale are scattered on the surface, and in most places they occur throughout the soil. The depth to bedrock ranges from 18 to 36 inches. Slopes range from 2 to 12 percent, but the dominant slopes are 5 to 12 percent. The Hicks soils are closely associated with the Stiversville, Culleoka, Hampshire, and Inman soils.

Profile of Hicks silt loam, 5 to 12 percent slopes, eroded, in a field of sericea lespedeza hay:

Ap—0 to 7 inches, brown (10YR 4/3) silt loam; moderate, fine, granular structure; very friable; many fine roots; medium acid; clear, smooth boundary.

B1—7 to 10 inches, yellowish-brown (10YR 5/4) light silty clay loam; weak, fine and medium, subangular blocky structure; patchy clay films; friable; common fine roots; few, small fragments of highly weathered, sandy limestone; strongly acid; gradual, smooth boundary.

B2—10 to 18 inches, yellowish-brown (10YR 5/4) to brown (7.5YR 4/4) clay loam with common, fine and medium, faint mottles of brown (10YR 5/3) and yellowish brown (10YR 5/6); moderate, fine and medium, subangular blocky and blocky structure; continuous clay films; friable; common fine roots; few, small, black and dark-brown concretions; many highly weathered fragments of sandy limestone and shale; strongly acid; gradual, smooth boundary

C—18 to 20 inches, mottled yellowish-brown (10YR 5/4) and strong-brown (7.5YR 5/6) silty clay interspersed among highly weathered fragments of sandy limestone; firm; few fine roots; strongly acid.

Dr—20 inches +, phosphatic, sandy limestone interbedded with shale.

*Mimosa series:* In this series are well-drained soils that developed in residuum weathered from argillaceous phosphatic limestone. The depth to bedrock ranges from 2 to 6 feet, but outcrops of bedrock are common in places. Cherty, noncherty, and very rocky types of Mimosa soils are mapped separately. The cherty types have a surface layer consisting mostly of cherty creep from nearby cherty soils. The very rocky soils have outcrops of bedrock covering from 10 to 50 percent of the surface. Slopes range from 2 to 40 percent. The Mimosa soils are closely associated with the Dellrose, Maury, Ashwood, Braxton, and Armour soils.

Profile of Mimosa cherty silt loam, 20 to 30 percent slopes, eroded, in pasture of fescue and annual lespedeza:

Ap—0 to 8 inches, dark-brown (10YR 3/3) cherty silt loam; moderate, fine and medium, granular structure; friable; many fine roots; strongly acid; clear, smooth boundary.

B1—8 to 13 inches, yellowish-brown (10YR 5/4) clay with few, fine and medium, distinct mottles of dark gray (10YR 4/1); strong, medium, blocky structure; thick, patchy clay films; firm; common fine roots; few ½- to 1-inch angular fragments of chert; few, small, black concretions; strongly acid; gradual, smooth boundary.

B21—13 to 29 inches, yellowish-brown (10YR 5/6) to strong-brown (7.5YR 5/6) clay; strong, medium and coarse, blocky structure; continuous clay films; very firm and plastic; common fine roots; few, small, black concretions; strongly acid; gradual, smooth boundary.

B22—29 to 38 inches, strong-brown (7.5YR 5/6) clay with few, fine, faint mottles of yellowish brown (10YR 5/4); strong, medium and coarse, blocky structure; continuous clay films; very firm and plastic; few fine roots; few weathered fragments of chert, ¼ to 1 inch across; strongly acid; gradual, smooth boundary.

B3—38 to 43 inches, strong-brown (7.5YR 5/6) clay with common, fine, faint mottles of pale brown (10YR 6/3) and few, fine, distinct mottles of red (2.5YR 4/6); strong, fine and medium, blocky structure; continuous clay films; few, small, black concretions; strongly acid; gradual, smooth boundary.

C—43 to 72 inches +, mottled strong-brown (7.5YR 5/6), light brownish-gray (2.5Y 6/2), light yellowish-brown (10YR 6/4), and yellowish-red (5YR 4/6) clay; massive (structureless); very firm and plastic; common, small and medium, black concretions; strongly acid.

*Sees series:* In this series are dark, fine-textured, moderately well drained soils that developed in old local alluvium or colluvium. The alluvium or colluvium ranges from 2 to 6 feet in thickness and consists of materials washed from soils derived from phosphatic limestone. Slopes range from 0 to 5 percent. The Sees soils are closely associated with the Egam, Lanton, and Dunning soils and are similar to those soils in origin of parent material.

Profile of Sees silty clay loam in a field of small grain:

Ap—0 to 10 inches, very dark gray (10YR 3/1) silty clay loam; moderate, fine and medium, granular structure; friable; common fine roots; few, small, black and dark-brown concretions; slightly acid; clear, smooth boundary.

B1—10 to 16 inches, very dark grayish-brown (10YR 3/2) silty clay with few, fine, faint mottles of dark brown

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(7.5YR 4/4) ; moderate, fine and medium, blocky structure; continuous clay films; firm; common fine roots; common, small, black and dark-brown concretions; medium acid; gradual, smooth boundary.

B21—16 to 30 inches, dark-brown (10YR 3/3) clay with common, fine, distinct mottles of grayish brown (10YR 5/2), yellowish brown (10YR 5/4), and grayish brown (2.5Y 5/2) ; moderate to strong, medium, blocky structure; continuous clay films; very firm; few fine roots; common, small, dark-brown concretions; slightly acid; gradual, smooth boundary.

B22—30 to 40 inches, dark yellowish-brown (10YR 3/4) clay with common, fine and medium, distinct mottles of dark grayish brown (10YR 4/2 and 2.5Y 4/2) and gray (10YR 5/1) ; strong, medium, blocky structure; continuous clay films; very firm; common, small and medium, dark-brown and black concretions; slightly acid; gradual, smooth boundary.

B3—40 to 44 inches +, dark yellowish-brown (10YR 4/4) clay with many, fine and medium, distinct mottles of dark grayish brown (2.5Y 4/2), light olive brown (2.5Y 5/4), dark gray (10YR 4/1), and reddish brown (5YR 5/4) ; strong, medium and coarse, blocky structure to massive (structureless) ; continuous clay films; very firm; common, dark-brown and black concretions; neutral.

GRAY-BROWN PODZOLIC SOILS GRADING TOWARD ALLUVIAL SOILS.—The Greendale and Sequatchie soils have developed in alluvium. They are Gray-Brown Podzolic soils that grade toward Alluvial soils, for their horizons are few and weakly developed, and the alluvium retains many of the characteristics of the original parent material.

*Greendale series:* In this series are well drained to moderately well drained soils that have developed in local alluvium along small drains and in depressions. The alluvium ranges from 18 inches to 5 feet in thickness and consists of material that washed from soils derived mostly from loess and cherty limestone. Slopes range from 2 to 12 percent. Cherty and noncherty types are mapped separately. The cherty type is the most extensive. It generally is on the stronger slopes along narrow V-shaped valleys, and it has a weaker profile development than the noncherty type. The Greendale soils are closely associated with the Baxter, Bodine, Sulphura, Mountview, and Humphreys soils.

Profile of Greendale cherty silt loam, 2 to 12 percent slopes, in a wooded area:

A00—2 inches to 1 inch, forest litter of leaves and twigs.

A0—1 inch to 0, partly decomposed forest litter.

A1—0 to 1 inch, very dark grayish-brown (10YR 3/2) cherty silt loam; weak, fine, granular structure; very friable; many fine tree roots; strongly acid; clear, smooth boundary.

A2—1 inch to 7 inches, pale-brown (10YR 6/3) cherty silt loam; weak, fine, granular structure; very friable; many fine tree roots; strongly acid; clear, smooth boundary.

C1—7 to 11 inches, brown (10YR 5/3) cherty silt loam; weak, fine, granular structure; friable; common fine and medium tree roots; strongly acid; gradual, smooth boundary.

C2—11 to 24 inches, brown (10YR 5/3) cherty silt loam with common, fine, faint mottles of yellowish brown (10YR 5/6) ; weak, fine and medium, granular structure; friable; common, fine and medium tree roots; strongly acid; gradual, smooth boundary.

C3—24 to 36 inches, brown (10YR 5/3) silt loam with common, fine, distinct mottles of yellowish brown (10YR 5/8) and light brownish gray (10YR 6/2) interspersed among angular fragments of chert; friable to firm; abrupt, smooth boundary.

D—36 inches +, stratified layers of cherty limestone.

*Sequatchie series:* In this series are well-drained soils that developed in old alluvium on low stream terraces. The alluvium ranges from 3 to 10 feet in thickness and contains a high percentage of fine sandy material that washed from soils derived from phosphatic sandy limestone interbedded with shale. Slopes range from 0 to 5 percent. The Sequatchie soils are closely associated with the Huntington, Lindside, and Armour soils.

Profile of Sequatchie loam, phosphatic, in pasture of fescue and whiteclover:

Ap—0 to 10 inches, dark-brown (10YR 3/3) loam; weak, fine, crumb structure; very friable; many fine roots; medium acid; clear, smooth boundary.

B1—10 to 18 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, fine, granular structure and weak, medium, subangular blocky structure; friable; common fine roots; medium acid; gradual, smooth boundary.

B2—18 to 39 inches, brown (7.5YR 4/4) fine sandy clay loam; weak to moderate, medium, subangular blocky structure; friable; strongly acid; gradual, smooth boundary.

C—39 to 60 inches +, yellowish-brown (10YR 5/4) fine sandy loam with common, fine, distinct mottles of pale brown (10YR 6/3) and yellowish red (7.5YR 6/6) ; weak, medium, subangular blocky structure; friable; few, small, rounded pebbles of chert below 50 inches; strongly acid.

GRAY-BROWN PODZOLIC SOILS GRADING TOWARD LITHOSOLS.—The Inman soils have a weakly developed profile, are moderately shallow over bedrock, and therefore grade toward Lithosols. Most areas of these soils are steep and lack a B horizon or have a very thin, faint one. On less steep slopes, however, a thin, weakly developed B horizon is generally present.

*Inman series:* These well-drained to excessively drained soils are phosphatic and have a fine-textured subsoil. They have developed in residuum weathered from interbedded shale and sandy limestone. Depth to bedrock ranges from 18 to 40 inches. Although slopes range from 5 to 30 percent, the dominant slopes are 12 to 20 percent. The Inman soils are closely associated with the Culleoka, Hampshire, Hicks, and Stiversville soils.

Profile of Inman silt loam, 12 to 20 percent slopes, in pasture of fescue and annual lespedeza:

Ap—0 to 6 inches, dark grayish-brown (10YR 3/3) silt loam; weak, fine, granular structure; very friable; many fine roots; few small fragments of highly weathered sandy limestone and shale; medium acid; clear, smooth boundary.

A3—6 to 9 inches, yellowish-brown (10YR 5/4) silty clay loam with common, fine, faint mottles of dark brown (10YR 4/3) ; weak, fine, subangular blocky structure; friable; common fine roots; few, small, highly weathered fragments of sandy limestone and shale; slightly acid; gradual, smooth boundary.

C1—9 to 15 inches, yellowish-brown (10YR 5/4–5/6) clay with few, fine, distinct mottles of light olive brown (2.5Y 5/4) and pale brown (10YR 6/3) ; moderate, medium, blocky structure; patchy clay films; firm and plastic; few fine roots; few, small, weathered fragments of sandy limestone and shale; slightly alkaline; gradual, smooth boundary.

C2—15 to 19 inches, yellowish-brown (10YR 5/4–5/6) clay with common, fine and medium, distinct mottles of light brownish gray (10YR 6/2) ; strong, blocky structure; patchy clay films; firm to very firm; few fine roots; common weathered fragments of sandy limestone and shale; slightly alkaline; gradual, smooth boundary.

C3—19 to 36 inches +, mottled brownish-yellow (10YR 6/6), gray (10YR 6/1), and yellowish-brown (10YR 5/4) clay; massive (structureless); very firm; many weathered fragments of sandy limestone and shale; medium alkaline.

### *Intrazonal order*

Although most soils in Williamson County are zonal and reflect the influence of climate and living organisms, some soils reflect the dominating influence of topography, drainage, or parent material over the normal effects of climate and vegetation and are therefore in the intrazonal order.

The intrazonal soils of Williamson County are in the Humic Gley, Low-Humic Gley, Planosol, and Rendzina great soil groups.

#### HUMIC GLEY SOILS

The Humic Gley great soil group is made up of poorly drained to very poorly drained, hydromorphic soils that have dark-colored, moderately thick, organic-mineral horizons underlain by mineral gley horizons. These soils have developed under swamp-forest or herbaceous marsh vegetation in humid and subhumid climate and range from medium acid to mildly alkaline. A few of them are strongly acid (*14*).

In Williamson County only the soils of the Dunning series are in the Humic Gley great soil group. These soils are inextensive and amount to less than 1 percent of all the soils in the county.

In general, the Dunning soils have developed in alluvium, and their surface layer is relatively thick, dark colored, and moderately high in organic matter. The subsoil is dark, highly mottled, and generally higher in clay than the surface layer. These soils have a medium to high cation-exchange capacity, a relatively high percentage of base saturation, and a slightly acid to medium alkaline reaction. These properties are largely the result of the influences of level to nearly level relief, poor drainage, and the character of the parent material.

*Dunning series:* The soils of this series are dark and poorly drained. They have developed in alluvium that ranges from 2 to 10 feet in thickness and that consists of materials washed from soils of the uplands derived chiefly from phosphatic limestone. Slopes range from 0 to 2 percent. The soils are subject to overflow and, in many places, to long periods of ponding. The Dunning soils are closely associated with the Lanton, Melvin, Lindside, and Huntington soils, and they are similar to those soils in position and in origin of parent material.

Profile of Dunning silt loam, phosphatic, in fescue pasture:

Ap—0 to 7 inches, black (10YR 2/1) silt loam with common, fine, faint mottles of dark brown (10YR 3/3); weak, fine, granular structure; very friable; many fine roots; few, small, rounded, black concretions; neutral; gradual, smooth boundary.

C1—7 to 15 inches, very dark gray (10YR 3/1) silty clay loam with few, fine, distinct mottles of dark grayish brown (2.5Y 4/2); strong, fine and medium, granular structure; friable; common fine roots; many, small, dark-brown and black concretions; neutral; gradual, wavy boundary.

Cg1—15 to 26 inches, mottled very dark gray (N 3/0), olive-brown (2.5Y 4/4), and gray (N 5/0) silty clay; massive (structureless); firm; few fine roots; many, small and medium, black, strong-brown and dark-brown concretions; few rounded pebbles of chert; slightly alkaline; gradual, wavy boundary.

Cg2—26 to 33 inches, mottled dark-gray (N 4/0), olive-brown (2.5Y 4/4), gray (10YR 5/1), and strong-brown (7.5YR 5/6) clay; massive (structureless); very firm; common, small and medium, dark-brown and strong-brown concretions; slightly alkaline; gradual, wavy boundary.

Cg3—33 to 51 inches, mottled dark-gray (N 4/0), strong-brown (7.5YR 5/6), and very dark gray (N 3/0) clay; massive (structureless); very firm; many, small and medium, black, dark-brown, and strong-brown concretions; medium alkaline; gradual, wavy boundary.

Cg4—51 to 80 inches, gray (N 6/0) clay interspersed among many, medium and coarse, strong-brown and black concretions; massive (structureless); extremely firm; few small pebbles of chert; medium alkaline; abrupt, smooth boundary.

Dr—80 inches +, limestone.

#### LOW-HUMIC GLEY SOILS

These intrazonal soils are imperfectly drained to very poorly drained. They have a thin surface horizon that is moderately high in organic matter. The surface horizon is over mottled gray and brown, gleylike, mineral horizons that differ from each other only slightly. Low-Humic Gley soils have developed under swamp forest or marsh plants. They are generally medium acid to very strongly acid, but a few of them are neutral or alkaline (*14*).

In Williamson County only the Dowellton and Melvin soils are Low-Humic Gleys. These soils amount to about one-half of one percent of the total county area.

These poorly drained to very poorly drained soils are medium acid to strongly acid. They have a dark-gray surface horizon and a highly mottled, gray subsoil. Unpublished data indicate that they have a low cation-exchange capacity and a low to medium percentage of base saturation. These properties are mainly the results of the level to nearly level relief, poor drainage, parent material, and age.

*Dowellton series:* In this series are somewhat poorly drained to poorly drained soils that have developed in residuum weathered from argillaceous limestone. The depth to bedrock ranges from 2 to 4 feet. Slopes range from 2 to 5 percent. Most of these soils are in depressions or along small drains and have a thin, silty overwash on the surface. The Dowellton soils are closely associated with the Talbott, Fairmount, Mercer, and Hampshire soils.

Profile of Dowellton silt loam, 2 to 5 percent slopes, in fescue pasture:

Ap—0 to 5 inches, dark-gray (10YR 4/1) silt loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, smooth boundary.

A3—5 to 9 inches, grayish-brown (10YR 5/2) silty clay loam with few, fine, distinct mottles of gray (10YR 6/1) and brownish yellow (10YR 6/6); weak, fine and medium, subangular blocky structure; friable; few, small, black and dark-brown concretions; strongly acid; clear, smooth boundary.

Bg1—9 to 13 inches, mottled light-gray (10YR 7/2), light brownish-gray (2.5Y 6/2), brownish-yellow (10YR 6/2), and strong-brown (7.5YR 5/6) clay; strong, medium and coarse, blocky structure to massive (structureless); continuous clay films; few fine roots; common, small and medium, black concretions; strongly acid; gradual, smooth boundary.

Bg2—13 to 22 inches, mottled light-gray (5Y 7/2), pale-yellow (2.5Y 7/4), yellowish-brown (10YR 5/6), and reddish-yellow (5YR 6/8) clay; massive (structureless); very firm and plastic; many, small and medium, black concretions; strongly acid; gradual, smooth boundary.

Bg3—22 to 26 inches, mottled gray (N 6/0), pale-yellow (2.5Y 7/4), brownish-yellow (10YR 6/6), and reddish-brown (5YR 4/4) clay; massive (structureless); very firm and plastic; common, small and medium, black concretions; strongly acid; gradual, smooth boundary.

Cg—26 to 32 inches, mottled gray (N 6/0), red (2.5YR 5/6), pale-yellow (2.5Y 7/4), and brownish-yellow (10YR 6/6) clay; massive (structureless); very firm and plastic; few 3- to 5-inch slabs of weathered limestone; medium acid.

Dr—32 inches +, argillaceous limestone.

*Melvin series:* In this series are gray, poorly drained soils that developed in level to nearly level alluvium. The alluvium ranges from 20 inches to more than 10 feet in thickness and consists of materials that washed from soils derived chiefly from phosphatic limestone. Melvin soils are dominantly gray throughout, but in many places they are light gray in the upper 2 or 3 feet and consist of more recent, friable alluvium overlying older alluvium that is darker and finer textured. The Melvin soils are closely associated with the Huntington, Lindside, Egam, and Dunning soils and have similar parent material.

Profile of Melvin silt loam, phosphatic, in fescue and whiteclover pasture:

Ap—0 to 7 inches, dark-gray (10YR 4/1) silt loam with common, fine, distinct mottles of brown (7.5YR 5/4) and light yellowish brown (10YR 6/4); weak, fine, granular structure; very friable; many fine roots; few, small, rounded, dark reddish-brown and black concretions; strongly acid; clear, smooth boundary.

Cg1—7 to 12 inches, mottled gray (10YR 6/1), very dark gray (10YR 3/1), and brown (7.5YR 5/4) silt loam; weak, fine, granular structure; friable; common fine roots; common, black and dark reddish-brown concretions; strongly acid; gradual, smooth boundary.

Cg2—12 to 28 inches, mottled very dark grayish-brown (2.5Y 3/2), dark grayish-brown (10YR 4/2), and gray (10YR 5/1) silt loam; weak, fine, granular structure; friable; few fine roots; many, small, black and brown concretions; strongly acid; gradual, smooth boundary.

Cg3—28 to 48 inches +, mottled very dark grayish-brown (2.5Y 3/2), yellowish-brown (10YR 5/8), and yellowish-red (5YR 4/8) silty clay; massive (structureless); firm; many black and brown concretions; medium acid.

#### PLANOSOLS

Planosols are intrazonal soils that have one or more horizons that are cemented, compacted, or high in clay and are abruptly separated from and sharply contrasting to adjoining horizons. These soils have developed under forest or grass in climates that are mesothermal to tropical and perhumid to semiarid. In most places they have developed under the effects of a fluctuating water table. In many places the cemented or compacted horizon lies beneath a B horizon that is moderately well developed to well developed and has a higher percentage of clay than the A horizon (*14*).

The Robertsville and Taft soils are in the Planosol great soil group. These soils amount to less than 1 percent of the total land area in the county.

These soils generally have an eluviated surface horizon underlain by a B horizon that is more strongly illuviated, cemented, or compacted than that of associated zonal soils. They have developed in climate similar to that in which the zonal soils developed, but internally the Planosols are more moist than zonal soils and less well aerated. Podzolization and gleization were the main soil-forming processes in their development. Planosols are generally level or nearly level and have had slow geologic erosion. They are somewhat poorly drained to very poorly drained, and the characteristic fragipan is at a depth of 15 to 30 inches.

*Robertsville series:* These poorly drained soils developed in old alluvium on stream terraces. The alluvium is 2 to 10 feet thick and consists of materials that washed from soils derived mainly from phosphatic limestone. In a few upland depressions, however, the alluvium washed from soils derived from loess and cherty limestone. About one-half of the Robertsville soils have a strongly developed fragipan, and one-half have a gleyed heavy clay subsoil. Slopes range from 0 to 2 percent. The Robertsville soils are closely associated with Taft, Captina, and Armour soils but are more poorly drained than those soils.

Profile of Robertsville silt loam, phosphatic, in a field of small grain:

Ap—0 to 8 inches, grayish-brown (10YR 5/2) silt loam with few, fine, distinct mottles of strong brown (7.5YR 5/6); weak, fine, granular structure; very friable; common fine roots; few, small, dark-brown and black concretions; strongly acid; clear, smooth boundary.

Bg1—8 to 16 inches, gray (10YR 5/1) silt loam with common, medium, distinct mottles of light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6); weak, fine and medium, subangular blocky structure; friable; few fine roots; common, small, black and dark-brown concretions; strongly acid; gradual, smooth boundary.

Bg2—16 to 20 inches, gray (10YR 6/1) heavy silt loam with common, fine and medium, distinct mottles of strong brown (7.5YR 5/6) and light gray (10YR 7/2); weak, medium, subangular blocky structure; friable; common, fine and medium, dark-brown and black concretions; strongly acid; clear, smooth boundary.

B3m1—20 to 30 inches, light brownish-gray (10YR 6/2) light silty clay loam with many, medium, distinct mottles of strong brown (7.5YR 5/6) and light gray (10YR 7/1); massive (structureless); very firm, hard, and compact; many, medium, brown and black concretions; strongly acid; gradual, wavy boundary.

B3m2—30 to 50 inches +, light brownish-gray (10YR 6/2) silty clay loam with many, medium, distinct mottles of strong brown (7.5YR 5/6), light gray (10YR 7/1), and light olive brown (2.5Y 5/4); massive (structureless); very firm, hard, and compact; common, medium, strong-brown and black concretions; strongly acid.

*Taft series:* In the Taft series are somewhat poorly drained soils that have a strong fragipan. These soils developed in old alluvium on stream terraces, toe slopes, and fans. The alluvium ranges from 2 to 10 feet in thickness and in most places consists of materials washed chiefly from soils derived from phosphatic limestone. In some places, however, the alluvium washed from soils derived mainly from loess and cherty limestone, and it may contain varying amounts of chert. Phosphatic and nonphosphatic Taft soils are mapped separately. Slopes range from 0 to 8 percent but are dominantly less than 2 percent. The Taft soils are closely associated with the Robertsville, Captina, Armour, and Humphreys soils and have parent material similar to that of those soils.

Profile of Taft silt loam, 0 to 8 percent slopes, in idle cropland grown up to sedgegrass and volunteer annual lespedeza:

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; many fine roots; common, small, strong-brown and black concretions; strongly acid; clear, smooth boundary.

A2—6 to 8 inches, pale-brown (10YR 6/3) silt loam with common, fine, distinct mottles of dark grayish brown (10YR 4/2); weak, fine, granular structure; very friable; common fine roots; common, small and medium, strong-brown and black concretions; strongly acid; gradual, smooth boundary.

B1—8 to 13 inches, pale-brown (10YR 6/3) heavy silt loam with few to common, fine, distinct mottles of brownish yellow (10YR 6/6); weak, medium, subangular blocky structure; friable; few fine roots; few, small, black and strong-brown concretions; strongly acid; gradual, smooth boundary.

B2—13 to 19 inches, pale-brown (10YR 6/3) silty clay loam with common, fine and medium, distinct mottles of yellowish brown (10YR 5/6) and light gray (2.5Y 7/2); moderate, medium, subangular blocky structure; patchy clay films; friable; common, strong-brown concretions; strongly acid; abrupt, smooth boundary.

B3m1—19 to 28 inches, mottled gray (10YR 5/1), pale-brown (10YR 6/3), reddish-yellow (7.5YR 6/8), and very pale-brown (10YR 7/3) silt loam; massive (structureless); very firm, compact, and hard; common, small and medium, black and brown concretions; strongly acid; gradual, wavy boundary.

B3m2—28 to 36 inches +, mottled gray (10YR 6/1), brownish-yellow (10YR 6/6), and light brownish-gray (10YR 6/2) silty clay loam; massive (structureless); very firm, compact, and hard; many dark-brown and black concretions; strongly acid.

#### RENDZINA SOILS

In the Rendzina great soil group are soils that have a black or very dark-gray surface horizon underlain by light-gray or yellowish, soft, calcareous material. These soils have developed under grass or grass and forest in a humid or semiarid climate (*15*).

The Ashwood and Fairmount soils are the only soils of Williamson County in the Rendzina great soil group, and they amount to about 1 percent of the total land area.

These soils are generally shallow to moderately deep over limestone bedrock. In places they are moderately well drained to somewhat poorly drained because water seeps from higher slopes. They have a relatively thick surface layer that is moderately high in organic matter and a clayey subsoil that is dominantly yellowish brown. These soils are slightly acid to medium alkaline. They have a relatively high cation-exchange capacity and a high percentage of base saturation.

*Ashwood series:* In the Ashwood series are well-drained to somewhat poorly drained soils that developed in residuum weathered from argillaceous phosphatic limestone. Although bedrock generally is at a depth of 20 inches to 4 feet, it crops out in places. The surface layer is dominantly silty clay loam, but in places it is silt loam. In places the soils are moderately well drained to somewhat poorly drained because water seeps from higher slopes. Slopes range from 2 to 20 percent. The Ashwood soils are closely associated with the Mimosa, Maury, Braxton, and Hampshire soils.

Profile of Ashwood silty clay loam, 2 to 5 percent slopes, in a pasture of fescue and whiteclover:

Ap—0 to 6 inches, black (10YR 2/1) light silty clay loam; moderate, fine and medium, granular structure; friable; many fine roots; few, small, dark-brown and black concretions; slightly acid; gradual, smooth boundary.

A3—6 to 11 inches, very dark brown (10YR 2/2) silty clay loam; moderate, medium, granular structure; friable to firm; common fine roots; common, small and medium, black and dark-brown concretions; neutral; clear, wavy boundary.

B2—11 to 21 inches, dark yellowish-brown (10YR 4/4) silty clay; strong, medium and coarse, angular blocky structure; continuous clay films; firm; few fine roots; few, small, black concretions; neutral; gradual, smooth boundary.

C—21 to 29 inches, dark yellowish-brown (10YR 4/4) clay with many, medium, distinct mottles of gray (10YR 6/1) and light olive brown (2.5Y 5/4); strong, coarse, blocky structure or massive (structureless); very firm; slightly alkaline.

Dr—29 inches +, argillaceous, phosphatic limestone.

*Fairmount series:* The soils of this series are moderately well drained, and they have a heavy, plastic clay subsoil. They have developed in residuum weathered from argillaceous limestone and range from 10 inches to 3 feet deep over bedrock. Slopes range from 2 to 10 percent. These soils are closely associated with the Talbott, Hagerstown, and Mercer soils.

Profile of Fairmount silty clay loam, 2 to 10 percent slopes, in forest of redcedar:

A1—0 to 5 inches, very dark grayish-brown (10YR 3/2) light silty clay loam; moderate, fine and medium, granular structure; friable; common, fine and medium tree roots; slightly acid; gradual, smooth boundary.

A3—5 to 7 inches, very dark grayish-brown (2.5Y 3/2) to dark grayish-brown (2.5Y 4/2) silty clay loam with few, fine, distinct mottles of yellowish brown (10YR 5/4); moderate, fine and medium, subangular blocky structure; friable; common, fine and medium tree roots; common, small and medium, dark-brown and black concretions; neutral; clear, smooth boundary.

B2—7 to 10 inches, dark grayish-brown (10YR 4/2) heavy silty clay; many peds coated with dark grayish brown (2.5Y 4/2); strong, medium, blocky structure; continuous clay films; firm to very firm; few, medium and large roots of trees; common, small, dark-brown and black concretions; neutral; boundary clear, wavy.

C—10 to 19 inches, mottled olive-brown (2.5Y 4/4), yellowish-brown (10YR 5/4), and yellowish-red (5YR 4/6) clay; massive (structureless); very firm and plastic; few, medium and large roots of trees; few weathered slabs of limestone, ½ to 6 inches across, in lower part; slightly alkaline.

Dr—19 inches +, argillaceous limestone.

### Azonal order

Soils of the azonal order have little or no profile development, because of their resistant parent material, their steep slopes, or their youth. All azonal soils reflect the effects of environment to a small degree. All have a surface layer or A horizon that is generally dark colored and contains a moderate amount of organic matter. A few of these soils have a thin layer of illuviation, but most have an A horizon directly overlying weathered parent material and are commonly called A-C soils.

The azonal soils in Williamson County are the Alluvial soils, Lithosols, and Regosols.

#### ALLUVIAL SOILS

Alluvial soils are developing in recently deposited alluvium that shows little or no modification by the soil-forming processes. The profiles of these soils lack horizons that are genetically related. Except in areas where the soils are altered by imperfect drainage, they retain many of the characteristics of the original parent material (*15*).

Alluvial soils in Williamson County are on first bottoms, along small drainways, and in depressions. These soils account for about 15 percent of the total land area.

The alluvium in which these soils are developing consists mainly of sediments from eroded soils on uplands. All Alluvial soils in the county have a dark surface layer or A horizon that is moderately high in organic matter and is directly underlain by parent material or a C horizon that has been changed little or none by the soil-forming processes. The few and faint horizons represent the early stages of development.

CENTRAL CONCEPT OF ALLUVIAL SOILS.—The Egam, Huntington, and Lindside series are in the central concept of Alluvial soils.

*Egam series:* The soils in this series have 15 to 30 inches of dark-brown, well drained to moderately well drained recent alluvium that overlies darker, more compact, poorly drained alluvium. In most places in Williamson County the upper part of the Egam soils resembles the Huntington or Lindside soils, and the lower part resembles the Lanton or Dunning soils. The alluvium consists mostly of materials washed from soils derived from phosphatic limestone and is underlain by residuum or bedrock at a depth of 2 to 10 feet. Slopes are dominantly 0 to 2 percent. The Egam soils are closely associated with the Huntington, Lindside, Lanton, and Dunning soils and have parent material similar to that of those soils.

Profile of Egam silt loam, phosphatic, in bermudagrass pasture:

Ap—0 to 10 inches, dark-brown (10YR 3/3) silt loam; weak to moderate, fine, granular structure; very friable; many fine roots; slightly acid; gradual, smooth boundary.

C—10 to 22 inches, dark-brown (10YR 3/3) silt loam; moderate, fine, granular structure; friable; common fine roots; few, small, black concretions; neutral; clear, wavy boundary.

A1b—22 to 26 inches, very dark gray (10YR 3/1) silty clay loam with common, fine, distinct mottles of dark reddish brown (5YR 3/4); weak, fine and medium, subangular blocky structure; firm; few fine roots; few, small, dark-brown and black concretions; neutral; gradual, smooth boundary.

Cb—26 to 40 inches +, black (10YR 2/1) silty clay with common, fine, distinct mottles of dark reddish brown (5YR 3/4), gray (10YR 5/1), and dark grayish brown (2.5Y 4/2); massive (structureless); very firm; common, small and medium, black and dark-brown concretions; slightly alkaline.

*Huntington series:* In this series are well-drained soils that developed in recent alluvium on first bottoms, along small drains, and in depressions. The alluvium ranges from 2 to 10 feet in thickness and consists of materials washed from soils derived largely from limestone on uplands. Phosphatic, cherty, and noncherty Huntington soils are mapped separately. Slopes range from 0 to 5 percent. The Huntington soils are closely associated with Egam, Lindside, Melvin, Lanton, and Dunning soils and have parent material similar to that of those soils.

Profile of Huntington silt loam, phosphatic, in a cornfield:

Ap—0 to 9 inches, dark-brown (10YR 3/3) silt loam; weak, fine, granular structure; very friable; common fine roots; slightly acid; gradual, smooth boundary.

C1—9 to 28 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; common fine roots; slightly acid; gradual, smooth boundary.

C2—28 to 60 inches +, brown (10YR 4/3) silt loam with few, fine, distinct mottles of light yellowish brown (10YR 6/4) and light brownish gray (10YR 6/2); weak, fine and medium, granular structure; friable; few fine roots above a depth of 40 inches; few, small, black concretions; neutral.

*Lindside series:* In this series are moderately well drained soils that developed in recent alluvium on first bottoms, along small drains, and in depressions. The alluvium ranges from 2 to 10 feet in thickness and consists of materials washed from soils derived chiefly from limestone. Cherty, noncherty, phosphatic, and nonphosphatic types are mapped separately. Slopes range from 0 to 5 percent. The Lindside soils are closely associated with the Huntington, Melvin, Egam, Lanton, and Dunning soils and are similar to them in origin of parent material.

Profile of Lindside silt loam, phosphatic, in fescue and annual lespedeza pasture:

Ap—0 to 10 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; many fine roots; slightly acid; gradual, smooth boundary.

C1—10 to 20 inches, dark grayish-brown (10YR 4/2) silt loam with few, fine, faint mottles of yellowish brown (10YR 5/4) and grayish brown (10YR 5/2); weak to moderate, fine, granular structure; friable; common fine roots; few, small, black concretions; neutral; gradual, smooth boundary.

C2—20 to 26 inches, dark-brown (10YR 3/3) heavy silt loam with common, fine and medium, distinct mottles of grayish brown (10YR 5/2), light yellowish brown (10YR 6/4), and gray (5Y 5/1); moderate, fine and medium, granular structure; friable; few fine roots; few, small, black concretions; few pebbles of chert, ¼ to 1 inch across; neutral; gradual, smooth boundary.

Cg1—26 to 46 inches, mottled dark-brown (10YR 3/3), dark grayish-brown (2.5Y 4/2), and grayish-brown (2.5Y 5/2) silty clay loam; weak, medium, subangular blocky structure to massive (structureless); firm; few fine roots above a depth of 36 inches; common, small and medium, strong-brown and black concretions; few pebbles of chert, ¼ to 2 inches across; neutral; clear, wavy boundary.

Cg2—46 to 74 inches +, dark-gray (5Y 4/2) clay interspersed among dark-brown, strong-brown, and black concretions and pebbles of chert, ¼ to 2 inches across; massive (structureless); very firm; gravel makes up about 50 percent of the soil, by volume; slightly alkaline.

ALLUVIAL SOILS GRADING TOWARD HUMIC GLEY SOILS.—Alluvial soils that formed from similar parent materials may differ in drainage and in characteristics that result from differences in drainage. The moderately well drained to somewhat poorly drained Lanton soils are dark colored and have several characteristics of the Humic Gley great soil group and are therefore Alluvial soils grading toward Humic Gley soils.

*Lanton series:* The Lanton series consists of moderately well drained to somewhat poorly drained, dark-colored soils that developed in alluvium on first bottoms, along small drains, and in depressions. The alluvium ranges from 2 to 10 feet in thickness and consists of materials washed from soils derived from limestone. Most Lanton soils have a medium to high content of phosphorus. Slopes range from 0 to 5 percent but are dominantly less than 2 percent. The Lanton soils are closely associated with the Dunning, Egam, Lindside, Huntington, and Sees soils and formed in parent material similar to that of those soils.

Profile of Lanton silt loam, phosphatic, in a field of small grain:

Ap—0 to 9 inches, very dark brown (10YR 2/2) silt loam; moderate, fine, granular structure; friable; many fine roots; slightly acid; gradual, smooth boundary.

C1—9 to 20 inches, black (10YR 2/1) silty clay loam; moderate, medium, granular structure; friable to firm; common fine roots; few, small, black and dark-brown concretions; neutral; gradual, smooth boundary.

C2—20 to 36 inches, black (10YR 2/1) silty clay with few, fine and medium, faint mottles of very dark grayish brown (2.5Y 3/2) and dark gray (5Y 4/1); strong, medium and coarse, blocky structure to massive (structureless) firm; few fine roots; common, small, black and dark-brown concretions; neutral; gradual, smooth boundary.

C3g—36 to 50 inches, mottled dark gray (N 4/0), very dark gray (N 3/0), and olive (5Y 4/3) clay; massive (structureless); very firm; many, small and medium, dark-brown and black concretions; slightly alkaline; gradual, smooth boundary.

Dg—50 to 65 inches +, mottled dark grayish-brown (2.5Y 4/2), dark-gray (N 4/0), very dark gray (N 3/0), and strong-brown (7.5YR 5/6) clay; massive (structureless); very firm; few, small, brown and reddish-brown concretions; few, small, weathered fragments of chert; slightly alkaline.

#### LITHOSOLS

Lithosols have an indistinct solum, or no clearly expressed soil morphology. They are generally on steeply sloping land where geologic erosion is rapid, and they consist primarily of a freshly and incompletely weathered mass of hard rock or hard rock fragments (*14*). In Williamson County, only the Sulphura soils are in this great soil group. The Sulphura soils are shallow and have few, faint horizons. Their position, generally on slopes greater than 20 percent, favors geologic erosion. Shale bedrock is exposed in many places, but in some places the soil is fairly well developed.

*Sulphura series:* In the Sulphura series are excessively drained soils that have developed in shaly residuum mantled by thin cherty creep in most places. Although depth to shale bedrock ranges from 10 to 48 inches, outcrops are common, especially on the steeper slopes. Slopes range from 12 to 50 percent, but the dominant slopes are more than 20 percent. The mantle of cherty creep consists almost entirely of materials from the closely associated Bodine soils on the slopes above the Sulphura soils. The Sulphura soils also are closely associated with the Dellrose soils on the lower slopes in many places.

Profile of Sulphura cherty silt loam, 20 to 50 percent slopes, in a forest of hardwoods:

A00—2 inches to 1 inch, forest litter of leaves and twigs.

A0—1 inch to 0, partly decomposed forest litter.

A1—0 to 4 inches, very dark grayish-brown (10YR 3/2) cherty silt loam; moderate, fine and medium, granular structure; very friable; many fine tree roots; slightly acid; clear, smooth boundary.

A2—4 to 7 inches, dark-brown (10YR 3/3) shaly silt loam; moderate, fine, granular structure; very friable; many, fine and medium tree roots; few angular chert fragments; slightly acid; clear, smooth boundary.

BC—7 to 19 inches, brown (10YR 4/3) heavy shaly silt loam; weak, fine, subangular blocky structure and moderate, medium, granular structure; friable; common, medium and large roots of trees; about 50 percent of the soil, by volume, is weathered fragments of shale; neutral.

Dr—19 inches +, partly weathered calcareous shale.

#### REGOSOLS

The Regosols consist of thick, soft mineral deposits in which few or no clearly expressed soil characteristics have developed. These soils are largely confined to recent sand dunes, and to loess and glacial drift in steeply sloping areas (*14*). Normally, the only horizons are a weak A1 or Ap underlain directly by a C or D horizon. These faint horizons are few and indicate that soil development is in initial stages.

The Bodine series is the only soil series in Williamson County in the Regosol great soil group. The soils of this series amount to about 12 percent of the total land area.

The Bodine soils, dominantly on steep uplands, developed in residuum from cherty limestone. The soils vary from place to place but in most places have a weak A1 or Ap horizon directly over parent material that is highly resistant to weathering. In places, however, there is evidence that a B horizon is beginning to develop. Angular fragments of chert generally make up from 50 to 80 percent of the soil mass. The development of the Bodine soils is weak, mainly because of the highly resistant parent material and the steep slope, which generally is greater than 20 percent.

*Bodine series:* The soils of the Bodine series are cherty and excessively drained. Depth to bedrock of cherty limestone ranges from 18 inches to 5 feet. In the upper part of these soils, the content of chert ranges from 25 to 60 percent, by volume, and in the lower part it is as much as 80 percent in some places. Slopes range from 5 to 45 percent but are dominantly 20 to 45 percent. The Bodine soils are closely associated with the Sulphura, Baxter, Mountview, Humphreys, and Greendale soils.

Profile of Bodine cherty silt loam, 20 to 45 percent slopes, in an area of hardwoods:

A00—2 inches to 1 inch, litter of leaves and twigs.

A0—1 inch to 0, partly decomposed forest litter.

A1—0 to 3 inches, dark grayish-brown (10YR 4/2) cherty silt loam; weak, fine, crumb or granular structure; very friable; many fine roots of trees; strongly acid; clear, smooth boundary.

A2—3 to 7 inches, pale-brown (10YR 6/3) cherty silt loam; weak, fine, granular structure; very friable; many fine and medium roots of trees; strongly acid; gradual, wavy boundary.

BC—7 to 20 inches, yellowish-brown (10YR 5/4) light very cherty silty clay loam; weak, fine and medium, subangular blocky structure; friable; common, fine and few large roots of trees; 40 to 50 percent of the soil, by volume, is angular chert fragments, 2 to 6 inches across; strongly acid; gradual, wavy boundary.

C—20 to 50 inches +, yellowish-brown (10YR 5/6) silty clay loam with common, medium, distinct mottles of reddish yellow (5YR 6/6), strong brown (7.5YR 5/6), and pale brown (10YR 6/3); firm; interspersed among stratified layers of angular chert; chert makes up about 75 percent or more of the soil mass, by volume; strongly acid.

## Chemical and Physical Properties of Soils

Table 9 gives chemical and physical analyses of some of the soils in Williamson County. The profiles shown in the table are described in the previous subsection of this report.

TABLE 9.—*Chemical and physical*

| Soil type | Horizon | Depth | Exchangeable cations (milliequivalents per 100 grams of soil) | | | | | | Total base saturation |
|---|---|---|---|---|---|---|---|---|---|
| | | | Ca | Mg | K | Na | H | Total cation-exchange capacity | |
| | | *Inches* | | | | | | | *Percent* |
| Armour silt loam | Ap | 0–9 | 9. 1 | 0. 5 | 0. 3 | <0. 1 | 5. 9 | 15. 8 | 63 |
| | A3 | 9–17 | 6. 5 | . 8 | . 3 | . 1 | 5. 1 | 12. 8 | 60 |
| | B1 | 17–21 | 6. 3 | 1. 0 | . 3 | . 1 | 5. 3 | 13. 0 | 59 |
| | B2 | 21–29 | 5. 4 | 1. 7 | . 3 | <. 1 | 6. 1 | 13. 5 | 55 |
| | B31 | 29–42 | 4. 0 | 1. 7 | . 4 | <. 1 | 9. 6 | 15. 7 | 39 |
| | B32 | 42–53 | 3. 4 | 1. 6 | . 5 | <. 1 | 13. 3 | 18. 8 | 29 |
| | B33 | 53–65 | 2. 2 | 1. 3 | . 4 | <. 1 | 13. 8 | 17. 7 | 22 |
| | C | 65–80 | 1. 6 | 1. 2 | . 4 | <. 1 | 15. 8 | 19. 0 | 17 |
| Armour silt loam | Ap | 0–7 | 4. 6 | . 5 | . 3 | <. 1 | 6. 5 | 11. 9 | 45 |
| | A3 | 7–13 | 4. 4 | . 7 | . 3 | <. 1 | 5. 9 | 11. 3 | 48 |
| | B1 | 13–20 | 4. 9 | . 8 | . 3 | <. 1 | 6. 1 | 12. 1 | 50 |
| | B21 | 20–24 | 5. 4 | . 8 | . 3 | <. 1 | 6. 3 | 12. 8 | 51 |
| | B22 | 24–37 | 5. 7 | 1. 7 | . 4 | <. 1 | 7. 9 | 15. 7 | 50 |
| | B23 | 37–48 | 4. 6 | 1. 4 | . 4 | <. 1 | 12. 1 | 18. 5 | 34 |
| | B31 | 48–66 | 5. 9 | 1. 7 | . 6 | . 1 | 12. 8 | 21. 1 | 39 |
| | B32 | 66–78 | 6. 9 | 1. 6 | . 5 | . 1 | 12. 8 | 21. 9 | 42 |
| | C | 78–86 | 5. 9 | 1. 2 | . 4 | <. 1 | 14. 0 | 21. 2 | 34 |
| Maury silt loam | Ap | 0–6 | 4. 7 | . 8 | . 4 | . 1 | 7. 4 | 13. 4 | 45 |
| | A2 | 6–12 | 5. 8 | . 9 | . 2 | <. 1 | 5. 3 | 12. 2 | 56 |
| | A3 | 12–18 | 6. 7 | 1. 3 | . 2 | <. 1 | 5. 9 | 14. 1 | 58 |
| | B1 | 18–25 | 6. 5 | 2. 0 | . 2 | . 1 | 6. 9 | 15. 7 | 56 |
| | B21 | 25–37 | 4. 1 | 2. 1 | . 3 | . 1 | 10. 3 | 16. 8 | 39 |
| | B22 | 37–51 | 4. 1 | 2. 3 | . 3 | <. 1 | 18. 2 | 24. 9 | 27 |
| | B2b1 | 51–57 | 3. 8 | 2. 1 | . 3 | <. 1 | 21. 0 | 27. 2 | 23 |
| | B2b2 | 57–76 | 5. 1 | 2. 8 | . 4 | . 1 | 27. 1 | 35. 5 | 24 |
| | Cb1 | 76–101 | 3. 4 | 1. 7 | . 3 | <. 1 | 25. 3 | 30. 7 | 18 |
| Maury silt loam | Ap | 0–7 | 9. 6 | . 5 | . 3 | <. 1 | 4. 9 | 15. 3 | 68 |
| | A2 | 7–11 | 7. 5 | . 5 | . 3 | <. 1 | 4. 7 | 13. 0 | 64 |
| | A3 | 11–19 | 8. 2 | . 8 | . 3 | <. 1 | 5. 5 | 14. 8 | 63 |
| | B21 | 19–27 | 8. 2 | . 8 | . 3 | <. 1 | 7. 3 | 16. 6 | 56 |
| | B22 | 27–37 | 8. 7 | 1. 2 | . 4 | <. 1 | 8. 4 | 18. 7 | 55 |
| | B31 | 37–51 | 8. 9 | 1. 9 | . 5 | <. 1 | 8. 9 | 20. 2 | 56 |
| | B32 | 51–72 | 8. 9 | 2. 4 | . 6 | <. 1 | 10. 1 | 22. 0 | 54 |
| | B33 | 72–88 | 6. 2 | 1. 4 | . 6 | <. 1 | 16. 2 | 24. 4 | 34 |
| | C | 88–101 | 6. 3 | 1. 7 | . 5 | <. 1 | 17. 3 | 25. 8 | 33 |
| Maury silt loam | Ap | 0–7 | 8. 4 | . 9 | . 3 | <. 1 | 4. 7 | 14. 3 | 67 |
| | A3 | 7–11 | 7. 8 | . 4 | . 2 | <. 1 | 4. 7 | 13. 1 | 64 |
| | B1 | 11–16 | 8. 3 | . 5 | . 3 | . 1 | 5. 7 | 14. 9 | 62 |
| | B21 | 16–25 | 7. 3 | 1. 1 | . 3 | . 1 | 8. 9 | 17. 7 | 50 |
| | B22 | 25–40 | 4. 5 | 1. 4 | . 3 | . 1 | 13. 9 | 20. 2 | 31 |
| | B23 | 40–56 | 4. 0 | 1. 6 | . 3 | <. 1 | 16. 2 | 22. 1 | 27 |
| | B31 | 56–69 | 3. 6 | 1. 2 | . 3 | . 1 | 18. 4 | 23. 6 | 22 |
| | B32 | 69–85 | 4. 5 | 1. 0 | . 3 | <. 1 | 17. 6 | 23. 4 | 25 |
| | C1 | 85–112 | 8. 2 | 1. 1 | . 2 | . 1 | 13. 4 | 23. 0 | 42 |
| | C3 | 114–129 | 10. 9 | 1. 0 | . 2 | <. 1 | 13. 5 | 25. 6 | 49 |
| | C4 | 129–139 | 11. 6 | 1. 9 | . 3 | . 1 | 13. 0 | 26. 9 | 52 |
| Maury silt loam | Ap | 0–8 | 6. 3 | . 5 | . 4 | <. 1 | 4. 7 | 11. 9 | 60 |
| | A3 | 8–11 | 5. 9 | 1. 1 | . 3 | <. 1 | 4. 9 | 12. 3 | 60 |
| | B1 | 11–20 | 4. 4 | 1. 5 | . 3 | <. 1 | 7. 3 | 13. 5 | 46 |
| | B21 | 20–28 | 3. 0 | 1. 4 | . 3 | <. 1 | 8. 9 | 13. 6 | 34 |
| | B22 | 28–29 | 2. 4 | 1. 4 | . 4 | <. 1 | 10. 7 | 14. 9 | 28 |
| | B23 | 29–54 | 2. 3 | 1. 4 | . 4 | <. 1 | 13. 7 | 17. 8 | 23 |
| | B24 | 54–64 | 1. 8 | 1. 4 | . 3 | <. 1 | 13. 1 | 16. 6 | 21 |
| | B31 | 64–80 | 1. 6 | 1. 0 | . 3 | <. 1 | 12. 9 | 15. 8 | 18 |
| | B32 | 80–96 | 4. 3 | 2. 3 | . 3 | <. 1 | 24. 1 | 31. 0 | 22 |
| | B33 | 96–114 | 5. 2 | 2. 6 | . 3 | <. 1 | 28. 1 | 36. 4 | 22 |

*properties of some representative soils*

| pH $H_2O$ (1:1) | Organic carbon | Free iron oxide | Soil class and diameter of particles in millimeters: Very coarse sand (2.0–1.0) | Coarse sand (1.0–0.5) | Medium sand (0.5–0.25) | Fine sand (0.25–0.1) | Very fine sand (0.1–0.05) | Silt (0.05–0.002) | Clay (<0.002) | Textural class |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Percent* | *Percent* | *Percent* | *Percent* | *Percent* | *Percent* | *Percent* | *Percent* | *Percent* | |
| 6.0 | 1.41 | 1.5 | 0.3 | 0.4 | 0.4 | 4.5 | 4.4 | 69.8 | 20.2 | Silt loam. |
| 6.0 | .27 | 1.7 | .1 | .3 | .3 | 4.4 | 5.1 | 64.0 | 25.8 | Silt loam. |
| 5.7 | .18 | 1.9 | .4 | .4 | .3 | 4.7 | 5.8 | 62.0 | 26.4 | Silt loam to silty clay loam. |
| 5.4 | .17 | 2.1 | .5 | .5 | .4 | 6.3 | 7.7 | 58.3 | 26.3 | Silt loam to silty clay loam. |
| 4.8 | .10 | 2.6 | .4 | .5 | .5 | 8.2 | 10.4 | 47.0 | 33.0 | Silty clay loam to clay loam. |
| 4.5 | .07 | 2.7 | .3 | .5 | .4 | 7.9 | 10.7 | 43.1 | 37.1 | Silty clay loam to clay loam. |
| 4.3 | .07 | 2.6 | .4 | .6 | .6 | 11.8 | 17.1 | 36.6 | 32.9 | Clay loam. |
| 4.5 | .09 | 2.2 | .3 | .5 | .5 | 13.6 | 21.3 | 29.8 | 34.0 | Clay loam. |
| | | | | | | | | | | |
| 5.6 | .96 | 1.4 | .4 | .4 | .3 | 4.0 | 10.9 | 68.7 | 15.3 | Silt loam. |
| 5.3 | .23 | 1.7 | .3 | .4 | .2 | 3.4 | 10.0 | 63.5 | 22.2 | Silt loam. |
| 5.3 | .13 | 1.9 | .2 | .3 | .2 | 3.8 | 11.7 | 61.0 | 22.8 | Silt loam. |
| 5.5 | .12 | 2.0 | .2 | .3 | .2 | 4.4 | 14.3 | 56.8 | 23.8 | Silt loam. |
| 5.4 | .09 | 2.6 | .2 | .3 | .2 | 4.1 | 16.5 | 48.6 | 30.1 | Clay loam. |
| 4.9 | .06 | 2.8 | .1 | .2 | .1 | 4.0 | 19.3 | 42.3 | 34.0 | Clay loam. |
| 5.0 | .08 | 2.9 | .1 | <.1 | <.1 | 4.4 | 22.7 | 39.4 | 33.4 | Clay loam. |
| 5.0 | .06 | 2.8 | .1 | .1 | .1 | 7.4 | 26.1 | 36.7 | 29.5 | Clay loam. |
| 5.0 | .08 | 2.2 | .3 | .7 | .5 | 11.9 | 27.2 | 33.7 | 25.7 | Loam. |
| | | | | | | | | | | |
| 5.2 | .87 | 1.7 | .5 | 1.0 | .5 | 8.4 | 6.9 | 65.9 | 16.8 | Silt loam. |
| 5.8 | .18 | 2.2 | .4 | .8 | .4 | 5.3 | 5.0 | 64.0 | 24.1 | Silt loam. |
| 6.0 | .15 | 2.6 | 1.5 | 1.1 | .4 | 6.1 | 5.2 | 58.4 | 27.3 | Silty clay loam. |
| 5.8 | .12 | 3.1 | 1.4 | 1.0 | .5 | 7.4 | 6.6 | 51.6 | 31.5 | Silty clay loam. |
| 5.2 | .10 | 4.5 | 1.0 | 1.1 | .5 | 7.7 | 6.6 | 38.3 | 44.8 | Clay. |
| 4.8 | .11 | 6.0 | 1.8 | 1.4 | .6 | 7.2 | 6.2 | 27.8 | 55.0 | Clay. |
| 4.7 | .09 | 7.8 | 2.5 | 2.6 | 1.1 | 7.2 | 7.2 | 24.8 | 54.6 | Clay. |
| 5.1 | .07 | 9.4 | 2.4 | 2.2 | 1.4 | 5.4 | 5.6 | 19.7 | 63.3 | Clay. |
| 4.4 | .11 | 7.1 | .2 | .5 | .6 | 23.1 | 4.6 | 7.4 | 63.6 | Clay. |
| | | | | | | | | | | |
| 6.4 | 1.13 | 1.8 | .5 | 1.0 | .6 | 2.7 | 3.9 | 70.3 | 21.0 | Silt loam. |
| 6.2 | .28 | 2.4 | .6 | 1.0 | .4 | 1.9 | 3.0 | 64.8 | 28.3 | Silty clay loam. |
| 6.1 | .20 | 2.9 | 1.3 | 1.6 | .5 | 2.1 | 3.1 | 62.1 | 29.7 | Silty clay loam. |
| 5.8 | .14 | 3.5 | 1.5 | 1.5 | .5 | 2.5 | 3.8 | 54.4 | 35.8 | Silty clay loam. |
| 5.5 | .16 | 4.3 | 1.2 | 1.7 | .6 | 2.7 | 4.0 | 45.9 | 43.9 | Silty clay. |
| 5.7 | .11 | 5.0 | 1.8 | 2.0 | .6 | 2.6 | 4.0 | 39.4 | 49.6 | Clay. |
| 5.6 | .09 | 5.4 | 1.6 | 2.4 | .6 | 2.7 | 4.3 | 35.2 | 53.2 | Clay. |
| 4.7 | .09 | 6.3 | 1.2 | 2.0 | .6 | 2.4 | 4.2 | 29.2 | 60.4 | Clay. |
| 4.8 | .07 | 6.6 | 1.1 | 2.1 | .7 | 2.3 | 4.0 | 27.7 | 62.1 | Clay. |
| | | | | | | | | | | |
| 6.6 | 1.12 | 1.6 | 1.5 | 1.5 | .7 | 13.2 | 8.1 | 58.1 | 16.9 | Silt loam. |
| 6.7 | .47 | 2.2 | 1.2 | 1.6 | .7 | 11.2 | 7.4 | 56.6 | 21.3 | Silt loam. |
| 6.6 | .35 | 2.6 | 1.8 | 1.7 | .9 | 13.1 | 8.3 | 42.9 | 31.3 | Clay loam. |
| 6.0 | .25 | 3.3 | 1.0 | 1.1 | .6 | 12.6 | 6.9 | 42.9 | 34.9 | Clay loam. |
| 5.0 | .15 | 3.9 | 1.3 | 1.3 | .6 | 14.8 | 6.9 | 33.7 | 41.4 | Clay. |
| 5.1 | .09 | 4.4 | 1.0 | 1.5 | .7 | 19.7 | 7.1 | 26.7 | 43.3 | Clay. |
| 4.8 | .13 | 5.3 | 1.0 | 2.0 | 1.1 | 22.8 | 12.4 | 14.2 | 46.5 | Clay. |
| 4.8 | .09 | 5.7 | 3.7 | 3.9 | 2.0 | 18.0 | 19.9 | 10.7 | 41.8 | Silty clay. |
| 5.1 | .06 | 4.7 | 1.6 | 2.4 | 1.7 | 29.5 | 12.0 | 10.4 | 42.4 | Silty clay. |
| 5.2 | .07 | 5.1 | 3.9 | 2.5 | 1.0 | 13.6 | 16.1 | 14.0 | 48.9 | Clay. |
| 4.9 | .05 | 5.8 | .3 | .8 | .8 | 3.1 | 3.5 | 28.9 | 62.6 | Clay. |
| | | | | | | | | | | |
| 6.5 | .58 | 2.2 | 1.3 | 2.1 | 1.0 | 5.2 | 6.0 | 62.8 | 21.6 | Silt loam. |
| 6.2 | .30 | 2.8 | 1.9 | 2.0 | .7 | 3.7 | 4.9 | 60.2 | 26.6 | Silt loam. |
| 5.4 | .09 | 3.4 | 3.0 | 2.4 | .8 | 4.1 | 5.5 | 55.3 | 28.9 | Silty clay loam. |
| 5.0 | .09 | 3.8 | 2.8 | 2.4 | .8 | 4.8 | 6.5 | 47.1 | 35.6 | Silty clay loam. |
| 4.8 | .11 | 4.3 | 2.6 | 2.4 | .7 | 5.4 | 6.8 | 41.7 | 40.4 | Silty clay. |
| 4.9 | .11 | 4.9 | 2.4 | 2.4 | .8 | 5.9 | 6.6 | 35.3 | 46.6 | Clay. |
| 4.9 | .07 | 4.9 | 2.1 | 2.4 | .8 | 7.1 | 7.7 | 37.4 | 42.5 | Clay. |
| 4.9 | .04 | 5.3 | 4.6 | 2.4 | 1.0 | 8.1 | 7.9 | 39.6 | 35.4 | Clay loam. |
| 4.8 | .08 | 9.4 | 2.1 | 1.9 | .8 | 7.7 | 5.1 | 20.0 | 62.4 | Clay. |
| 4.8 | .08 | 9.1 | 1.6 | 1.5 | 1.0 | 13.0 | 5.8 | 15.5 | 61.6 | Clay. |

689-560—64——10

TABLE 9.—*Chemical and physical properties*

| Soil type | Horizon | Depth | Exchangeable cations (milliequivalents per 100 grams of soil) | | | | | | Total base saturation |
|---|---|---|---|---|---|---|---|---|---|
| | | | Ca | Mg | K | Na | H | Total cation-exchange capacity | |
| | | *Inches* | | | | | | | *Percent* |
| Stiversville silt loam | Ap | 0–8 | 4. 4 | 0. 7 | 0. 3 | 0. 1 | 7. 6 | 13. 1 | 42 |
| | B1 | 8–14 | 5. 3 | . 4 | . 2 | <. 1 | 9. 6 | 15. 5 | 38 |
| | B21 | 14–23 | 6. 3 | . 4 | . 2 | <. 1 | 10. 2 | 17. 1 | 40 |
| | B22 | 23–33 | 6. 0 | . 5 | . 2 | <. 1 | 15. 6 | 22. 3 | 30 |
| | B3 | 33–41 | 11. 2 | . 9 | . 3 | <. 1 | 22. 5 | 34. 9 | 36 |
| Stiversville silt loam | Ap | 0–9 | 6. 5 | . 5 | . 3 | <. 1 | 7. 6 | 14. 9 | 49 |
| | A3 | 9–13 | 6. 9 | . 5 | . 2 | <. 1 | 7. 0 | 14. 6 | 52 |
| | B1 | 13–19 | 6. 5 | . 4 | . 2 | <. 1 | 7. 0 | 14. 1 | 50 |
| | B21 | 19–27 | 6. 8 | . 4 | . 2 | . 1 | 7. 2 | 14. 7 | 51 |
| | B22 | 27–34 | 7. 0 | . 7 | . 2 | . 1 | 8. 1 | 16. 1 | 50 |
| | B23 | 34–40 | 8. 1 | 1. 0 | . 4 | . 1 | 11. 1 | 20. 7 | 46 |
| | B3 | 40–45 | 8. 2 | 1. 1 | . 5 | . 1 | 10. 1 | 26. 0 | 38 |
| | C | 45–50 | 6. 9 | . 8 | . 5 | . 1 | 20. 5 | 28. 8 | 29 |
| Talbott silt loam [1] | Ap | 0–6 | 2. 1 | . 3 | . 2 | <. 1 | 3. 7 | 6. 3 | 41 |
| | B21 | 6–13 | 3. 7 | . 7 | . 2 | <. 1 | 5. 3 | 9. 9 | 46 |
| | B22 | 13–21 | 2. 2 | . 6 | . 2 | <. 1 | 9. 8 | 12. 8 | 23 |
| | B23 | 21–31 | 2. 6 | . 8 | . 2 | . 1 | 19. 0 | 22. 7 | 16 |
| | B24 | 31–41 | 2. 5 | . 8 | . 3 | . 1 | 20. 8 | 24. 5 | 15 |
| | B3 | 41–49 | 3. 6 | . 9 | . 3 | . 1 | 21. 9 | 26. 8 | 18 |
| | C1 | 49–69 | 10. 0 | 1. 7 | . 4 | . 1 | 19. 4 | 31. 6 | 39 |
| | C2 | 69–80 | 28. 9 | 3. 7 | . 3 | . 1 | 4. 8 | 37. 8 | 87 |
| | (2) | (2) | 31. 4 | 4. 9 | . 4 | . 2 | 6. 2 | 43. 1 | 86 |
| Talbott silt loam | AP | 0–5 | 6. 5 | 1. 3 | . 5 | <. 1 | 5. 7 | 14. 1 | 60 |
| | B1 | 5–7 | 10. 6 | 2. 0 | . 3 | <. 1 | 7. 5 | 20. 5 | 63 |
| | B21 | 7–15 | 15. 2 | 2. 0 | . 4 | . 1 | 7. 6 | 25. 3 | 70 |
| | B23 | 15–23 | 10. 4 | 1. 6 | . 4 | . 1 | 16. 2 | 28. 7 | 44 |
| | B31 | 23–38 | 7. 1 | 1. 5 | . 4 | <. 1 | 16. 2 | 25. 3 | 36 |
| | B32 | 38–47 | 13. 8 | 2. 8 | . 5 | . 1 | 12. 9 | 30. 1 | 57 |
| | C1 | 47–56 | 37. 6 | 7. 0 | . 5 | . 1 | 3. 2 | 48. 5 | 93 |

[1] Correlated as Talbott silty clay loam. [2] Clay over rock.

# General Nature of the County

This section describes briefly the establishment and population of the county; the geology, relief, and drainage; the climate; the agriculture; and other subjects of general interest.

## Establishment and Population

Williamson County, once a part of Davidson County, was established by an act of the General Assembly on October 28, 1799 (*7*). By the same act, Franklin was established as the county seat. The frontier development of the Nashville region set the pattern for the development of Williamson County.

In 1960 the population was approximately 28 percent urban, 37 percent rural nonfarm, and 35 percent rural farm, according to the United States Bureau of the Census. From 1930 to 1940, the population increased from 22,845 to 25,220. In 1945 when part of the county was annexed to Rutherford County, the population of Williamson County, especially the rural farm population, decreased. By 1960, however, the total population had reached 25,267. From 1940 to 1960, the rural-farm population decreased at least 30 percent, but the urban and nonfarm population increased about 12 percent. The population is fairly well distributed, except in the highly dissected and wooded areas of the Highland Rim in the western part of the county. These areas are sparsely populated. Franklin, the principal town, had a population of 6,977 in 1960, according to the Bureau of the Census.

## Geology, Relief, and Drainage

Williamson County is underlain by sedimentary rocks ranging from the Mississippian to the Ordovician. These rocks deviate only slightly from the horizontal. The present relief and drainage are the results of the Cincinnati anticline, which caused arching of the strata and increased geologic erosion.

The county is divided into four main physiographic divisions. They are (1) the Highland Rim, (2) the outer Central Basin, (3) the inner Central Basin, and (4) the terraces and bottom lands of the Harpeth River Valley.

The Highland Rim is a maturely dissected plain that crosses the western part of the county from north to south.

*of some representative soils*—Continued

| ph $H_2O$ (1:1) | Organic carbon | Free iron oxide | Soil class and diameter of particles in millimeters | | | | | | | Textural class |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Very coarse sand (2.0–1.0) | Coarse sand (1.0–0.5) | Medium sand (0.5–0.25) | Fine sand (0.25–0.1) | Very fine sand (0.1–0.05) | Silt (0.05–0.002) | Clay (<0.002) | |
| | *Percent* | *Percent* | *Percent* | *Percent* | *Percent* | *Percent* | *Percent* | *Percent* | *Percent* | |
| 5. 8 | 0. 80 | 1. 7 | 1. 1 | 1. 5 | 1. 1 | 23. 6 | 8. 1 | 48. 3 | 16. 3 | Loam. |
| 5. 6 | . 28 | 1. 8 | . 8 | . 9 | . 6 | 14. 5 | 5. 2 | 55. 1 | 22. 9 | Silt loam. |
| 5. 6 | . 17 | 2. 0 | 1. 2 | 1. 2 | 1. 0 | 15. 7 | 5. 6 | 50. 3 | 25. 0 | Silt loam. |
| 5. 2 | . 08 | 2. 7 | 2. 7 | 2. 0 | 1. 6 | 17. 5 | 5. 8 | 42. 0 | 28. 4 | Clay loam. |
| 5. 0 | . 12 | 4. 2 | 1. 6 | 2. 6 | 3. 8 | 23. 0 | 5. 7 | 20. 4 | 42. 9 | Clay. |
| 6. 1 | 1. 23 | 1. 4 | . 8 | . 7 | . 5 | 12. 9 | 7. 4 | 61. 8 | 15. 9 | Silt loam. |
| 6. 0 | . 93 | 1. 6 | . 7 | . 6 | . 4 | 11. 9 | 6. 9 | 59. 0 | 20. 5 | Silt loam. |
| 6. 0 | . 35 | 1. 8 | . 5 | . 6 | . 5 | 11. 9 | 6. 7 | 57. 2 | 22. 6 | Silt loam. |
| 6. 0 | . 22 | 2. 0 | . 8 | . 7 | . 5 | 12. 2 | 6. 8 | 55. 4 | 23. 6 | Silt loam. |
| 6. 0 | . 13 | 2. 2 | 1. 2 | 1. 0 | . 7 | 14. 3 | 7. 3 | 50. 6 | 24. 9 | Silt loam. |
| 5. 9 | . 13 | 2. 7 | 2. 7 | 1. 7 | 1. 1 | 16. 3 | 7. 4 | 42. 4 | 28. 4 | Clay loam. |
| 5. 5 | . 15 | 3. 1 | 2. 7 | 2. 1 | 1. 6 | 19. 1 | 7. 7 | 37. 5 | 29. 3 | Clay loam. |
| 5. 1 | . 16 | 3. 3 | 3. 5 | 3. 9 | 3. 6 | 26. 2 | 7. 5 | 25. 2 | 30. 1 | Clay loam. |
| 5. 6 | . 67 | 2. 0 | 2. 6 | 1. 7 | 1. 0 | 9. 4 | 22. 1 | 53. 3 | 9. 9 | Silt loam. |
| 5. 2 | . 23 | 2. 8 | 1. 7 | 1. 1 | . 6 | 5. 1 | 11. 3 | 55. 3 | 24. 9 | Silt loam. |
| 4. 9 | . 13 | 3. 4 | 2. 4 | 1. 1 | . 6 | 4. 6 | 11. 4 | 48. 8 | 31. 1 | Clay loam to silty clay loam. |
| 5. 0 | . 13 | 5. 3 | . 7 | . 9 | . 5 | 4. 3 | 10. 2 | 33. 9 | 49. 5 | Clay. |
| 4. 7 | . 13 | 5. 5 | . 8 | 1. 0 | . 7 | 3. 8 | 10. 0 | 31. 0 | 52. 7 | Clay. |
| 4. 6 | . 10 | 5. 4 | . 8 | 1. 1 | . 6 | 4. 2 | 9. 9 | 29. 5 | 53. 9 | Clay. |
| 4. 7 | . 10 | 4. 8 | . 5 | . 8 | . 8 | 2. 8 | 5. 8 | 24. 9 | 64. 4 | Clay. |
| 6. 0 | . 04 | 4. 4 | . 4 | . 8 | . 9 | 4. 4 | 8. 3 | 21. 6 | 63. 6 | Clay. |
| 5. 9 | . 11 | 5. 8 | . 4 | . 4 | . 4 | 2. 0 | 3. 9 | 17. 1 | 75. 8 | Clay. |
| 5. 8 | 1. 37 | 2. 1 | 2. 1 | 2. 0 | 1. 1 | 4. 8 | 11. 0 | 61. 7 | 17. 3 | Silt loam. |
| 5. 8 | . 50 | 3. 5 | 2. 2 | 1. 8 | . 9 | 2. 9 | 8. 2 | 48. 3 | 35. 7 | Silty clay loam |
| 5. 6 | . 34 | 4. 3 | 1. 1 | 1. 2 | . 7 | 2. 7 | 7. 6 | 38. 5 | 48. 2 | Clay. |
| 4. 7 | . 18 | 4. 1 | . 7 | . 8 | . 6 | 2. 7 | 7. 8 | 32. 9 | 54. 5 | Clay. |
| 4. 9 | . 09 | 3. 8 | . 8 | . 9 | . 6 | 2. 9 | 9. 3 | 37. 3 | 48. 2 | Clay. |
| 5. 1 | . 10 | 4. 2 | . 6 | . 6 | . 5 | 2. 5 | 8. 3 | 31. 9 | 55. 6 | Clay. |
| 7. 1 | . 14 | 4. 5 | . 4 | . 7 | . 6 | 2. 1 | 5. 1 | 28. 2 | 62. 9 | Clay. |

Knobs and isolated, high, rounded hills that are remnants of the Highland Rim extend throughout the central and eastern parts of the county.

Level-bedded rock formations that resist weathering underlie the Highland Rim. Fort Payne chert is the main surface rock. The lower, shaly facies of Fort Payne chert and Chattanooga black shale are exposed in many places on the steeper slopes. A thin mantle of loess covers the broader, less highly dissected areas.

The slopes of the Highland Rim range from 0 to more than 40 percent. The steepest or roughest parts are along the edge of the rim, bordering the Central Basin, and are called the Highland Rim escarpment. The elevation of the county ranges from about 1,200 feet in the eastern part to about 800 feet in the western part, the Cincinnati anticline accounting for the difference in elevation of 300 to 400 feet.

The base of the Chattanooga shale is generally accepted as the boundary between the Highland Rim and the Central Basin.

The Central Basin extends from the base of the Highland Rim through the eastern two-thirds of the county. Erosion was hastened by the lifting of the Cincinnati anticline, the center of which is to the east of the county. After the resistant chert and shale of the Highland Rim were removed, the Central Basin was formed when the relatively soluble underlying limestones were rapidly removed.

The Central Basin is subdivided into the outer Central Basin and the inner Central Basin on the basis of phosphorus content of the limestone formations underlying the area.

The outer Central Basin is below the Highland Rim and separates the rim from the inner Central Basin. The outer Central Basin is underlain by the Leipers, Catheys, Cannon, Bigby, and Hermitage rock formations. These formations consist of limestone that is relatively free of chert and is medium to high in phosphorus. In places the Bigby and Hermitage formations yield commercial phosphate. The base of the Hermitage formation marks the boundary between the outer Central Basin and the inner Central Basin.

The outer Central Basin ranges in slope from 0 to more than 30 percent, and most of it is less dissected and more nearly level than the Highland Rim. Elevation ranges from about 700 feet to about 1,000 feet. Near the tops of the many steep, isolated hills scattered throughout this area, there are remnants of chert and shale similar to the rocks of the Highland Rim.

The inner Central Basin is divided into fairly small, widely separated areas that are distributed throughout the eastern half of the county. The largest areas are near Nolensville, Duplex, Flat Creek, Kirkland, and Arrington.

The rocks of the inner Central Basin are nonphosphatic limestone that is relatively free of chert. They are of the Carters, Lebanon, and Ridley formations. The Ridley is the lowest formation exposed in the county.

The relief of the inner Central Basin is milder than that of the outer Central Basin. Most of the slopes are less than 12 percent. Elevation ranges from about 550 feet to about 800 feet, the lowest point being along Mill Creek at the Davidson County line. Common to this area are soils derived from limestone and nearly flat, rocky areas called glades.

The terraces and bottom lands in the county are along the Harpeth River, its tributaries, and other creeks and streams. The high stream terraces are above the level of overflow and are gently sloping to rolling. Most of the bottom lands and low stream terraces are on the gently sloping to nearly level areas in the meanders of the streams. In these areas most of the soils have a medium to high content of phosphorus.

Extending through the southern part of the county from east to west, the Duck River Ridge forms the watershed between the Cumberland River and Tennessee River. Rutherford, Flat, Carter, and Lick Creeks head in the southern part of the county and flow generally southwestward to the Duck River. Mill Creek heads in the northeastern part of the county and flows northward to the Cumberland River. The principal drainage of the county is from southeast to northwest by the Harpeth River and its tributaries, which flow into the Cumberland River.

## Natural Resources

Perennial streams, springs, farm ponds, and drilled wells provide an adequate supply of water for livestock, industry, and domestic use. Springs are abundant in the valleys of the Highland Rim where their floors are on or below the Chattanooga shale. Springs are less numerous in the outer Central Basin and are scarce in the inner Central Basin. In these areas, artificial lakes, farm ponds, and wells are the main sources of water.

Brown phosphate, formed by the weathering of phosphatic limestone, is the most abundant mineral deposit in the county. Most deposits are in the more gently sloping areas of the outer Central Basin in the eastern two-thirds of the county. Some galena, or lead deposits, have been found near Nolensville (*5*). Lead was mined in this area during World War I, but the mines were abandoned shortly after the war. Some uranium is contained in the Chattanooga shale, which outcrops around the fringe and on the flanks of the higher hills within the outer Central Basin. Extensive studies, however, indicate that deposits of uranium suitable for commercial mining have not been discovered in the county.

The limestone that underlies all of the county is abundant and easily accessible for industrial and agricultural use (fig. 33). Chert immediately underlies the soils on the Highland Rim in the western part of the county and provides a fair roadbuilding material that is used for some rural roads.

***Figure 33.*—A limestone quarry, the source of limestone for building roads, for farming, and for other uses.**

Williamson County was originally covered by a deciduous forest, but this source of forest products decreased when most of the soils suitable for cultivation were gradually cleared. The present forests amount to about 83,000 acres and are mainly on the Highland Rim. Most of these areas are covered by upland hardwoods, chiefly oak, hickory, and poplar, and have been heavily cut over, grazed, and burned. A less extensive forest of cedar and hardwoods covers most of the very rocky and shallow soils in the eastern two-thirds of the county. Although the county is primarily agricultural, many farmers supplement their farm income by the sale of forest products. Many areas of the county should remain in forest and many areas should be reforested, but better management than that prevailing is needed to improve the productivity of these areas.

## Climate [5]

The climate of Williamson County is characterized by mild winters, warm summers, and abundant rainfall. Although the county is not near a large body of water, it is far enough east to be influenced by air masses from the Gulf of Mexico and far enough north to be frequently traversed by cold air masses from northern regions. Consequently, seasonal and even daily variations in temperature and humidity are great.

Most of Williamson County is in the Central Basin, an extensive agricultural section of middle Tennessee. The county is composed of rolling farmland, flat river valleys, and many hills and ridges. Although most of the county is 600 to 800 feet above sea level, many of the hills and ridges are more than 1,000 feet above sea level. Differences in elevation may cause some local differences in daily weather, but they do not cause major differences in

[5] This subsection was written by M. H. BAILEY, State climatologist, U.S. Weather Bureau, Nashville, Tennessee.

climate. Therefore, the data on climate at Franklin, which is in the Harpeth River Valley at an elevation of 670 feet, is representative of the entire county. These data are given in table 10.

### *Temperature*

The average annual temperature at Franklin is 59° F. A temperature above 100° in summer is rare, and extremely cold spells in winter seldom last more than a few days. As shown in table 10, the average lowest daily temperature ranges from about 31° in winter to about 66° in summer. The average highest daily temperature ranges from 51° in winter to about 90° in summer. Temperature extremes were 107° and −18° during the period 1931 to 1960.

At Franklin, April 12 is the average date of the last freeze in spring, and October 21 is the average date of the first freeze in fall. The interval between these dates, which is the growing season, is 192 days. Figure 34 shows the probabilities of the temperature dropping to 32° F., 28°, or 24° after any given date in spring. For example, suppose you wish to find the last date in spring on which a temperature of 28° or less can be expected with a 20 percent probability (2 years in 10). Start with the probability of 20 percent at the top of the graph and follow the vertical line down until it intersects the line labeled 28° F. From this point, follow the horizontal line to the left margin and you will see the date is about April 9. The probabilities of freezing temperature before any given date in fall are shown in figure 35. To find the earliest

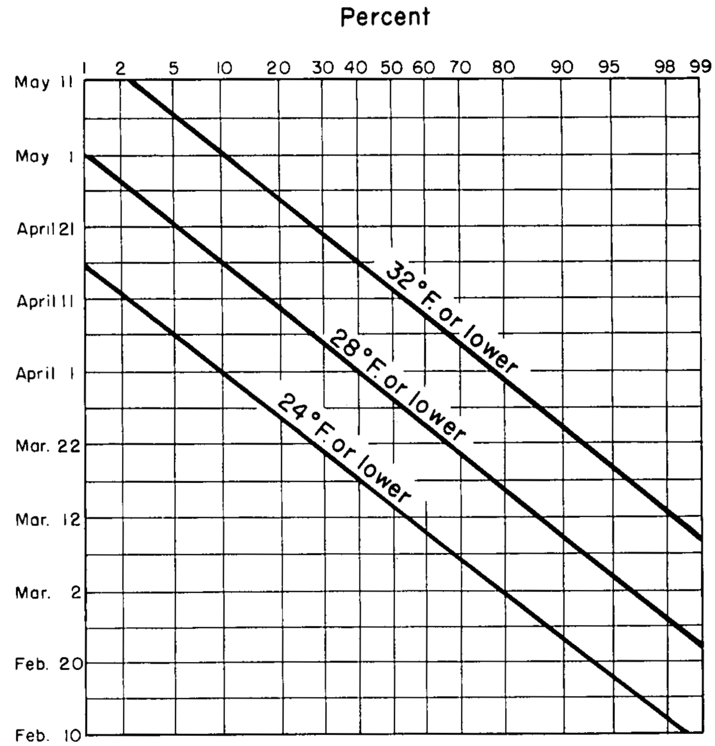


*Figure 34.*—**Probability that the temperature at Franklin will be 24° F. or lower, 28° or lower, or 32° or lower after any given date in spring.**

TABLE 10.—*Temperature and precipitation for Franklin, Williamson County, Tenn.*

[Elevation 670 feet; latitude 35°56′ N., longitude 86°52′ W.]

| Month | Temperature [1] | | | | Precipitation | | | |
|---|---|---|---|---|---|---|---|---|
| | Average daily maximum [2] | Average daily minimum [2] | Two years in 10 will have at least 4 days with—: Maximum temperature equal to or higher than [2]— | Two years in 10 will have at least 4 days with—: Minimum temperature equal to or lower than [2]— | Average monthly total [3] | One year in 10 will have—: Less than [3]— | One year in 10 will have—: More than [3]— | Average snowfall [4] |
| | °F. | °F. | °F. | °F. | Inches | Inches | Inches | Inches |
| January | 51. 0 | 31. 3 | 68 | 11 | 5. 61 | 1. 7 | 10. 6 | 2. 6 |
| February | 52. 7 | 31. 4 | 68 | 16 | 5. 09 | 1. 3 | 9. 8 | 1. 2 |
| March | 61. 0 | 37. 9 | 77 | 22 | 5. 32 | 2. 2 | 8. 0 | . 5 |
| April | 70. 5 | 46. 0 | 83 | 31 | 4. 01 | 2. 1 | 6. 1 | (5) |
| May | 79. 8 | 54. 8 | 91 | 41 | 3. 81 | 1. 2 | 7. 9 | 0 |
| June | 88. 5 | 63. 7 | 98 | 53 | 3. 50 | . 9 | 6. 6 | 0 |
| July | 90. 2 | 66. 6 | 98 | 58 | 3. 85 | 1. 7 | 7. 2 | 0 |
| August | 89. 5 | 66. 0 | 98 | 57 | 3. 72 | 1. 3 | 7. 2 | 0 |
| September | 84. 0 | 58. 4 | 94 | 43 | 2. 77 | . 8 | 5. 3 | 0 |
| October | 74. 8 | 46. 9 | 87 | 32 | 2. 47 | . 8 | 5. 7 | (5) |
| November | 60. 1 | 36. 7 | 75 | 21 | 3. 58 | 1. 4 | 7. 5 | . 4 |
| December | 50. 6 | 30. 7 | 71 | 15 | 4. 30 | 1. 6 | 7. 5 | 1. 0 |
| Year | 71. 1 | 47. 5 | [6] 100 | [6] 3 | 48. 03 | 35. 7 | 59. 0 | 5. 7 |

[1] Temperatures referred to in this summary were measured in standard Weather Bureau instrument shelters with thermometer 4.5 feet above the ground. On clear, calm nights temperature at shelter level usually will be about 5 degrees warmer than the air temperature near the ground, but this difference can be as much as 12 degrees.

[2] From data available for 20 years between 1931 and 1952.

[3] From 1931 to 1960.

[4] From data available for 17 years between 1931 and 1952.

[5] Trace.

[6] Average annual extremes in years between 1931 and 1952.

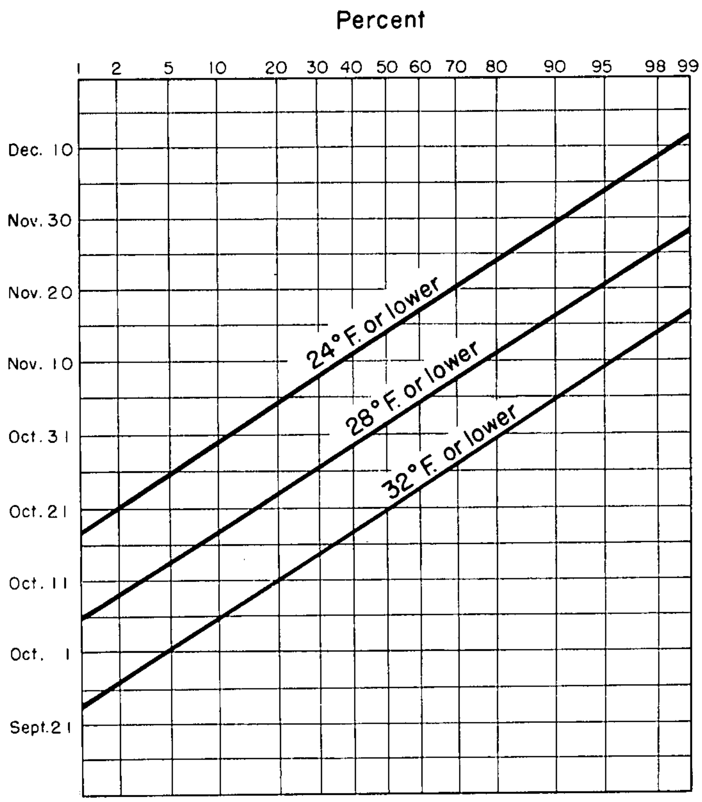


***Figure 35.*—Probability that the temperature at Franklin will be 24° F. or lower, 28° or lower, or 32° or lower before any given date in fall.**

date of a freeze at a selected probability, read downward from the top of the graph to the desired fall temperature line, and then to the left margin for the date.

The growing period is long enough for corn, tobacco, vegetables, and other crops to be planted over a period of a few weeks and still have time to mature. The winters are mild enough so that small grains that are sown in fall survive well and furnish some grazing for livestock during the winter months. During many days in winter the temperature is high enough for pastures to make substantial growth.

A light freeze between 28° and 32° does little or no damage to most plants, but it may destroy tomatoes, peppers, and other tender plants (*3*). Plants that have been hardened by drought or by low temperatures on sunny days may escape damage. A light freeze may destroy anthers in small grains. It may also destroy pistils and anthers of strawberries and other flowering crops, thereby cutting production but causing little or no evident damage to the plants themselves.

A moderate freeze between 24° and 28° does some damage to most plants. It heavily damages fruit blossoms and semihardy plants, and it may destroy tender plants.

A severe freeze of 24° or lower does heavy damage to all plants.

### Precipitation

Williamson County receives an average annual rainfall of 48 inches, which is enough moisture for farming and related activities. During the period 1931 to 1960, the total annual rainfall at Franklin ranged from 31.03 inches in 1941 to 65.60 inches in 1957. As shown in table 10, precipitation is greatest in winter and early in spring. In this period low pressure areas pass more frequently over the State. In summer when local showers and thunderstorms are most frequent, precipitation is near the monthly average. Precipitation is lightest in the fall because in that season high pressure areas pass more frequently over the State. Table 10 indicates that some months of the growing season have less than 1 inch of rainfall during 1 year in 10 and that each month has 5 inches or more during 1 year in 10. Thus, although there are periods of dry weather, there are also periods of ample rainfall in all seasons, as well as periods of excessive rainfall.

At Franklin the maximum 24-hour precipitation was 5.85 inches in March 1902. Maximum precipitation in 24 hours at nearby stations was 4.62 inches at Dickson, 6.36 inches at Murfreesboro, and 6.05 inches at Nashville. During the period 1931–1960, the maximum monthly precipitation at Franklin was 15.09 inches in January 1960.

### The water balance

The growth of plants depends to a large degree on the amount of available moisture, or the water balance, in the soil. By knowing the average monthly water balance in the soil, it is possible to anticipate periods of moisture deficit and periods of moisture surplus and to know when irrigation will probably be needed. The average monthly water balance for Franklin, Tennessee, is shown on the graph in figure 36. This balance was computed by the Thornthwaite method (*13*), and available soil moisture at field moisture capacity was assumed to be 4 inches per foot. Definitions of some terms used on the graph are given in the following paragraph.

Field moisture capacity is the greatest amount of moisture that a soil holds 2 or 3 days after a soaking rain. The water balance in soil is the amount of moisture available to plants, or the amount of moisture received minus the amount of moisture lost. Evapotranspiration is the loss of moisture by evaporation and by transpiration through the leaves and stems of plants. Potential evapotranspiration is an estimate of the amount of moisture that will be lost from a soil that has a good cover of growing plants. Actual evapotranspiration is the actual amount of moisture lost; it is the same as potential evapotranspiration when the soil is at field moisture capacity, but is less when the soil is partly dry. As the soil dries it holds moisture more tightly and the rate of evapotranspiration is slower.

Figure 36 shows that from January through May of the average year, precipitation exceeds actual evapotranspiration. From June through September, actual evapotranspiration exceeds precipitation. Near the end of September, 3.47 inches of the original 4 inches of available water have been removed from the soil. By October, precipitation again exceeds evapotranspiration and begins to replace the moisture lost during the summer. This replacement is completed early in December, and again there is a surplus of precipitation over evapotranspiration. This excess precipitation is lost from the soil by surface or subsurface runoff.

The moisture conditions shown in figure 36 are for the end of each month; variations for shorter periods are not shown. For example, even though figure 36 shows that

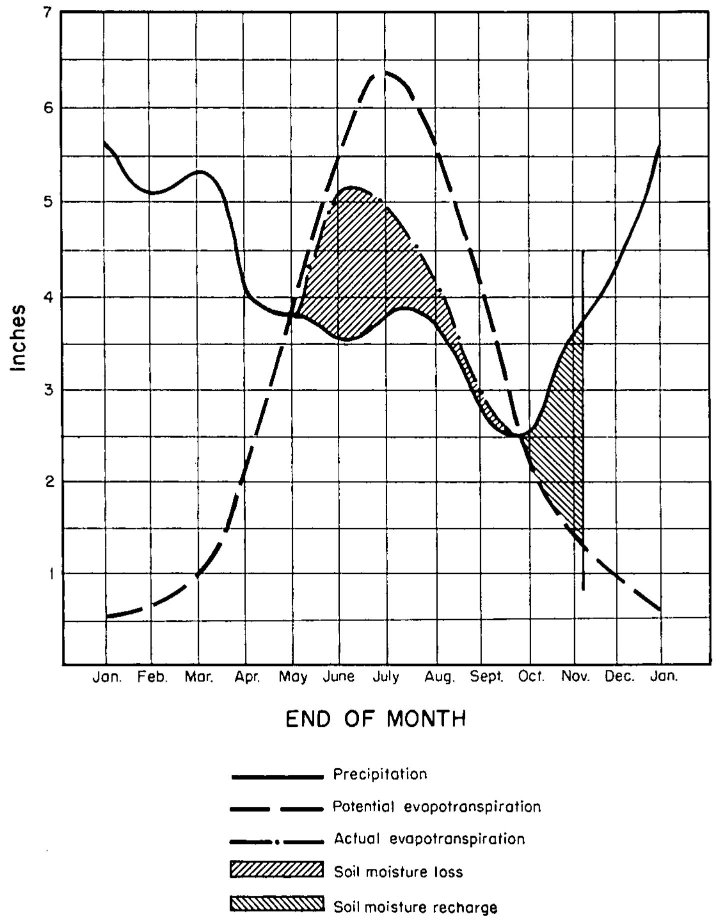


*Figure 36.*—**The average monthly water balance, at Franklin, Tennessee.**

precipitation exceeds evapotranspiration in the spring, the soil is at field capacity only after it is saturated by heavy rains. Usually there are a few days between rains in which the soil is dry enough to cultivate. Also, conditions vary considerably from year to year, mostly because the amount of rainfall varies.

### *Severe storms*

Severe storms have been fairly infrequent in Williamson County. Only seven tornadoes have been reported in the county during the period 1916–1960. The area is too far inland for tropical storms to cause much damage. Thunderstorms occur only about 55 days a year at any one place, and most of these are in spring and summer. Hailstorms occur at a given locality about twice a year, generally in the spring.

### *Humidity, wind, and clouds*

The average annual relative humidity for Williamson County is about 70 percent. Since relative humidity rises or falls inversely as the temperature rises or falls, it is highest early in the morning and lowest early in the afternoon. Also, relative humidity is highest in winter and lowest in spring.

For the year, the prevailing direction of the wind is south. The average speed of the wind is about 8 miles per hour. The average wind speed varies from about 10 miles per hour in March to about 6 miles per hour in August.

On the average, 0.6 of the sky is covered with clouds between sunrise and sunset. The range is from about 0.7 in winter to about 0.5 in summer. Thus, sunshine is abundant during the growing season because there are fewer clouds and many hours of daylight.

## Agriculture

Williamson County has been agricultural since the first white settlers arrived. According to the 1960 census, about 72 percent of the population is rural, but only about 49 percent of the rural population is rural farm. The remaining 51 percent is rural nonfarm. The Census of Agriculture reports that, in 1954, 70 percent of the farms were operated by owners, but only about 64 percent of all farm operators could be classified as full-time farmers. In 1959, only 56 percent of all farmers were full-time farmers, and 44 percent were part time. Based on the 1954 Census of Agriculture, farms in the eastern two-thirds of the county are classified as residential, dairy, tobacco, livestock, and part time; and farms in the western third are classified as residential, livestock, and part time (*8*).

### *Farms and farm tenure*

In increasing numbers, farmers in Williamson County are combining small farms to make larger ones; are supplementing their farm income with off-the-farm employment; and are mechanizing their farms. Also, an increasing number of businessmen are investing in farmland.

From 1940 to 1959 the number of farms, farm owners, and tenant farmers steadily decreased, while the average size of farms and the number of part-time farmers increased. To a great extent, these trends can be attributed to the nearness of industries in and around Nashville in adjoining Davidson County. These trends are indicated in table 11 by data from the 1959 Census of Agriculture.

TABLE 11.—*Farms, farm tenure, and farm operators*

| Farms by number, tenure, size, and kinds of operators— | 1940 | 1950 | 1959 |
|---|---|---|---|
| Farms……number.. | 3, 534 | 2, 979 | [1]1, 986 |
| Average size of farm……acres.. | 94. 1 | 109. 9 | 139. 3 |
| Farm owners……number.. | 1, 899 | 1, 689 | 1, 222 |
| Tenant farmers……number.. | 1, 431 | 855 | 414 |
| Farmers working off of farms 100 days or more a year……number.. | 737 | 605 | 726 |
| Farmers with other income exceeding farm income……number.. | ([2]) | 764 | 868 |

[1] In 1959 the definition used for a farm was more restrictive than that previously used and accounts for 16 percent of the decrease since 1950, or for 106 farms.
[2] Not reported.

In 1959 about 62 percent of the farms was operated by full owners; 16 percent, by part owners; and 21 percent, by tenants. Only 1 percent was operated by managers. A few farms are rented for cash, but under the common rental agreement the tenant furnishes all labor and pays his rent with part of the crops, part of the livestock, or part of both.

The rapid mechanization of farms in the county is indicated by the rapid increase in the number of tractors. In 1959 there were 1,537 tractors on 52 percent of the farms, as compared to 985 tractors used on 26 percent of the farms in 1950, and 246 tractors used on 6 percent of the farms in 1940. In 1959 there were also 101 cornpickers on 100 farms, 227 grain combines on 213 farms, 97 field forage harvesters on 97 farms, 192 pickup hay balers on 191 farms, and 956 motortrucks on 821 farms.

### *Land use and type of farms*

In recent years land use and types of farms have changed significantly in Williamson County. A large acreage of cropland is now used for pasture; a large acreage of woodland has been cleared; a large acreage of farmland has been converted to residential, urban, and industrial use; and farming has become more diversified.

Data from the Census of Agriculture listed in table 12 show the changes in agricultural use of land from 1949 to 1959. Between those years the acreage of all agricultural land decreased, except acreage of cropland used for pasture.

TABLE 12.—*Use of farm land in stated years*

| Land use | 1949 | 1959 | Change |
|---|---|---|---|
| | *Acres* | *Acres* | *Acres* |
| Cropland harvested | 95, 496 | 62, 772 | −32, 724 |
| Cropland not harvested and not pastured | 17, 524 | 12, 381 | −5, 143 |
| Cropland used only for pasture | 49, 173 | 75, 567 | +26, 394 |
| Pasture not cropland and not woodland | 42, 939 | 29, 335 | −13, 604 |
| Woodland pastured | 66, 372 | 53, 914 | −12, 458 |
| Woodland not pastured | 39, 783 | 28, 937 | −10, 846 |
| Other land in farms | 15, 972 | 13, 795 | −2, 177 |
| Total land in farms | 327, 259 | 276, 701 | −50, 558 |

The number of farms by types of farms and the changes from 1949 to 1959 are given in table 13. All types of farms decreased in number. A part of these changes resulted from a change in the definition of a farm, but many of the changes resulted from the increase of nonfarm and urban population in the county. The decrease in the number of field-crop and general farms is significant.

The trend in the county is toward an increase in livestock farms, especially farms for beef production. This trend is reflected in the rather small change in the number of livestock farms after the more restrictive definition of a farm was applied in 1959.

TABLE 13.—*Number of farms by types in 1949 and 1959*

| Type of farms | 1949 | 1959 | Change |
|---|---|---|---|
| Field crop | 532 | 171 | −361 |
| Dairy | 497 | 397 | −100 |
| Livestock | 407 | 361 | −46 |
| Vegetable | 45 | 0 | −45 |
| Poultry | 25 | 20 | −5 |
| General | 485 | 192 | −293 |
| Miscellaneous and unclassified | 988 | 845 | −143 |
| Total | 2, 979 | 1, 986 | −993 |

### *Farm crops*

In Williamson County corn, small grains, tobacco, and hay are grown in the largest total acreages. Burley tobacco is the principal cash crop. In 1954 the county was among the 10 leading counties of Tennessee in acreages of tobacco, wheat, oats, barley, and hay. By 1959, however, the county was eleventh in the State in acreage of tobacco. Table 14 shows the acreage of the principal crops in 1939, 1949, and 1959, as reported by the Census of Agriculture.

From 1939 to 1959, the greatest changes in crop acreage were the decreased acreages of corn and wheat. On the other hand, corn and sorghum cut for silage increased from 599 acres in 1949 to 2,570 acres in 1959. From 1949 to 1959, the reductions in acreage allotments and the Soil Bank Program had a significant effect on the acreage of some crops. The acreages of most crops, however, were decreased mainly because less farm labor was available and the trend was toward increased livestock farming.

TABLE 14.—*Acreages of principal crops*

| Crop | 1939 | 1949 | 1959 |
|---|---|---|---|
| | *Acres* | *Acres* | *Acres* |
| Corn for all purposes | 44, 474 | 28, 548 | 15, 370 |
| Wheat harvested for grain | 14, 275 | 10, 878 | 3, 821 |
| Oats harvested for grain | 2, 197 | 6, 633 | 4, 371 |
| Barley harvested for grain | 5, 806 | 6, 969 | 2, 629 |
| Tobacco | 2, 690 | 2, 833 | 1, 844 |
| Hay crops, total | 39, 551 | 34, 969 | 29, 260 |
| Alfalfa and alfalfa mixtures cut for hay | 2, 608 | 8, 506 | 5, 651 |
| Clover, timothy, and mixtures of grasses cut for hay | 741 | 1, 049 | 3, 148 |
| Lespedeza cut for hay | 32, 869 | 19, 952 | 13, 215 |
| Small grains cut for hay | 623 | 3, 714 | 3, 861 |
| Other hay cut | 2, 710 | 1, 748 | 3, 385 |
| Sorghum for all purposes except sirup | 1, 240 | 1, 060 | 2, 296 |

Most farmers of Williamson County produce feed for their livestock and food for home use. The corn, small grains, and hay are used mostly on the farm. The farmers sell all tobacco, nearly all wheat, about 25 percent of the oats and barley, and less than 10 percent of the hay.

Yields of most crops have been increased, mainly by an increased use of soil testing, of fertilizers, and of improved hybrids. Yields of most crops, especially of corn and alfalfa, can be further increased by a better selection of soil.

Burley tobacco is the principal cash crop, ranking second to dairy products as a source of farm income. It is generally grown on the best soils. Yields, however, are low, mainly because of improper fertilization and management. Practically all tobacco is sold by auction at Franklin.

Nearly all small grains are used as supplemental pasture before the crops are combined or threshed. Most farmers tend to overgraze small grains by grazing them too long in the spring. This generally accounts for the low yields of oats and barley.

Annual lespedeza, the principal hay crop, amounts to about 45 percent of all hay grown in the county and is grown on nearly all the soils. A common practice in seeding lespedeza for hay is to overseed it on small grain early in spring after the small grain has been harvested. Alfalfa is generally grown on the better soils, which are managed at a higher level than are the soils used for other hay crops. Some soybeans and oats are grown for hay, and pasture clippings of fescue, orchardgrass, and whiteclover are used rather extensively for hay.

### *Pasture*

A large acreage is used for pasture in Williamson County. Most of the pasture is permanent, but some is in rotations. According to the 1958 Conservation Needs Inventory, about 90 percent of the permanent pasture was on soils in class I through class IV, but a large acreage was on soils in other classes and was strongly sloping, eroded, shallow, and rocky. Much of the pasture is unimproved and poorly managed, but recently pasture has been improved by liming, fertilizing, and using better seed mixtures. Plants most common in permanent pasture are bluegrass, fescue, orchardgrass, lespedeza, whiteclover, and alfalfa. On many dairy farms, sudangrass and millet are grown for supplemental pasture. Small grains and crimson clover are commonly grown for grazing in winter and early in spring.

### *Livestock and livestock products*

Livestock and dairy farming are the most important sources of farm income. Livestock farms are increasing, especially those that produce beef. The main kinds of livestock are beef cattle, dairy cattle, hogs, sheep, and chickens. Of lesser importance is the Tennessee Walking Horse, but it contributes to the income of several farms. Williamson County is among the leading counties in the State in the production of beef cattle, milk cows, sheep, horses, and mules (*12*). Table 15 shows the number of livestock on farms in the county, according to the Census of Agriculture.

TABLE 15.—*Number of livestock on farms*

| Livestock | 1939 | 1949 | 1959 |
|---|---|---|---|
| | *Number* | *Number* | *Number* |
| Cattle and calves | [1] 25, 863 | 40, 790 | 46, 650 |
| Milk cows | 13, 108 | 17, 194 | 12, 827 |
| Swine | [2] 23, 082 | 27, 560 | 24, 601 |
| Sheep and lambs | [3] 22, 983 | 25, 294 | 13, 804 |
| Horses and mules | [1] 9, 950 | 7, 168 | 3, 138 |
| Chickens | [2] 146, 942 | [2] 125, 017 | [2] 96, 373 |

[1] Over 3 months old.
[2] Over 4 months old.
[3] Over 6 months old.

## Industries and Markets

Nashville, in adjoining Davidson County, is the principal market for the agricultural products of Williamson County, but in and around Franklin there are three tobacco warehouses, a dairy, a creamery, a cheese plant, a poultry processing plant, and a cold storage locker. Probably the most important of these are the tobacco warehouses, where more than 4 million pounds of burley tobacco are sold each year. About half of this is grown in Williamson County. In addition to the plants for processing agricultural products, there are lumber mills, phosphate strip mines, and limestone quarries near Franklin.

## *Glossary*

**Aggregate, soil.** Many fine soil particles held in a single mass or cluster such as in the form of a clod, crumb, block, or prism.

**Alluvium.** Sand, mud, and other sediments deposited on land by streams.

**Available moisture capacity.** The capacity of a soil to supply water to plants at rates significant to their growth. Characteristics of the soil important in determining available moisture capacity are slope, rate of infiltration, moisture retentiveness, drainage, and depth of the soil.

**Chert.** A structureless form of silica, closely related to flint, that breaks into angular fragments. Soils that developed from impure limestone containing fragments of chert and that have abundant quantities of these fragments in the soil mass are called cherty soils.

**Clay.** As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt (*16*).

**Clay film.** A thin coating of clay on the surface of a soil aggregate; clay coat; clay skin.

**Colluvium.** Soil material, rock fragments, or both, moved by creep, slide, and local wash and deposited near the base of steep slopes. Colluvial soils develop in this material.

**Consistence, soil.** The combination of properties of soil material that determines its resistance to crushing and its ability to be molded or changed in shape. Because consistence varies with moisture content, a soil aggregate may be hard when dry and plastic when wet. Terms commonly used to describe consistence are:

*Compact.* Soil material is dense and has firm consistence and close packing or arrangement of soil particles.

*Firm.* When moist, soil material crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

*Friable.* When moist, soil material crushes easily under gentle to moderate pressure between thumb and forefinger, and can be pressed together into a lump.

*Hard.* When dry, soil material resists pressure moderately, is barely breakable between thumb and forefinger, but can be broken in the hands without difficulty.

*Loose.* Noncoherent; will not hold together in a mass.

*Plastic.* When wet, soil material forms wirelike shape if rolled between thumb and forefinger; moderate pressure is required to deform the soil mass.

*Sticky.* When wet, soil material adheres to other material; if pressed between thumb and forefinger and pressure is released, material tends to stretch somewhat and pull apart instead of pulling free from the thumb or forefinger.

**Creep, soil.** The downward movement of soil and soil material, primarily through the action of gravity. The movement is generally slow and irregular. It occurs most commonly when the lower part of the soil is nearly saturated, and it may be facilitated by alternate freezing and thawing.

**Eluviation.** The movement of material from one place to another within the soil, in true solution or colloidal suspension. Soil horizons that have lost material through eluviation are referred to as *eluviated;* those that have received material, as *illuviated.*

**Erosion.** The wearing away of the land surface by water, wind, or other geological agents.

**Fertility, soil.** The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of plants when light, moisture, temperature, and other factors are favorable.

**First bottom.** The normal flood plain of a stream; generally subject to frequent or occasional flooding.

**Fragipan.** A dense, brittle subsurface horizon very low in organic matter and clay but rich in silt or very fine sand. When dry, the layer seems to be cemented, is hard or very hard, and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick and generally occur below the B horizon, 15 to 40 inches from the surface.

**Genesis, soil.** The manner in which the soil originated, with special reference to the processes responsible for the development of the solum from the unconsolidated parent material.

**Great soil group.** Any one of several broad groups of soils with fundamental characteristics in common. Examples are Chernozem, Red-Yellow Podzolic, and Planosol.

**Hardpan.** A hardened or cemented soil horizon or layer. The soil material may be sandy or clayey and may be cemented by iron oxide, silica, calcium carbonate, or other substances.

**Horizon, soil.** A layer of soil, approximately parallel to the soil surface, with distinct characteristics produced by soil-forming processes.

*Horizon A.* The upper part of the soil consisting of (1) one or more mineral horizons with accumulation of organic matter; or (2) horizons that have lost clay, iron, or aluminum and, as a result, have a concentration of other more resistant minerals; or (3) horizons belonging to both of these categories. This horizon is generally divided into two or more subhorizons, of which the A0 is not a part of the mineral soil but consists of an accumulation of organic debris on the surface. Other subhorizons are designated as A1, A2, and A3.

*Horizon B.* The horizon of deposition, to which materials have been added by percolating water; the illuviated part of the solum; the subsoil. This horizon may also be divided into subhorizons, depending on color, structure, consistence, or are designated as B1, B2, B3, and so on.

*Horizon C.* A mineral horizon or layer, excluding bedrock, that consists of unconsolidated material and has been affected relatively little by the soil-forming processes; usually the parent material.

*Horizon D.* Underlying substratum.

**Loess.** Geological deposit of relatively uniform, fine material that is mostly silt and presumably was transported by wind.

**Microclimate.** The local climatic conditions near the ground resulting from the modification of the general climate by local differences in elevation, exposure, and cover.

**Morphology, soil.** The physical constitution of the soil expressed in the kinds of horizons, their thickness and arrangement in the profile, and their color, texture, structure, consistence, and other chemical and biological properties.

**Mottles, soil.** Irregular spots or patches of different colors. Mottles are described by abundance, size, and grade or distinctness.

**Pan.** A layer of soil that is firmly compacted or is rich in clay. Examples are *hardpan, fragipan, claypan,* and *traffic pan.*

**Parent material.** The horizon of weathered rock or partly weathered soil material from which soil has formed; horizon C in the profile.

**Parent rock.** The rock from which the parent materials of soils are formed.

**Ped.** An individual natural soil aggregate such as a crumb, granule, block, or prism, in contrast to a clod.

**Permeability.** The quality of a soil that enables water and air to move through it. Permeability is measured in terms of flow of water through a unit cross section of saturated soil in unit time. Rates are expressed in inches per hour, as follows:

| | *Inches per hour* |
|---|---|
| Slow | Less than 0.2 |
| Moderately slow | 0.2 to 0.8 |
| Moderate | 0.8 to 2.5 |
| Moderately rapid | 2.5 to 5.0 |
| Rapid | More than 5.0 |

**Phase, soil.** The subdivision of a soil type made because of differences within the type that affect management but do not justify the establishment of a new type; a mapping unit. The variations are chiefly in slope, stoniness, or erosion.

**Poorly graded soil (engineering).** A soil material consisting mainly of particles nearly the same size. Because there is little difference in the size of the particles in poorly graded soil material, density can be increased only slightly by compaction.

**Productivity, soil.** The capability of a soil to produce a specified plant or sequence of plants under a defined system of management.

**Profile, soil.** A vertical section of a soil extending through all of its horizons into the parent material.

**Reaction.** The degree of acidity or alkalinity of a soil expressed in words and in pH values as follows:

| | *pH* | | *pH* |
|---|---|---|---|
| Extremely acid | below 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 | Very strongly alkaline | 9.1 and higher |

**Relief.** The elevations or inequalities of the land surface, considered collectively.

**Residual material.** Unconsolidated, partly weathered mineral material that accumulates over disintegrating solid rock. Residual material is not soil but is frequently the material in which a soil has formed.

**Sand.** As a soil separate, particles ranging in diameter from 0.05 millimeter to 2.0 millimeters. As a textural class, soil material that is 85 percent or more sand and not more than 10 percent clay.

**Series, soil.** A group of soils formed from the same kind of parent material and having genetic horizons that, except for the texture of the surface soil, are similar in differentiating characteristics and arrangement in the profile.

**Silt.** As a soil separate, individual mineral particles ranging in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of sand (0.05 millimeter). As a textural class, soil material that is 80 percent or more silt and less than 12 percent clay.

**Soil.** A natural, three-dimensional body that supports plants on the earth's surface. Soil has properties that result from the integrated effect of climate and living matter acting upon parent material that has been conditioned by relief over a period of time.

**Solum.** That part of a soil profile, above the parent material, in which processes of soil formation are active. In mature soils the solum includes the A and B horizons.

**Structure, soil.** The arrangement of individual soil particles into aggregates. Soil structure is described according to grade, class, and type.

*Grade.* Distinctness or strength of aggregation, described as structureless (single grain or massive), weak, moderate, and strong.

*Class.* Size of soil aggregates, described as very fine or very thin, fine or thin, medium, coarse or thick, and very coarse or very thick.

*Type.* Shape of aggregates, described as platy, prismatic, columnar, blocky, subangular blocky, granular, and crumb.

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

**Substratum.** Any layer beneath the solum, or true soil; the parent material and other layers below the B horizon; the C or D horizon.

**Surface layer.** A term used in nontechnical soil descriptions for one or more layers above the subsoil; includes the A horizon and part of the B horizon, but has no depth limit.

**Terrace, geological.** An old alluvial plain, generally flat or undulating, bordering a stream; frequently called a second bottom, as contrasted with a first bottom or flood plain; seldom flooded.

**Texture, soil.** The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportions of fine particles are as follows: sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

**Topsoil.** A presumed fertile soil or soil material, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

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

**Upland, geologic.** Land consisting of materials unworked by water in recent geological time and ordinarily lying at higher elevations than the alluvial plains or stream terraces.

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## GUIDE TO MAPPING UNITS

| Map symbol | Mapping unit | Page | Capability unit Symbol | Capability unit Page | Woodland suitability group Number | Woodland suitability group Page |
|---|---|---|---|---|---|---|
| AcB | Armour cherty silt loam, 2 to 5 percent slopes | 10 | IIe-3 | 51 | 1 | 68 |
| AcC2 | Armour cherty silt loam, 5 to 12 percent slopes, eroded | 10 | IIIe-4 | 54 | 1 | 68 |
| AcD2 | Armour cherty silt loam, 12 to 20 percent slopes, eroded | 10 | IVe-3 | 57 | 1 | 68 |
| AmC3 | Armour cherty silty clay loam, 5 to 12 percent slopes, severely eroded | 10 | IVe-3 | 57 | 1 | 68 |
| ArA | Armour silt loam, 0 to 2 percent slopes | 11 | I-1 | 49 | 1 | 68 |
| ArB | Armour silt loam, 2 to 5 percent slopes | 11 | IIe-1 | 50 | 1 | 68 |
| ArB2 | Armour silt loam, 2 to 5 percent slopes, eroded | 11 | IIe-1 | 50 | 1 | 68 |
| ArC | Armour silt loam, 5 to 12 percent slopes | 11 | IIIe-1 | 53 | 1 | 68 |
| ArC2 | Armour silt loam, 5 to 12 percent slopes, eroded | 11 | IIIe-1 | 53 | 1 | 68 |
| AtC3 | Armour silty clay loam, 5 to 12 percent slopes, severely eroded | 11 | IVe-1 | 56 | 1 | 68 |
| AwB | Ashwood silty clay loam, 2 to 5 percent slopes | 12 | IIIe-2 | 53 | 2 | 69 |
| AwC | Ashwood silty clay loam, 5 to 12 percent slopes | 12 | IVe-2 | 56 | 2 | 69 |
| AwD | Ashwood silty clay loam, 12 to 20 percent slopes | 12 | VIe-2 | 58 | 2 | 69 |
| BaC | Baxter cherty silt loam, 5 to 12 percent slopes | 13 | IIIe-4 | 54 | 6 | 70 |
| BaD | Baxter cherty silt loam, 12 to 20 percent slopes | 12 | IVe-3 | 57 | 6 | 70 |
| BaD2 | Baxter cherty silt loam, 12 to 20 percent slopes, eroded | 12 | IVe-3 | 57 | 6 | 70 |
| BaE | Baxter cherty silt loam, 20 to 30 percent slopes | 13 | VIe-1 | 58 | 6 | 70 |
| BcC3 | Baxter cherty silty clay loam, 5 to 12 percent slopes, severely eroded | 13 | IVe-3 | 57 | 6 | 70 |
| BcD3 | Baxter cherty silty clay loam, 12 to 20 percent slopes, severely eroded | 13 | VIe-1 | 58 | 6 | 70 |
| BoC | Bodine cherty silt loam, 5 to 12 percent slopes | 14 | VIs-1 | 59 | 6 | 70 |
| BoD | Bodine cherty silt loam, 12 to 20 percent slopes | 14 | VIs-1 | 59 | 6 | 70 |
| BoE | Bodine cherty silt loam, 20 to 45 percent slopes | 14 | VIIs-1 | 59 | 6 | 70 |
| BrB2 | Braxton cherty silt loam, 2 to 5 percent slopes, eroded | 14 | IIIe-2 | 53 | 2 | 69 |
| BrC2 | Braxton cherty silt loam, 5 to 12 percent slopes, eroded | 15 | IVe-2 | 56 | 2 | 69 |
| BrD2 | Braxton cherty silt loam, 12 to 20 percent clopes, eroded | 15 | VIe-2 | 58 | 2 | 69 |
| BsC3 | Braxton cherty silty clay loam, 5 to 12 percent slopes, severely eroded | 15 | VIe-2 | 58 | 3 | 69 |
| BsD3 | Braxton cherty silty clay loam, 12 to 20 percent slopes, severely eroded | 15 | VIe-2 | 58 | 3 | 69 |
| CaA | Captina silt loam, phosphatic, 0 to 2 percent slopes | 16 | IIw-2 | 52 | 5 | 69 |
| CaB | Captina silt loam, phosphatic, 2 to 5 percent slopes | 15 | IIe-2 | 51 | 5 | 69 |
| CaB2 | Captina silt loam, phosphatic, 2 to 5 percent slopes, eroded | 16 | IIe-2 | 51 | 5 | 69 |
| CaC2 | Captina silt loam, phosphatic, 5 to 12 percent slopes, eroded | 16 | IIIe-3 | 54 | 5 | 69 |
| CfD2 | Culleoka flaggy loam, 12 to 20 percent slopes, eroded | 17 | VIs-1 | 59 | none | ---- |
| CfE2 | Culleoka flaggy loam, 20 to 30 percent slopes, eroded | 17 | VIs-1 | 59 | 1 | 68 |
| CkC | Culleoka silt loam, 5 to 12 percent slopes | 18 | IIIe-1 | 53 | 1 | 68 |
| CkD | Culleoka silt loam, 12 to 20 percent slopes | 18 | IVe-1 | 56 | 1 | 68 |
| CkD3 | Culleoka silt loam, 12 to 20 percent slopes, severely eroded | 18 | VIe-1 | 58 | 1 | 68 |
| CkE | Culleoka silt loam, 20 to 35 percent slopes | 17 | VIe-1 | 58 | 1 | 68 |
| CkE3 | Culleoka silt loam, 20 to 35 percent slopes, severely eroded | 18 | VIe-1 | 58 | 1 | 68 |
| DeD | Dellrose cherty silt loam, 12 to 20 percent slopes | 18 | IVe-3 | 57 | 1 | 68 |
| DeE | Dellrose cherty silt loam, 20 to 30 percent slopes | 19 | VIe-1 | 58 | 1 | 68 |
| DeE3 | Dellrose cherty silt loam, 20 to 30 percent slopes, severely eroded | 19 | VIIe-1 | 59 | 1 | 68 |
| DeF | Dellrose cherty silt loam, 30 to 40 percent slopes | 19 | VIIe-1 | 59 | 1 | 68 |
| DeF3 | Dellrose cherty silt loam, 30 to 40 percent slopes, severely eroded | 19 | VIIe-1 | 59 | 1 | 68 |
| DkB | Dickson silt loam, 2 to 5 percent slopes | 19 | IIe-2 | 51 | 5 | 69 |
| DnB | Donerail silt loam, 2 to 5 percent slopes | 20 | IIe-2 | 51 | 5 | 69 |
| DnB2 | Donerail silt loam, 2 to 5 percent slopes, eroded | 20 | IIe-2 | 51 | 5 | 69 |
| DnC2 | Donerail silt loam, 5 to 12 percent slopes, eroded | 20 | IIIe-3 | 54 | 5 | 69 |
| DoB2 | Donerail silt loam, concretionary, 2 to 5 percent slopes, eroded | 21 | IIe-2 | 51 | 5 | 69 |
| DoC2 | Donerail silt loam, concretionary, 5 to 12 percent slopes, eroded | 20 | IIIe-3 | 54 | 5 | 69 |
| DsB | Dowellton silt loam, 2 to 5 percent slopes | 21 | IIIe-5 | 55 | 11 | 71 |
| Du | Dunning silt loam, phosphatic | 21 | IIIw-1 | 55 | 9 | 70 |
| Eg | Egam silt loam, phosphatic | 22 | IIw-1 | 52 | 8 | 70 |
| EtB | Etowah silt loam, 2 to 5 percent slopes | 22 | IIe-1 | 50 | 1 | 68 |
| EtC2 | Etowah silt loam, 5 to 12 percent slopes, eroded | 22 | IIIe-1 | 53 | 1 | 68 |
| FaC | Fairmount silty clay loam, 2 to 10 percent slopes | 23 | IIIe-5 | 55 | 2 | 69 |
| FrC | Frankstown cherty silt loam, 5 to 12 percent slopes | 23 | IIIe-4 | 54 | 6 | 70 |
| FrD | Frankstown cherty silt loam, 12 to 20 percent slopes | 24 | IVe-3 | 57 | 6 | 70 |
| GrC | Greendale cherty silt loam, 2 to 12 percent slopes | 24 | IIIe-4 | 54 | 8 | 70 |
| GsB | Greendale silt loam, 2 to 5 percent slopes | 24 | I-2 | 49 | 8 | 70 |
| Gu | Gullied land | 24 | VIIe-1 | 59 | 12 | 71 |
| HaB2 | Hagerstown silt loam, 2 to 5 percent slopes, eroded | 25 | IIe-1 | 50 | 1 | 68 |
| HaC2 | Hagerstown silt loam, 5 to 12 percent slopes, eroded | 25 | IIIe-1 | 53 | 1 | 68 |
| HbB | Hampshire silt loam, 2 to 5 percent slopes | 26 | IIIe-2 | 53 | 2 | 69 |
| HbB2 | Hampshire silt loam, 2 to 5 percent slopes, eroded | 26 | IIIe-2 | 53 | 2 | 69 |
| HbC2 | Hampshire silt loam, 5 to 12 percent slopes, eroded | 26 | IVe-2 | 56 | 2 | 69 |
| HbD2 | Hampshire silt loam, 12 to 20 percent slopes, eroded | 26 | VIe-2 | 58 | 2 | 69 |
| HcC3 | Hampshire silty clay loam, 5 to 12 percent slopes, severely eroded | 26 | VIe-2 | 58 | 3 | 69 |
| HcD3 | Hampshire silty clay loam, 12 to 20 percent slopes, severely eroded | 26 | VIe-2 | 58 | 3 | 69 |
| HeB2 | Hampshire-Colbert silt loams, 2 to 5 percent slopes, eroded | 27 | IIIe-2 | 53 | 2 | 69 |
| HeC2 | Hampshire-Colbert silt loams, 5 to 12 percent slopes, eroded | 27 | IVe-2 | 56 | 2 | 69 |
| HeD2 | Hampshire-Colbert silt loams, 12 to 20 percent slopes, eroded | 27 | VIe-2 | 58 | 2 | 69 |
| HhC3 | Hampshire-Colbert silty clay loams, 5 to 12 percent slopes, severely eroded | 27 | VIe-2 | 58 | 3 | 69 |
| HhD3 | Hampshire-Colbert silty clay loams, 12 to 20 percent slopes, severely eroded | 28 | VIe-2 | 58 | 3 | 69 |
| HmB | Hermitage silt loam, 2 to 5 percent slopes | 28 | IIe-1 | 50 | 1 | 68 |
| HmB2 | Hermitage silt loam, 2 to 5 percent slopes, eroded | 28 | IIe-1 | 50 | 1 | 68 |

## GUIDE TO MAPPING UNIT—Continued

| Map symbol | Mapping unit | Page | Capability unit: Symbol | Capability unit: Page | Woodland suitability group: Number | Woodland suitability group: Page |
|---|---|---|---|---|---|---|
| HnB2 | Hicks silt loam, 2 to 5 percent slopes, eroded | 28 | IIe–1 | 50 | 7 | 70 |
| HnC2 | Hicks silt loam, 5 to 12 percent slopes, eroded | 29 | IIIe–1 | 53 | 7 | 70 |
| HoC3 | Hicks silty clay loam, 5 to 12 percent slopes, severely eroded | 29 | IVe–1 | 56 | 7 | 70 |
| HpB | Humphreys cherty silt loam, 2 to 5 percent slopes | 30 | IIe–3 | 51 | 1 | 68 |
| HpC2 | Humphreys cherty silt loam, 5 to 12 percent slopes, eroded | 29 | IIIe–4 | 54 | 1 | 68 |
| HpD2 | Humphreys cherty silt loam, 12 to 20 percent slopes, eroded | 30 | IVe–3 | 57 | 1 | 68 |
| HrB | Humphreys silt loam, 2 to 5 percent slopes | 30 | IIe–1 | 50 | 1 | 68 |
| HrC2 | Humphreys silt loam, 5 to 12 percent slopes, eroded | 30 | IIIe–1 | 53 | 1 | 68 |
| Hs | Huntington cherty silt loam, phosphatic | 31 | IIs–1 | 52 | 8 | 70 |
| Ht | Huntington silt loam, local alluvium | 31 | I–2 | 49 | 8 | 70 |
| Hu | Huntington silt loam, phosphatic | 31 | I–2 | 49 | 8 | 70 |
| ImC | Inman silt loam, 5 to 12 percent slopes | 32 | IVe–2 | 56 | 2 | 69 |
| ImD | Inman silt loam, 12 to 20 percent slopes | 32 | VIe–2 | 58 | 2 | 69 |
| ImE | Inman silt loam, 20 to 30 percent slopes | 32 | VIe–2 | 58 | 2 | 69 |
| InC3 | Inman silty clay loam, 5 to 12 percent slopes, severely eroded | 32 | VIe–2 | 58 | 3 | 69 |
| InD3 | Inman silty clay loam, 12 to 20 percent slopes, severely eroded | 32 | VIe–2 | 58 | 3 | 69 |
| InE3 | Inman silty clay loam, 20 to 30 percent slopes, severely eroded | 32 | VIIe–1 | 59 | 3 | 69 |
| La | Lanton silt loam, phosphatic | 33 | IIw–1 | 52 | 9 | 70 |
| Lc | Lindside cherty silt loam | 33 | IIs–1 | 52 | 8 | 70 |
| Ld | Lindside cherty silt loam, phosphatic | 33 | IIs–1 | 52 | 8 | 70 |
| Ln | Lindside silt loam | 34 | I–3 | 50 | 8 | 70 |
| Lp | Lindside silt loam, phosphatic | 34 | I–3 | 50 | 8 | 70 |
| Ma | Made land | 34 | none | ---- | 12 | 71 |
| MbA | Maury silt loam, 0 to 2 percent slopes | 35 | I–1 | 49 | 1 | 68 |
| MbB | Maury silt loam, 2 to 5 percent slopes | 35 | IIe–1 | 50 | 1 | 68 |
| MbB2 | Maury silt loam, 2 to 5 percent slopes, eroded | 35 | IIe–1 | 50 | 1 | 68 |
| MbC2 | Maury silt loam, 5 to 12 percent slopes, eroded | 35 | IIIe–1 | 53 | 1 | 68 |
| McC3 | Maury silty clay loam, 5 to 12 percent slopes, severely eroded | 35 | IVe–1 | 56 | 1 | 68 |
| Me | Melvin silt loam, phosphatic | 36 | IIIw–1 | 55 | 10 | 70 |
| MfB2 | Mercer silt loam, 2 to 5 percent slopes, eroded | 36 | IIe–2 | 51 | 5 | 69 |
| MhC2 | Mimosa cherty silt loam, 5 to 12 percent slopes, eroded | 37 | IVe–2 | 56 | 2 | 69 |
| MhD2 | Mimosa cherty silt loam, 12 to 20 percent slopes, eroded | 37 | VIe–2 | 58 | 2 | 69 |
| MhE2 | Mimosa cherty silt loam, 20 to 30 percent slopes, eroded | 37 | VIe–2 | 58 | 2 | 69 |
| MkD3 | Mimosa cherty silty clay, 10 to 20 percent slopes, severely eroded | 37 | VIe–2 | 58 | 3 | 69 |
| MkE3 | Mimosa cherty silty clay, 20 to 30 percent slopes, severely eroded | 38 | VIIe–1 | 59 | 3 | 69 |
| MlB2 | Mimosa silt loam, 2 to 5 percent slopes, eroded | 38 | IIIe–2 | 53 | 2 | 69 |
| MlC2 | Mimosa silt loam, 5 to 12 percent slopes, eroded | 38 | IVe–2 | 56 | 2 | 69 |
| MlD2 | Mimosa silt loam, 12 to 20 percent slopes, eroded | 38 | VIe–2 | 58 | 2 | 69 |
| MmD3 | Mimosa silty clay, 10 to 20 percent slopes, severely eroded | 38 | VIe–2 | 58 | 3 | 69 |
| MnE | Mimosa very rocky soils, 20 to 40 percent slopes | 39 | VIIs–1 | 59 | 4 | 69 |
| MoD | Mimosa and Ashwood very rocky soils, 5 to 20 percent slopes | 38 | VIs–1 | 59 | 4 | 69 |
| Mp | Mine pits and dumps | 39 | none | ---- | 12 | 71 |
| Mr | Mine land, reclaimed | 39 | none | ---- | 12 | 71 |
| MsB | Mountview silt loam, 2 to 5 percent slopes | 40 | IIe–1 | 50 | 7 | 70 |
| MsC2 | Mountview silt loam, 5 to 12 percent slopes, eroded | 40 | IIIe–1 | 53 | 7 | 70 |
| MvB | Mountview silt loam, shallow, 2 to 5 percent slopes | 41 | IIe–3 | 51 | 7 | 70 |
| MvB2 | Mountview silt loam, shallow, 2 to 5 percent slopes, eroded | 41 | IIe–3 | 51 | 7 | 70 |
| MvC | Mountview silt loam, shallow, 5 to 12 percent slopes | 40 | IIIe–4 | 54 | 7 | 70 |
| MvC2 | Mountview silt loam, shallow, 5 to 12 percent slopes, eroded | 40 | IIIe–4 | 54 | 7 | 70 |
| MvC3 | Mountview silt loam, shallow, 5 to 12 percent slopes, severely eroded | 41 | IVe–3 | 57 | 7 | 70 |
| MvD | Mountview silt loam, shallow, 12 to 20 percent slopes | 41 | IVe–3 | 57 | 7 | 70 |
| MvD2 | Mountview silt loam, shallow, 12 to 20 percent slopes, eroded | 41 | IVe–3 | 57 | 7 | 70 |
| Rb | Robertsville silt loam, phosphatic | 42 | IVw–1 | 57 | 11 | 71 |
| Rc | Rockland | 42 | VIIs–1 | 59 | 4 | 69 |
| Sc | Sees silty clay loam | 43 | IIw–1 | 52 | 8 | 70 |
| Se | Sequatchie loam, phosphatic | 43 | I–2 | 49 | 8 | 70 |
| SrC3 | Stiversville clay loam, 5 to 12 percent slopes, severely eroded | 44 | IVe–1 | 56 | 7 | 70 |
| SrD3 | Stiversville clay loam, 12 to 20 percent slopes, severely eroded | 44 | VIe–1 | 58 | 7 | 70 |
| StB2 | Stiversville silt loam, 2 to 5 percent slopes, eroded | 44 | IIe–1 | 50 | 7 | 70 |
| StC2 | Stiversville silt loam, 5 to 12 percent slopes, eroded | 44 | IIIe–1 | 53 | 7 | 70 |
| StD2 | Stiversville silt loam, 12 to 20 percent slopes, eroded | 44 | IVe–1 | 56 | 7 | 70 |
| SuD | Sulphura cherty silt loam, 12 to 20 percent slopes | 45 | VIs–1 | 59 | 6 | 70 |
| SuE | Sulphura cherty silt loam, 20 to 50 percent slopes | 45 | VIIs–1 | 59 | 6 | 70 |
| SuE3 | Sulphura cherty silt loam, 20 to 50 percent slopes, severely eroded | 45 | VIIs–1 | 59 | 6 | 70 |
| TaB | Taft silt loam, 0 to 8 percent slopes | 45 | IIIw–2 | 55 | 11 | 71 |
| Tb | Taft silt loam, phosphatic | 46 | IIIw–2 | 55 | 11 | 71 |
| TfB3 | Talbott silty clay, 2 to 5 percent slopes, severely eroded | 47 | IVe–2 | 56 | 3 | 69 |
| TfC3 | Talbott silty clay, 5 to 12 percent slopes, severely eroded | 47 | VIe–2 | 58 | 3 | 69 |
| TsB2 | Talbott silty clay loam, 2 to 5 percent slopes, eroded | 46 | IIIe–2 | 53 | 2 | 69 |
| TsC2 | Talbott silty clay loam, 5 to 12 percent slopes, eroded | 46 | IVe–2 | 56 | 2 | 69 |
| TvD | Talbott very rocky soils, 2 to 15 percent slopes | 47 | VIs–1 | 59 | 4 | 69 |

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